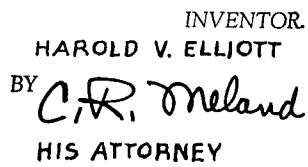


3,244,822

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April 5, 1966

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3,244,822

COMBINED PUSH-FULL ROTARY SWITCH WITH RHEOSTAT AND
THERMAL CIRCUIT BREAKER STRUCTURE

Filed Oct. 21, 1963

4 Sheets-Sheet 2

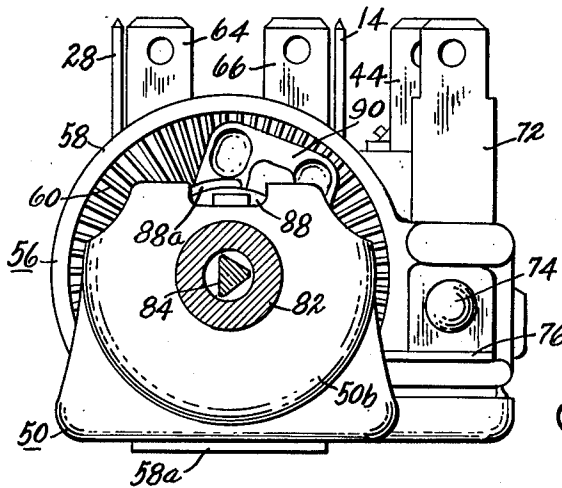


Fig. 3

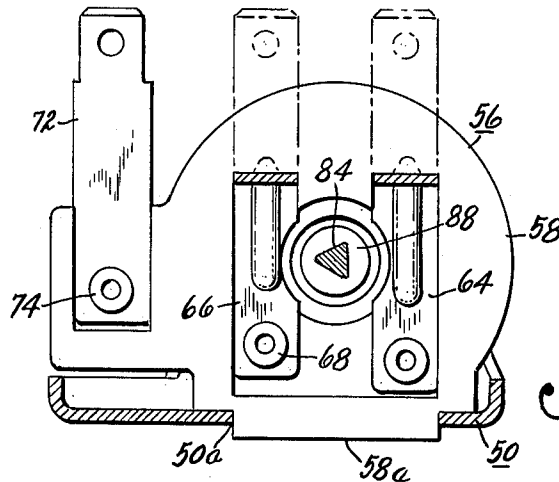


Fig. 4

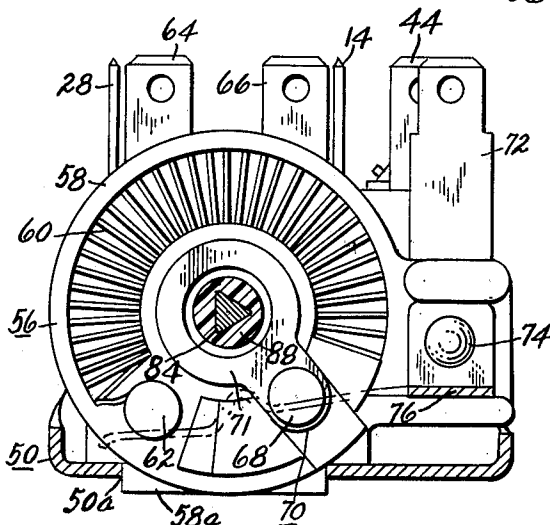


Fig. 5

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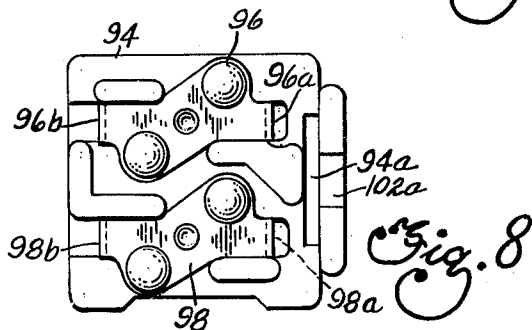
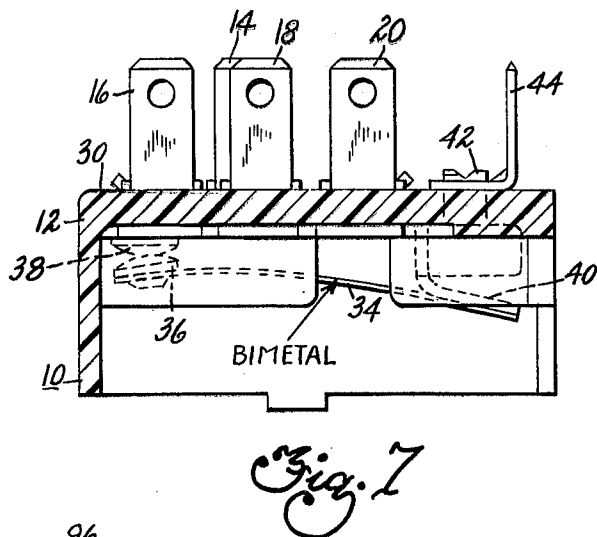
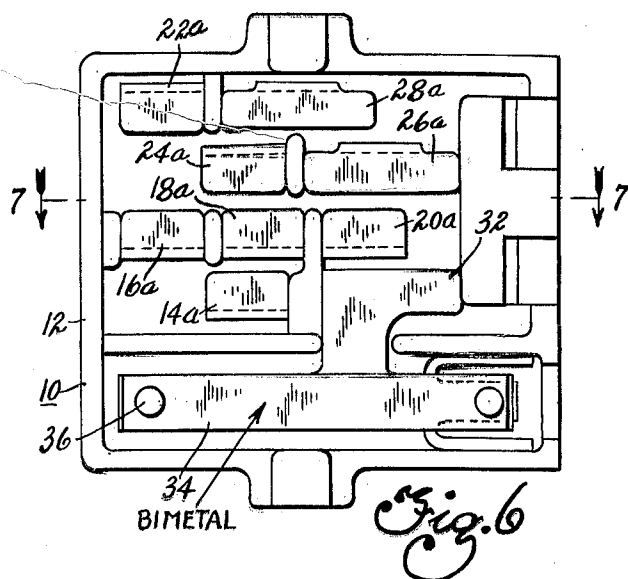
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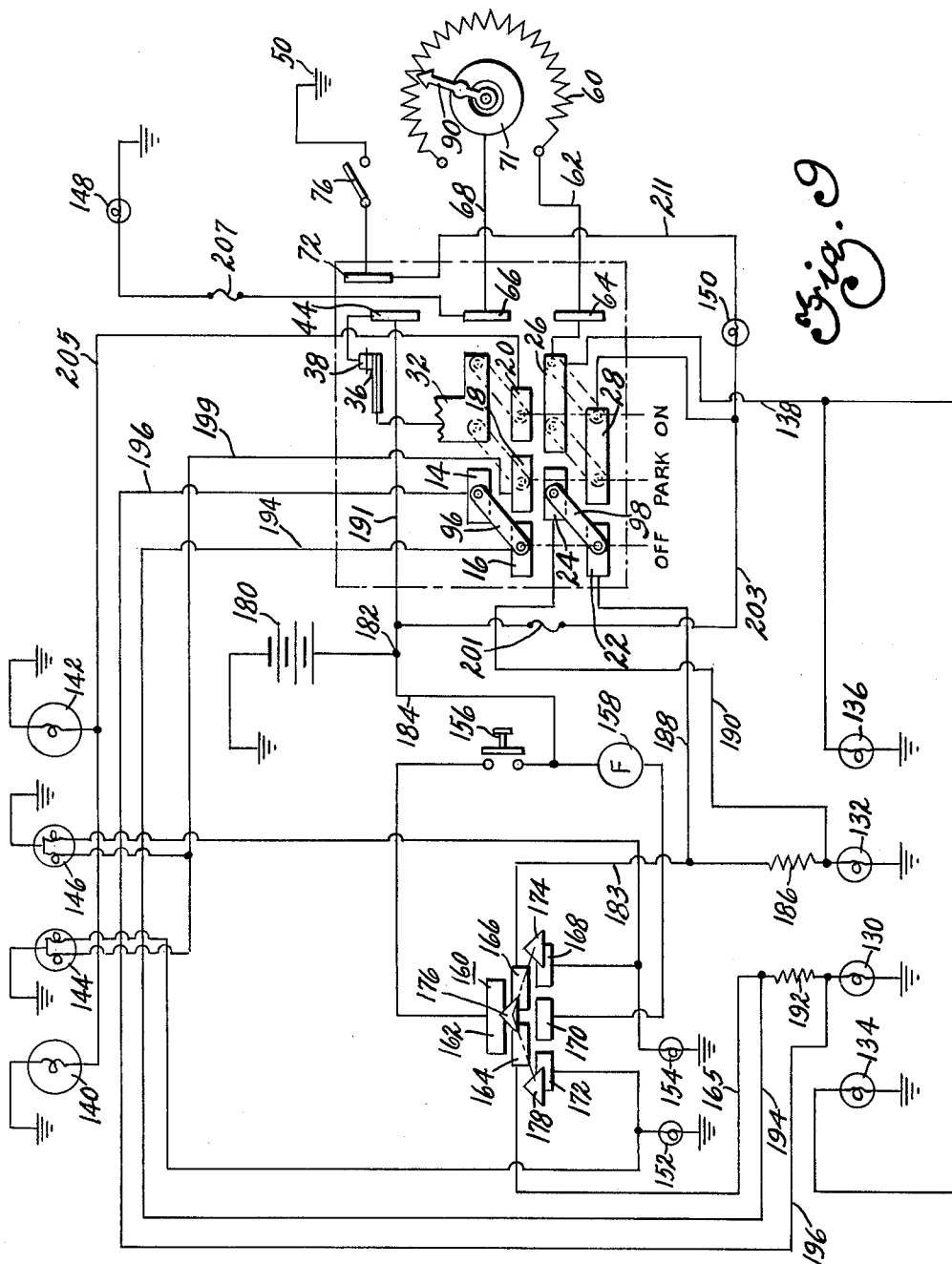


Fig. 9

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3,244,822 COMBINED PUSH-PULL ROTARY SWITCH WITH RHEOSTAT AND THERMAL CIRCUIT BREAKER STRUCTURE

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13 Claims. (Cl. 200-16)

This invention relates to a light switch for controlling a plurality of lighting circuits on a motor vehicle and more particularly to a light switch which is capable of providing a switching arrangement that can control the intensity of the light developed by certain signal lamps on a motor vehicle.

One of the objects of this invention is to provide a light control switch for a motor vehicle wherein the light control switch is capable of controlling a plurality of circuits such as the headlights, tail lights, parking lights and turn signal lights and wherein the light control device is provided with switching means for controlling a circuit that is capable of varying the intensity of certain signal lamps in accordance with the position of a shiftable contact means of the light switch.

Another object of this invention is to provide a motor vehicle light control switch which is capable of controlling the usual light circuits on a motor vehicle but which is provided with means for short circuiting a resistor in one position of the movable part of the switch and to open the short circuit around the resistor in another position of the switch to thereby control the resistance of a signal lamp circuit and therefore the intensity of the light developed by a signal lamp circuit.

A further object of this invention is to provide a light control switch which is capable of providing a dual intensity lamp system and which is manufactured from a minimum number of parts.

Another object of this invention is to provide a light control switch which has only two movable contacts and wherein these movable contacts are capable of controlling a plurality of light circuits on a motor vehicle.

A further object of this invention is to provide a light control switch which includes a dual intensity switching means which is operative to control the light intensity of certain signal lamps depending upon whether or not the movable part of the switch is in the "off" position or in the "park" or "headlight" energizing position.

Still another object of this invention is to provide a motor vehicle light control switch which is capable of controlling the usual lighting circuits on a motor vehicle and which is capable of providing a dual intensity energization for certain signal lamps by the addition of only two fixed contacts to the normal lighting switch.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings,

FIGURE 1 is a plan view of a light control switch made in accordance with this invention.

FIGURE 2 is a sectional view taken along line 2-2 of FIGURE 1.

FIGURE 3 is a sectional view taken along line 3-3 of FIGURE 2.

FIGURE 4 is a sectional view taken along line 4-4 of FIGURE 2.

FIGURE 5 is a sectional view taken along line 5-5 of FIGURE 2.

FIGURE 6 is an internal plan view of a housing which

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carries the fixed contacts of the light control switch illustrated in FIGURES 1 and 2.

FIGURE 7 is a sectional view taken along line 7-7 of FIGURE 6.

FIGURE 8 is a plan view of a contact carrier showing the two contacts of the light control switch of this invention.

FIGURE 9 is a schematic circuit diagram illustrating the use of a light control switch made in accordance with this invention in controlling the lighting circuits on a motor vehicle.

Referring now to the drawings and more particularly to FIGURES 1 and 2, the reference numeral 10 generally designates a case assembly for the electric switch of this invention. This case assembly includes a housing 12 formed of insulating material which carries a plurality of terminals 14, 16, 18, 20, 22, 24, 26 and 28. The terminals 14-28 each have integral flat sections 14a-28a which are illustrated in FIGURE 6 and which form fixed contacts for the switch of this invention. The fixed contact sections 14a-28a are located at right angles to the terminal portions of the terminals 14-28 and the terminal portions have side sections which are sheared down into engagement with the outside surface 30 of the housing 12. One pair of these side sections are designated by reference numerals 14b and 14c and the remainder of the terminals have these same sections for engaging the outside surface 30 of the housing 12. This method of forming combined terminals and fixed contacts is disclosed and claimed in the Redick, et al., patent, 2,958,069.

It can be seen from FIGURE 6 that the housing 10 carries another fixed contact 32 which is held in place by bent extensions 32a and 32b, shown in FIGURE 1. The fixed contact 32 has a section located beneath a bimetal blade 34 which carries a contact 36 that cooperates with a contact 38 that is in turn carried by the fixed contact 32. The bimetal blade 34 is secured to a bracket 40 and this bracket is fixed to the housing 10 by bent sections 42. The bent sections 42 hold a male terminal 44 in place and this male terminal 44 is therefore electrically connected with one side of the bimetal 34. The bimetal 34 serves as an overload protection for the switch.

The housing 10 is connected to a metal bracket or support generally designated by reference numeral 50. The bracket has sections 52 and 54 that are bent over extensions of the housing 10 in a manner illustrated in FIGURE 1, to secure the case 10 to the bracket 50.

The light switch of this invention includes a rheostat assembly which is generally designated by reference numeral 56. This rheostat assembly is best depicted in FIGURES 2, 3, 4 and 5. The rheostat assembly includes an annular member 54 which is formed of insulating material. This annular member has an annular slot which receives a coiled length of wire resistance material 60. One end of the coiled resistance wire 60 is connected to a rivet 62 which also serves to hold the male terminal 64 fixed with respect to the insulator 58. The insulator 58 carries another male terminal 66 which is held in place by a rivet 68. The rivet 68 holds a connector 70 in place which has an annular section 71.

The insulator 58 further carries a male terminal 72. The male terminal 72 is held in place by a rivet 74 which also serves to hold a contact arm 76 fixed with respect to the insulator 58.

The rheostat assembly 56 is secured both to the bracket or housing 50 and to the case assembly 10. Thus, the lower section 58a of the insulator 58 fits within a slot 50a formed in the bracket 50. The male terminals 64 and 66 of the rheostat assembly 56 pass through openings formed in the wall 30 of the housing 12. It is seen that

the male terminal 72 is spaced slightly from one end of the housing 12 and that a connector 80 connects the terminal 26 and the terminal 64 as is clearly depicted in FIGURE 1.

One end 50b of the bracket or housing 50 has an opening which receives a bushing 82. The bushing 82 slidably supports a triangular actuating shaft 84 which is connected with an actuating knob 86. The shaft 84 carries a driver member 88 which is formed of insulating material and which has a triangular opening that is complementary to the triangular rod 84. The driver member 88 drives and carries a contact 90 which electrically connects the annular section 71 of the connector 70 and the resistance wire 69. A spring 92 is interposed between the contactor 90 and the driver 88. The driver 88 has a cam section 88a which when rotated to a certain predetermined position will force the contact arm 75 into engagement with a portion of the metal bracket 50 so as to electrically ground the contact arm 76.

The light switch of this invention has a contact carrier which is designated by reference numeral 94 and which is formed of insulating material. The contact carrier 94 carries metal contacts 96 and 98 which are best illustrated in FIGURE 8. The contacts 96 and 98 have end sections 96a and 96b, and 98a and 98b which fit within slots formed in the contact carrier 94. These contacts are urged toward the inner face of the housing 10 by springs one of which is shown in FIGURE 2 and designated by reference numeral 100. The contact carrier 94 is slidable between case 10 and a portion of bracket 50.

The contact carrier 94 has a slot 94a which receives one end of an L-shaped latch plate 102. The latch plate 102 is spring biased toward the bracket 50 by a spring 104 that is interposed between the contact carrier 94 and the latch plate 102 and which fits within an opening in the contact carrier. The latch plate 102 has a detent projection 106 which can cooperate with the outwardly bent sections 108, 110 and 112 of the bracket 50 to provide three axially spaced detented positions for the latch plate 102 and the contact carrier 94.

The latch plate 102 has a keyhole shaped slot 102a which can clear the end 84a of the rod 84 when the latch plate is moved upwardly in FIGURE 2. In order to move the latch plate upwardly, a post 114 is provided which passes through an opening in the bracket 50 and which is spring biased to its position shown in FIGURE 2 by the spring 116. When the latch plate 102 is over the post 114, the post can shift the latch plate upwardly to release the latch plate from the slot 84b formed in the end of the rod 84. The rod 84 can be latched to the latch plate 102 by simply pushing it into the keyhole slot 102a formed in the latch plate 102.

Referring now to FIGURE 9, a schematic circuit diagram is illustrated showing the light control switch of this invention connected with various elements of a motor vehicle lighting system. In FIGURE 9, the same reference numerals have been used as were used in the other figures of the drawing to identify identical parts in each figure where appropriate.

In FIGURE 9, the reference numerals 130 and 132 designate rear direction signal and stop lamps for a motor vehicle. The lamps 134 and 136 are the tail lamps of a motor vehicle and it is seen that one side of these tail lamps are connected with conductor 138 which goes to terminal 26. Reference numerals 140 and 142 designate the headlights for the motor vehicle whereas reference numerals 144 and 146 are the front direction signal and parking lamps. The lamps 144 and 146 each have two filaments, one of which is used as parking lights and the other for direction signalling. The reference numeral 148 designates a panel lamp for the motor vehicle whereas the reference numeral 150 designates a dome lamp. Reference numerals 152 and 154 designate turn signal panel tell-tale lamps.

The system of FIGURE 9 includes a stop light switch 156 which is actuated to a close position in the usual manner when the brakes on the motor vehicle are applied. This system further includes a conventional flasher 158 and a direction signal switch generally designated by reference numeral 160.

The direction signal switch 160 has fixed contacts 162, 164, 166, 168, 170 and 172. These fixed contacts cooperate with movable contacts 174, 176 and 178 which are movable together and which are shifted in the conventional manner by a turn signal lever. The movable contacts 174, 176 and 178 are shown in their neutral position where no direction signal is indicated. These contacts can be shifted such that contact 176 connects only contacts 162 and 166 and contact 178 connects contacts 164, 170 and 172. These movable contacts can be moved in an opposite direction where contact 176 connects only contacts 162 and 164 and contact 174 connects contacts 166, 168 and 170. This type of switch is well-known to those skilled in the art.

The reference numeral 180 designates a source of direct current on a motor vehicle and as shown designates a battery on the motor vehicle. One end of the battery 180 is grounded whereas the opposite end is connected with junction 182. The junction 182 is connected with conductor 184 which feeds one side of the flasher 158 and one side of the stoplight switch 156. It is seen that an opposite side of the flasher is connected with fixed contact 170 of the direction signal switch and that the opposite side of the stoplight switch 156 is connected with fixed contact 162 of the direction signal switch.

The fixed contact 166 of the direction signal switch is connected to one side of a resistor 186. Conductors 188 and 190 are connected to opposite sides of the resistor 186 and are also connected with contacts 22 and 24 of the light control switch. It is seen that the resistor 186 is connected in series with the rear turn signal lamp 132 and that this resistor will be shorted by the movable contact 98 of the light control switch in one position of the light control switch which is the "off" position. In a similar fashion, the contact 164 of the direction signal switch 160 is connected to one side of a resistor 192. The opposite sides of resistor 192 are connected with conductors 194 and 196 which go to the fixed contacts 16 and 14 of the light control switch. When movable contact 96 is connecting fixed contacts 14 and 16, the resistor 192 is short circuited.

When the movable contacts 96 and 98 are engaging respectively fixed contacts 14 and 16 and 22 and 24, the light control switch is in its "off" position. The contact carrier 94 can be shifted to a "park" position and in this position, the movable contacts 96 and 98 connect respectively the fixed contacts 18 and 32 and 26 and 28. When the contact carrier 94 is shifted to the "on" position, the movable contact 96 connects the fixed contacts 20 and 32 and the movable contact 98 connects the fixed contacts 26 and 28. These various positions of the movable contacts 96 and 98 are illustrated by dotted lines in FIGURE 9.

With the switch in the "off" position, there is no circuit through the light control switch for the headlights 140 and 142 or for the front parking lights 144 and 146. In addition, there is no circuit for the tail lamps 134 and 136 and there is no circuit to the panel lamps 148.

If the driver now desires to indicate a turn, the fixed contacts 174, 176, and 178 are shifted in one direction, for example, leftwardly in FIGURE 9. When these contacts are shifted, the contact 174 connects the fixed contacts 166, 168 and 170 and the contact 176 leaves contact 166, but connects the contacts 162 and 164. As a result of this switching action, the rear signal lamp 132 will be intermittently energized from a circuit that can be traced from one side of the flasher 158, through contact 170, through contact 174, through contact 166, through conductor 183, through conductor 188, through

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fixed contact 22 and movable contactor 98 to fixed contact 24, from fixed contact 24 to one side of the signal light 132 through conductor 190 and through the signal light 132 to ground. It will be observed that the resistor 186 is now short circuited so that the signal lamp 132 will exhibit its greatest intensity of light.

If the headlight control switch were now in the "park" position, the contact 96 would move out of engagement with fixed contacts 14 and 16 and would engage contacts 18 and 32. Contact 98 moves out of engagement with fixed contacts 22 and 24 and becomes engaged with the fixed contacts 26 and 28. As soon as the contacts 96 and 98 become disengaged respectively from contacts 14 and 16 and contacts 22 and 24, the short circuit around the resistor 186 is open and the resistor will now be in the energizing circuit for the signal lamp 132. Thus, the signal lamp 132 will now be energized from one side of the flasher 158, through contact 170, through contact 174, through contact 166, through conductor 183, through resistor 186 and then through the signal lamp 132 to ground.

If the direction signal switch 160 had been moved to cause an energization of the rear direction signal lamp 130, the resistor 192 would be short circuited as long as the contact 96 is connecting fixed contacts 14 and 16. When contact 96 is moved to the "park" or "on" position this short circuit is opened and the direction signal lamp 130 can be energized from flasher 158, through contact 170, through contactor 178, through contact 164, through conductor 165 and through the resistor 192 and the signal lamp 130 to ground.

It can be seen from the foregoing that the resistors 186 and 192 are short circuited respectively by the contactors 96 and 98 when the light control switch is in its "off" position. When the light control switch is either in its "park" or in its "on" position, this short circuit is open since the contactors 96 and 98 in these positions no longer engage the contacts 14 and 16 and 22 and 24. With this arrangement, the lamps 130 and 132 will glow more brightly during day time operation of the motor vehicle since during the day the headlight switch will be in its "off" position. During night time operation of the light control switch, the resistors are in the circuit with the rear direction signal lamps 130 and 132 to reduce the intensity of the light developed by these lamps.

The lamps 130 and 132 are also used as the stop light lamps for the motor vehicle and this indication also has a dual intensity depending upon the position of the contact carrier 94 of the light control switch.

When the light control switch is in the "park" position, the parking filaments of the front parking and direction signal lights 144 and 146 will be energized from a circuit that can be traced from one side of the battery 180, through junction 182, through conductor 191, through terminal 44, through bimetal controlled contacts 36 and 38, through contact 32, through contactor 96 to fixed contact 18, through conductor 199 and from this conductor through the parking filaments of lamps 144 and 146 to ground. In the "park" position, the tail lamps 134 and 136 are energized from battery 180, through junction 182, through a fuse 201, through conductor 203, through fixed contact 28, through contact 98, through contact 26 and then through conductor 138 to the tail lamps 134 and 136.

In the "on" position of the switch, the head lamps 140 and 142 are energized from one side of battery 180, through conductor 191, through terminal 44, through bimetal controlled contacts 36 and 38, through contact 32, through contact 96 to contact 20, and then through conductor 205 to the head lamps 140 and 142. In the "on" position of the switch, the tail lamps are energized from one side of battery 180, through fuse 201, through conductor 203, through contact 28, through contactor 98 to contact 26, and through conductor 138 to the tail lamps 134 and 136.

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The panel lamps 148 can be energized whenever the light control switch is in either its "on" or "park" position. This circuit is from contact 26, through conductor 62, through resistance wire 60, through contactor 90, through conductor 68, through terminal 66, through fuse 207 and then through panel lamp 148 to ground. The intensity of the light of the panel lamps can be varied by rotating the contactor 90 which occurs when the shaft 84 of the light control switch is rotated.

The dome light 150 can be energized from junction 182, through fuse 201, through conductor 203, through the dome lamp 150, through conductor 211, through terminal 72, and then through the switch contact 76 when it is grounded to the metal bracket 50 of the light switch.

It will be seen from the foregoing that a light control switch has been provided which is capable of controlling the head lamps, front parking lamps, rear parking lamps, tail lamps, panel lamps and dome lamp on a motor vehicle. In addition, the light control switch of this invention is capable of controlling the light intensity of the rear direction signal and stop lamps 130 and 132 by using the same contacts 96 and 98 that control various other lighting circuits on the motor vehicle.

While the embodiments of the present invention as herein disclosed constitute a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A light control switch for controlling the lighting system on a motor vehicle comprising, a case member, said case member carrying first and second fixed contacts which are adapted to be connected with a source of direct current and carrying third and fourth fixed contacts which are adapted to be connected respectively with the tail and head lamps of a motor vehicle, a contact carrier shiftable relative to said case member, said contact carrier carrying a pair of contacts, said contact carrier being shiftable between an off position, a park position, and an on position, and two pairs of directional signal intensity contacts carried by said case member, the contacts carried by said contact carrier respectively connecting each pair of direction signal intensity contacts only when said contact carrier is in its off position, one of said pair of contacts carried by said contact carrier in said park and in said on position connecting said first and third fixed contacts, said other of said other pair of contacts carried by said contact carrier connecting said second and fourth fixed contacts when said contact carrier is in said on position, said pairs of contacts carried by said contact carrier being disconnected from said first, second, third and fourth fixed contacts when connecting said direction signal intensity contacts.

2. A light control switch comprising, a case member formed of insulating material, said case member carrying a plurality of fixed contacts, said fixed contacts being connectible with head lamps and tail lamps on a motor vehicle, a metal bracket member carrying said case member, a contact carrier slidable between said metal bracket member and said case member carrying a pair of contacts, said pair of contacts connecting pairs of light intensity control contacts on said case member when said contact carrier is in the off position of said switch, said pairs of fixed light intensity control contacts being adapted to control the intensity of a pair of directional signal lamps in a motor vehicle lighting control system, said pair of contacts carried by said contact carrier engaging said fixed contacts when said contact carrier is shifted away from its off position and being disconnected from said fixed contacts when said pair of contacts carried by said contact carrier connects said pairs of fixed light intensity control contacts.

3. A light control switch for controlling the lighting system on a motor vehicle comprising, a case member formed of insulating material, said case member carrying first, second, third and fourth rows of fixed contacts, a contact carrier shiftable relative to said case member

carrying a pair of shiftable contacts which are operative respectively to bridge the fixed contacts of said first and second rows of fixed contacts and said third and fourth rows of said fixed contacts, one of said shiftable contacts bridging a first pair of fixed contacts from said first and second rows which are adapted to energize the motor vehicle headlamps when said contact carrier is in an on position, said pair of shiftable contacts bridging respectively a second pair of contacts of said first and second rows of contacts and a third pair of contacts of said third and fourth rows of contacts only in the off position of said contact carrier where said headlamp contacts are not bridged.

4. A light control switch for a motor vehicle system comprising, a case member formed of insulating material, a bracket member supporting said case member, a contact carrier shiftable between said bracket member and case member, said contact carrier having first and second laterally spaced shiftable contacts, a rod member for shifting said contact carrier, said contact carrier being shiftable axially between an off position, a park position and an on position, first, second, third and fourth rows of axially spaced fixed contacts carried by said case member, said shiftable contacts carried by said contact carrier being operative to bridge a first pair of contacts from said first and second rows when said contact carrier is in its on position and being operative to bridge a second pair of contacts from said third and fourth rows when said contact carrier is in said park position, said shiftable contacts carried by said contact carrier bridging respectively a third pair of contacts in said first and second rows and a fourth pair of contacts in said third and fourth rows of contacts only when said contact carrier is in its off position, said contacts carried by said contact carrier connecting only said third and fourth pairs of said fixed contacts when said contact carrier is in its off position.

5. The light control switch according to claim 4 wherein the bracket member carries a rheostat assembly which has terminals that pass through openings in said case member and which has a portion fitting into a slot formed in said bracket member.

6. The light control switch according to claim 4 wherein slidable movement of said actuating rod shifts the contact carrier axially and wherein rotatable movement of said actuating rod rotates a means that is operable to actuate a contact of a dome light switch.

7. The light control switch according to claim 4 wherein the actuating rod and the contact carrier have a releasable connection provided by a latch plate which engages said contact carrier and said rod and which can be released by shifting a post aligned with said latch plate when the contact carrier is in a position where the post is aligned with said latch plate, said post being carried by said bracket member.

8. The light control switch according to claim 4 wherein the actuating rod is connected to the contact carrier through a latch plate which also serves as part of a detent means for the contact carrier, the latch plate being engageable with recesses formed in said bracket member which operate as the detent means for the contact carrier.

9. A light control switch for controlling the lighting system of a motor vehicle comprising, a case member, said case member having first, second, third and fourth rows of axially spaced fixed contacts, said first row of contacts including a first battery contact and a dual intensity contact, said second row of contacts including a headlamp energizing contact, a parking light energizing contact and a dual intensity contact, said third row of contacts including a dual intensity contact and a tail lamp

contact, said fourth row of contacts including a dual intensity contact and a second battery contact, a contact carrier shiftable relative to said fixed contacts carrying a pair of shiftable contacts which are capable of bridging the first and second and third and fourth rows of contacts, said contact carrier being shiftable axially between an off position, a park position and an on position, said contacts carried by said contact carrier bridging the dual intensity contacts of said first and second rows of contacts and said third and fourth rows of contacts only when said contact carrier is in its off position, said contacts carried by said contact carrier bridging respectively said first battery contact and said headlamp energizing contact and said tail lamp contact and said second battery contact when said contact carrier is in its on position, said contacts carried by said contact carrier bridging respectively said first battery contact and said parking light energizing contact and said second battery contact and said tail lamp energizing contact when said contact carrier is in its park position.

10. The light control switch according to claim 9 wherein the case member has openings which receive at least one terminal of a rheostat assembly and wherein one end of the resistance element of the rheostat assembly is connected with the tail lamp contact of said third row of contacts.

11. The light control switch according to claim 9 wherein the contact carrier is shifted by an actuating rod and wherein means are provided for releasably connecting said contact carrier and actuating rod.

12. A light control switch for controlling the lighting system of a motor vehicle comprising, a case member formed of insulating material, said case member carrying a plurality of fixed electrical contacts, a bracket member, said bracket member and case member being secured together and defining a chamber, a rheostat assembly having projecting terminals passing through openings in said case member and having a section fitting within a slot formed in said bracket member, said rheostat assembly forming one wall of said switching chamber, a contact carrier shiftable in said switching chamber having a pair of contacts, at least four of said fixed contacts carried by said case member forming pairs of dual intensity contacts which are connected by the contacts carried by said contact carrier only when said contact carrier is in an "off" position the other fixed contacts being connected by said contacts carried by said contact carrier when it is shifted from its "off" position, said contacts carried by said contact carrier being disengaged from said other contacts when said contact carrier is in its "off" position.

13. The light control switch according to claim 12 wherein the contact carrier is shiftable by an actuating rod which is both axially shiftable and rotatable and wherein rotation of said actuating rod rotates a means that operates a contact of a dome lamp switch.

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