April 17, 1945. L. R. HARMON 2,373,889

LIGHT INDICATING SWITCH

Filed April 12, 1944 2 Sheets-Sheet 1

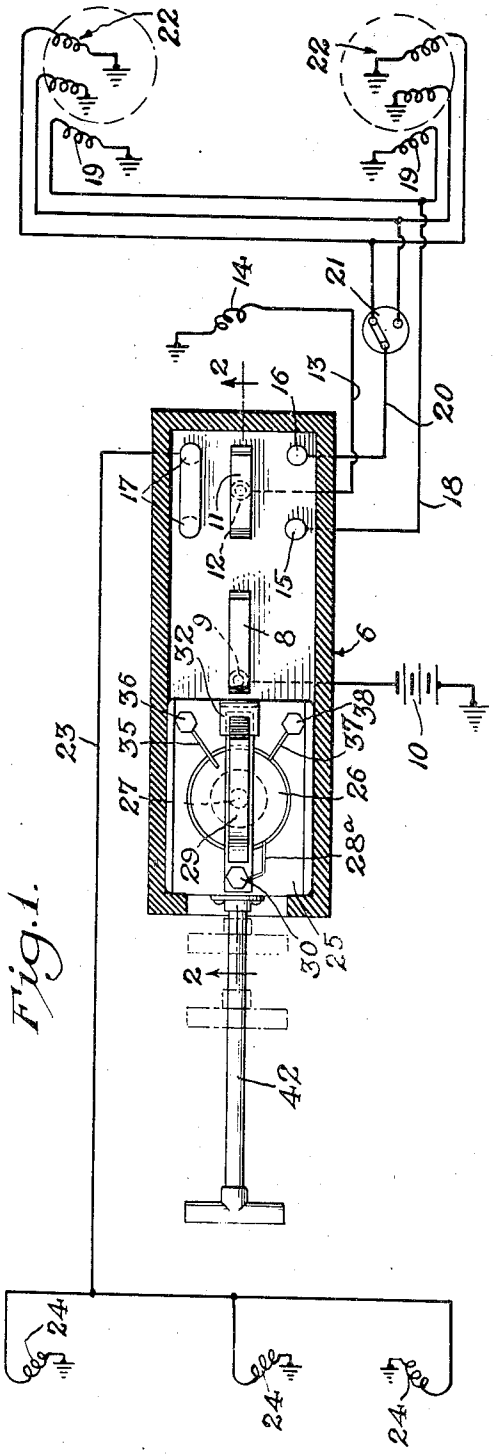

Fig. 1.

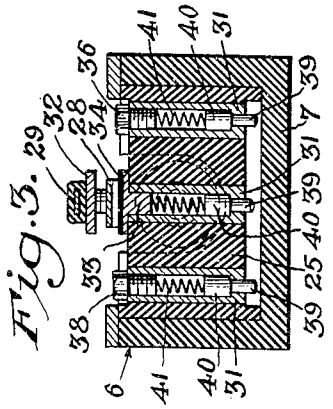

Fig. 3.

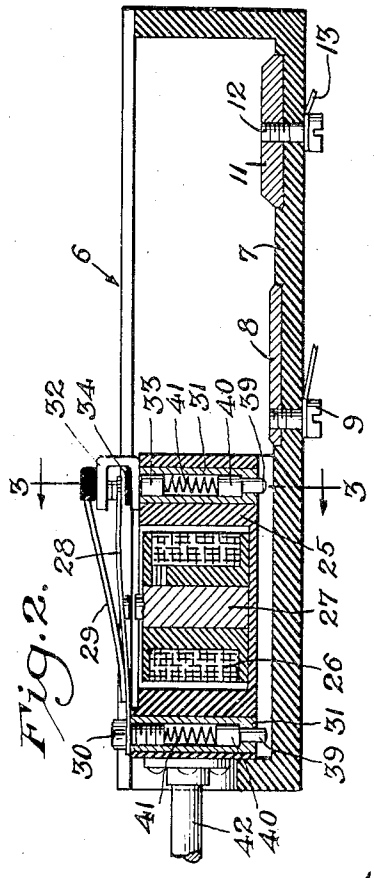

Fig. 2.

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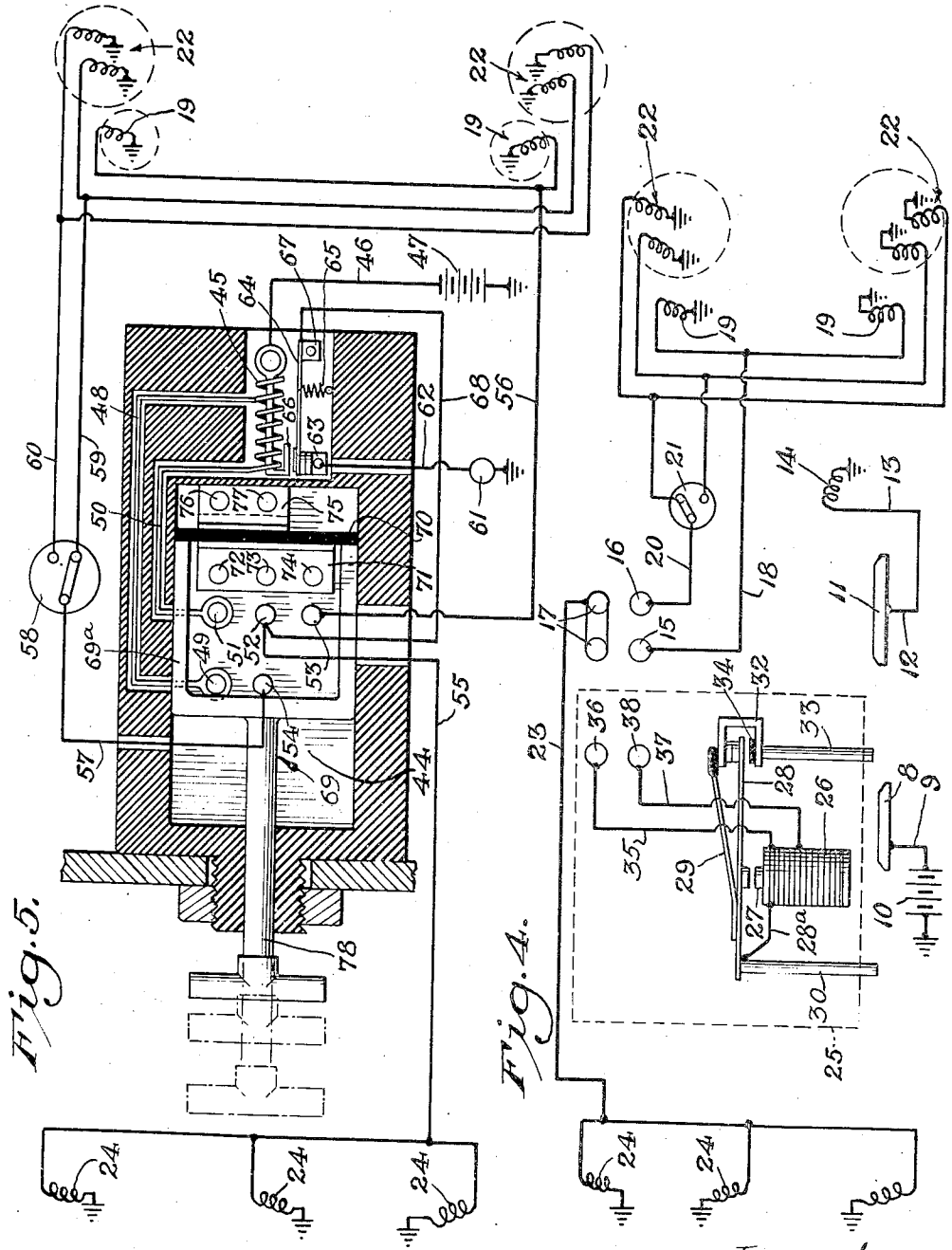

Fig. 5.

Fig. 4.

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Patented Apr. 17, 1945

2,373,889

UNITED STATES PATENT OFFICE

2,373,889

LIGHT INDICATING SWITCH

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Application April 12, 1944, Serial No. 530,688

10 Claims. (Cl. 315—136)

This invention relates to a switch adapted to be incorporated in a car lighting system and concerns itself primarily with a switch structure which thru means including varying resistances controls a signal or pilot light for indicating whether certain lights are "on" or "off" and whether the battery or source of energy is of sufficient potential.

According to this invention, the switch is designed to have two active positions. In the first position, the tail lights and the parking lights are adapted to be illuminated; the signal or pilot light will likewise be illuminated in such first position, a fact which will indicate that the battery is of sufficient potential for supplying the tail and parking lights. In the second position of the switch member, the parking lights will be cut out and the head or driving lights will be cut in; the tail lights remaining "on." However in the second position of the switch, the signal or pilot light will be "off" if the tail lights and the head lights are properly illuminated. So the driver will know the condition of the lights.

Should the signal or pilot light be "off" in the first position of the switch, it would indicate a failure in the lighting system. Then should the signal or pilot light be "on" in the second position, it would indicate a failure in the lighting system, especially the head lights or a drop in the voltage of the battery which would be insufficient to cut out the signal or pilot light.

The invention comprises the novel structure and combination of parts hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred form of this invention and in which similar reference numerals refer to similar features in the different views:

Fig. 1 is a diagrammatic view of a car lighting system with my novel switch incorporated therein in top plan view and involving this invention.

Fig. 2 is a sectional view taken upon the line 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a sectional view taken upon the line 3—3 of Fig. 2 looking in the direction of the arrows.

Fig. 4 represents a diagrammatic view of a wiring diagram of the apparatus shown in Fig. 1.

Fig. 5 is a top plan view of a modified form of switch involving this invention.

In referring now to the drawings, especially Figs. 1 to 4, there is shown an insulated housing or casing 6 having an insulated base 7. The casing may be made of Bakelite or any other suitable insulating material. Upon and partially embedded in the base 7, there is a suitable contact plate 8 which is connected by a post 9 extending thru the base with a battery or source of electrical energy 10.

Rearward of the battery plate 8, there is a second contact plate 11 upon and partially embedded in the base 7. The contact plate 11 has a post 12 which extends thru the base and is connected by a conductor 13 to a signal or pilot light 14. Opposite the sides of the contact plate 11, there are the light posts 15, 16 and 17—17. The post 15 is connected by a conductor 18 with the parking lights 19 which in turn are connected to ground as is common. The post 16 is connected by a conductor 20 with a conventional dimmer switch 21 which is connected to the filaments of the head lights 22 as is well known. The posts 17—17 which are connected together so that the current from one passes to the other are connected by a conductor 23 with the tail lights 24 which are suitably grounded as shown. It will be noted that the post 15 and a post 17 and the post 16 and the other post 17 lie in parallel lines normal to the sides of the housing. This arrangement allows for proper engagement with the switch member as will later appear.

A movable switch member 25 which may be made of Bakelite or any suitable material is mounted in the switch housing 6 and is adapted to be moved by successive stages over the base 7. This switch member carries a solenoid coil 26 having a core 27 for attracting the signal or pilot light switch arm 28 to which one end of a leaf spring 29 is attached. The switch arm 28 is attached at one end to a contact post 30 which is connected by a conductor 28a to the coil 26 and which extends into a conducting tube or sleeve 31 extending thru the switch member 25 to which reference will later be made. The free end of the switch arm 28 extends between the arms 32 of a bifurcation attached to the housing 6. This bifurcation carries an arm or contact post 33 fitting in a conducting tube 31 extending thru the switch member.

The free end of the leaf spring 29 is confined upon the top of the upper arm 32 and tends to normally hold the switch arm 28 against the lower surface of the upper arm 32 in signal light closing position. Upon the upper surface of the lower arm 32 of the bifurcation, there is a block of insulation 34 that is adapted to be engaged by the switch arm 28 when the same is attracted

by the magnet or solenoid 26 for opening the switch for extinguishing the signal light.

Adjacent the upper end of the coil 26, there is a conductor 35 that connects the same with a tail light post 36 while the lower end of the coil 26 is connected by a conductor 37 with the parking light post 38, thus establishing circuits of different resistances. The posts 36 and 38 are on the movable switch member 25 and fit in tubes or sleeves 31 extending thru said switch member. The conducting tubes are all alike and each has a restricted opening in its lower end thru which the reduced portion 39 of a spring pressed contact plunger 40 extends. A coil spring 41 is positioned between each plunger 40 and its upper contact post in such tube. Thus the contact plungers are yieldingly urged downwardly, but they can back up against their springs if necessary.

In the drawings, the switch member 25 is shown in an abnormal position for the sake of clearness. In its normal or inactive position, it will occupy a more forward position to the right with the post 33 slightly in advance of the battery plate 8. A push rod 42 is shown attached to the switch member 25 for operating the same. This push rod 42 will in practice be attached to the forward end of the switch block 25 and become a pull rod. It has been shown as a push rod to avoid confusion so that different features will appear clearer and as the means for operating the switch.

In Fig. 4, there is shown a wiring diagram for the structure just described; the same reference numerals being used, the posts 30 and 33 however being shown integral instead of a sleeve and end posts as shown in Fig. 2. In Fig. 4, the switch member 25 is not shown in an abnormal position; it is shown in its inactive position with the pilot light post 33 slightly in advance of the battery plate 8. Now if the switch member 25 be moved to the right until the posts 36 and 38 respectively overlie the posts 17 and 15, the switch member will be in its first position for illuminating the parking lights and the tail lights. In this position, the rear or battery post 30 will be in contact with the battery plate 8 and will conduct electrical energy thru the wire 28a to the coil 26 from which it will emerge to the parking and tail lights.

In the said first position of the switch member, the pilot or signal light post 33 will be in contact with the signal plate 11 so that the circuit thru the pilot light will be completed. It will be noted that current from the battery post 30 will also pass thru the switch arm 28 from which it will pass thru the bifurcation 32—32 and signal post 33 to the signal light 14. In this first position, the resistance of the coil 26 is insufficient to attract the signal switch 28 for opening the switch. As a result, the signal lamp will remain illuminated in such position and indicate that the parking and tail lights are "on."

When the switch member is moved further to the right until the posts 36 and 38 respectively engage the second tail light post 17 and the head light post 16, the switch will be in its second position for illuminating the head lights 22. In this position, it will be noted that the parking lights have been cut out due to the fact that the post 38 has passed beyond the post 15. In this position, the resistance of the coil 26 will be sufficient to attract the switch arm 28 and open the signal light switch. As a result, the signal light will be in "off" position when the switch member is in its second position provided there has been no failure of the lighting system. However, if there is a failure, the signal light will be illuminated. Further if the voltage in the battery drops so that it will not open the signal switch, the signal light will continue to burn and indicate the drop in the battery thru its weakness.

In Fig. 5, there is shown a modified form of the invention in which the base 44 of the control switch carries a solenoid coil 45 which is connected by a conductor 46 with a battery or source of electrical energy 47. The upper portion of the coil is connected by a conductor 48 with a head light post 49 on the base. The lower portion of the coil 45 is connected by a conductor 50 with a tail light post 51 on the base. Thus the current is supplied at different resistances to said light posts. In horizontal alinement with the post 51 are the tail light post 52 and the parking light post 53 and in horizontal alinement with the post 49 is a head light post 54.

The post 52 is connected by a conductor 55 with the tail lights 24. The post 53 is connected by a conductor 56 with the parking lights 19. The post 54 is connected by a conductor 57 with a dimmer switch which in turn is connected by the conductors 59 and 60 with the head lights 22.

A signal or pilot light 61 which is suitably grounded is connected by a conductor 62 with a contact post 63 adjacent the lower end of the solenoid coil 45. The contact post 63 is normally engaged by the pilot switch arm 64 which is yieldingly urged against said contact by a coil spring 65. The lower end of the switch arm is provided with an armature 66 for attraction by the solenoid coil. The upper end of the switch arm 64 is pivoted or fastened to a clip 67 attached to the switch casing. A conductor 68 connects the arm 64 with the tail light post 52.

A movable switch member 69 is slidably mounted upon the base for controlling the lights. This switch is shown as comprising a front U-shaped frame 69a having its rear ends attached to a strip of insulation 70. Upon the front side of the strip, there is attached a post board 71 having posts 72, 73 and 74 thereon which are respectively adapted to contact the posts 51, 52 and 53 when the switch member is moved forward a short distance. Upon the rear side of the insulated strip 70, there is attached a second post plate 75 having posts 76 and 77 thereon which are adapted to respectively contact the posts 51 and 52 when the switch member is moved to its second position, or in other words moved forward from its first position to bring the posts 72 and 73 into contact with the light posts 49 and 54. In the second position of the switch member, it will be noted that the parking light post 53 is out of contact with the switch member and that the parking lights are "off." A pull handle 78 is attached to the front end of the switch member for operating the same.

In use, the switch member normally occupies the position shown in Fig. 5. To illuminate the tail lights and the parking lights, the handle 78 is grasped and the switch member is moved forward until the posts 72, 73 and 74 respectively engage the posts 51, 52 and 53. In this position, the potential of the coil 45 will not be sufficient to attract the armature 66 and close the signal switch. As a result, current will flow from the post 52 thru conductor 68, thru switch arm 64 and thru conductor 62 to the pilot light 61 which is suitably grounded. Thus in the first position

of the switch the signal or pilot light will be "on."

However in the second position of the switch member, in which the parking lights are cut out and the head lights are cut in, the potential of the coil **45** will be sufficient to attract the armature **66** and open the signal light circuit with the result that the signal light will be "off" in the second position of the switch. Should the pilot light have illumination, in this second position, it would indicate a failure in the lighting system or a material drop in the battery voltage.

From the foregoing, it will be evident that this switch thru its signal light will indicate to the driver the condition of the lights and the battery in any of its active positions and be the means of preventing accidents and damage to cars thru the unknown failure of the lights or the battery.

An important feature of this invention, it will be apparent resides in the simplicity of the switch construction and the operation thereof whereby the cost thereof will be greatly reduced.

I am aware that many changes may be made and various details of construction modified without departing from the principles of this invention and I do not propose limiting the patent granted thereon otherwise than necessitated by the appended claims.

I claim as my invention:

1. In a car lighting system having a parking light, tail lights and head lights, a switch member movable into one position for establishing the parking light and the tail lights and movable to a second position for cutting out the parking light and establishing the head lights while maintaining the tail lights, a source of electrical energy, a solenoid connected with said source of energy, conductors connected at spaced points to said solenoid for supplying current to said tail lights and parking light thru said switch member when said switch member is in one position, and a signal light having a switch controlled by said solenoid, said switch being closed when said said switch member is in its first position and being open when said switch member is in its second position under a predetermined voltage in said source of electrical energy.

2. In a car lighting system having a parking light, tail lights and head lights, a switch member movable to one position for establishing the parking light and the tail lights and movable to a second position for cutting out the parking light and establishing the head lights while maintaining the tail lights, parallel circuits having different resistances for supplying current to said lights thru said switch member, a signal light and means including said different resistances for controlling said signal light according to the position of said switch member.

3. In a car lighting system having a parking light, tail lights and head lights, a switch member movable to one position for establishing the parking light and tail lights and movable to a second position for establishing the head lights, a source of electrical energy, a resistance coil connected to said source of energy, parallel conductors connected at spaced points to said coil for supplying current to said lights and a signal light controlled by the resistance in said coil for indicating the conditions of said lights.

4. In a car lighting system having tail lights and head lights, a switch member movable to one position for establishing the tail lights and movable to a second position for establishing the head lights while maintaining the tail lights, a source of electrical energy, a solenoid having a connection with said source of energy, parallel circuits attached at spaced points to said solenoid for supplying energy to said lights thru said switch member, and signalling means controlled by the resistance in said solenoid for indicating the condition of said lights and said source of electrical energy when said switch member is in its second position.

5. In a car lighting system having tail lights and head lights, a switch member movable to one position for establishing the tail lights and movable to a second position for establishing the head lights while maintaining the tail lights, a source of electrical energy, a solenoid connected with said source of energy, conductors connected at various different resistance points to said solenoid and having other connections for supplying energy to said lights, a signal light having a connection with said source of energy and a switch controlled by the resistance in said solenoid and adapted for indicating the condition of said head lights and said source of electrical energy when said switch member is in its second position.

6. In a car lighting system having tail lights and head lights, a switch member movable to one position for establishing the tail lights and movable to a second position for establishing the head lights while maintaining the tail lights, a source of electrical energy, circuits connecting said source of energy with said lights thru said switch member and having different resistances, and a signal light controlled by said different resistances for indicating the condition of said head lights and source of energy when said switch member is in its second position.

7. In a car lighting system having tail lights and head lights, a controlling switch therefor comprising relatively movable members having a tail light position and a combined tail and head light position, a source of electrical energy having parallel circuits for supplying energy thru said switch to said lights and having different resistances, a signal in circuit with said source of energy and means including said resistances for controlling said signal in accordance with the relative movements of said switch members for indicating the condition of said lights and said source of energy.

8. In a car lighting system, a controlling switch therefor comprising an insulated base, a switch member movable upon said base, a solenoid coil carried by said switch member, a pilot light switch controlled by said coil, tail and head light terminals on said base, contact posts carried by said switch member and having connections with said coil and adapted upon movement of said switch member for engaging said tail and head light terminals on said base, means for supplying electrical energy to said coil and a pilot light in circuit with said coil and said pilot light switch and controlled by the movements of said switch member for indicating the condition of said head lights and said means.

9. In a car lighting system, a controlling switch therefor comprising an insulated base, a battery terminal plate and a signal terminal plate mounted upon said base in spaced relation, a movable switch member mounted upon said base, a solenoid mounted upon said switch member and having a contact post extending thru said member and adapted for engaging said battery

plate upon movement of said member, light contact posts extending thru said switch member, conductors connecting said contact posts with spaced points on said solenoid, light posts on said base adapted for engagement by said contact posts, a signal connected to said signal plate and means for energising and de-energising said signal in accordance with the movements of said switch.

10. In a car lighting system having tail lights and head lights, a switch member movable to one position for establishing the tail lights and movable to a second position for establishing the head lights while maintaining the tail lights, a source of electrical energy, circuits connecting said lights with said source of energy and means in said circuits for increasing the resistance thereof when said switch member is in one position, a pilot light and means for energizing said pilot light when said switch member is in one of said positions.

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