Dec. 22, 1942. W. P. GOULD 2,305,962

LIGHTING AND SIGNALING SWITCH

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Fig. 1.

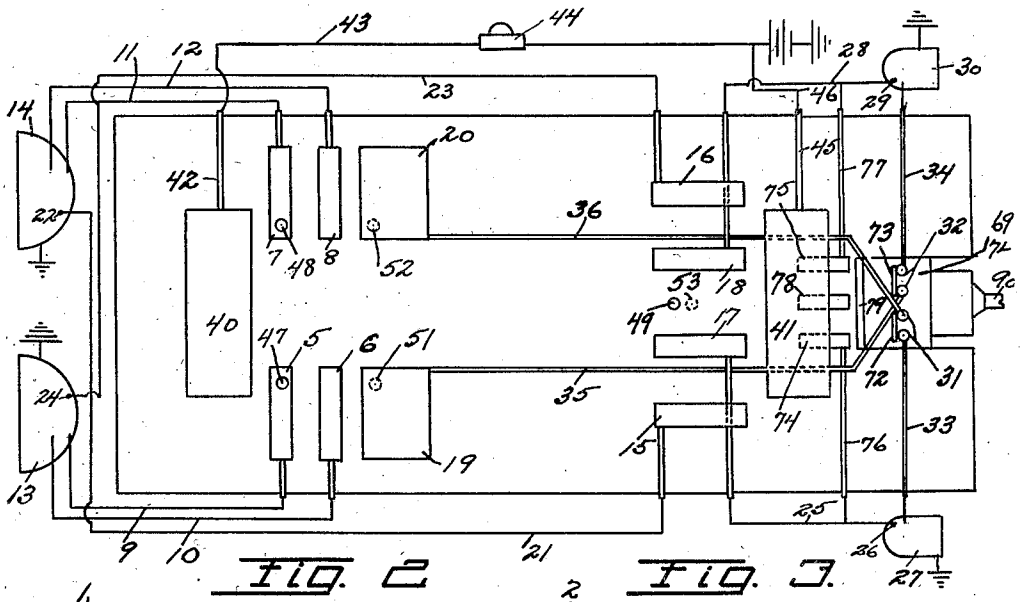


Fig. 2

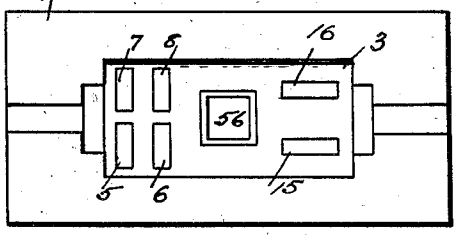


Fig. 3.

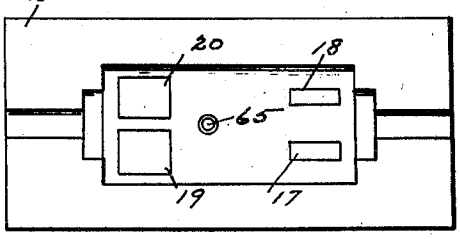


Fig. 4.

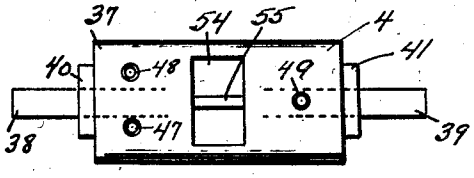
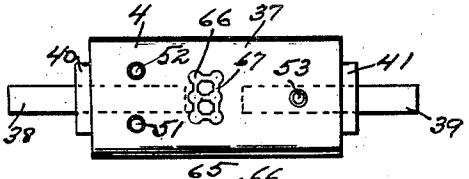


Fig. 5.



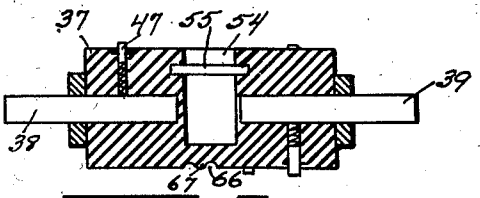


Fig. 6.

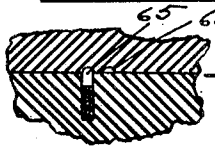


Fig. 7.

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Fig. 8.

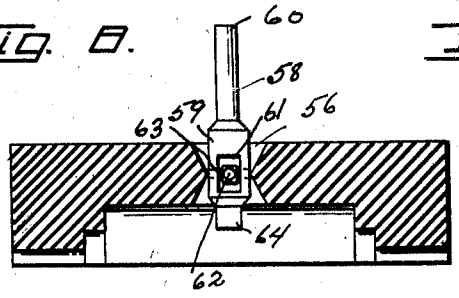


Fig. 9.

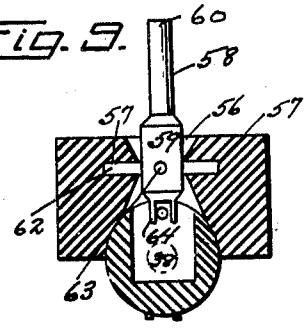
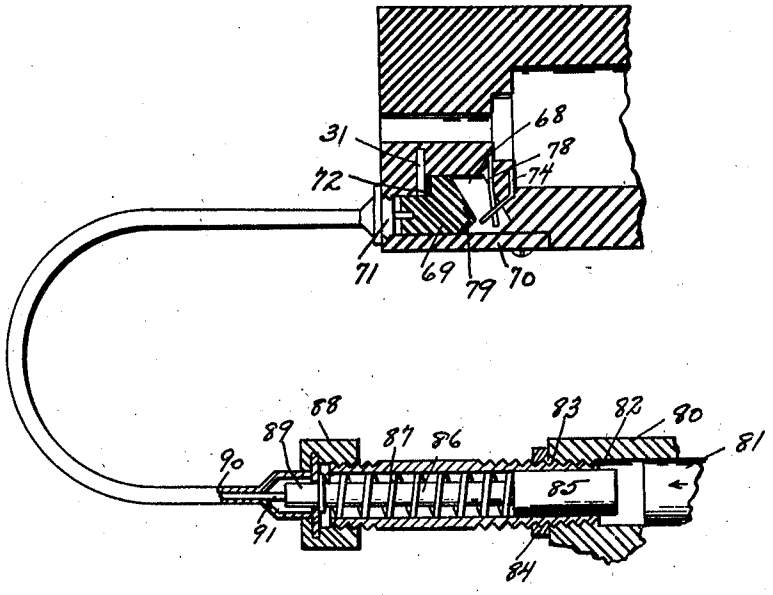


Fig. 10.



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LIGHTING AND SIGNALING SWITCH

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6 Claims. (Cl. 200—4)

This invention is directed to signaling means, designed more particularly for use with automobiles, and pertains more specifically to the means for controlling the signals.

Automobile signals indicating right and left hand turns and reverse movement are manually or automatically indicated, and are becoming more and more legal requirements in an increasingly number of towns and States as a means of preventing accidents. There has, so far as known, been no attempt to standardize signaling equipment, with the result that the oncoming or following driver, while expecting some signal of the intention of the driver of the particular car, does not know what to look for, and hence the effect of the signal given is often lost. If the signal given is automatic, in that it is simultaneous with the act which the signal indicates, there is little time for the following driver to accommodate his action to the signal, and hence it is important, and an essential characteristic of the present invention, that the signal be given sufficiently in advance of the act being signaled to permit the drivers of the other cars to control their vehicles in time to avoid accident.

The primary object of the present invention is the provision of a signal controlling means which may be manually set to control the desired signal to notify the drivers of following and oncoming cars of the immediate intention of the driver of the particular car, with the signaling controlling means selectively and instantly responsive to manual action through a simple hand or foot movement.

A further object of the invention is the provision of a signal controlling-means, or switch, by means of which the ordinary running lights both front and rear, and the signaling means, usually but not necessarily lights, are selectively and relatively controlled through the operation of a single lever.

A further object of the invention is the provision of a switch including an element mounted for predetermined longitudinal and rotary movement in the switch base, and in such movements, either alone or in combination, controlling the lighting of the headlights, either full or dimmed, and tail lights for ordinary running, and, at will, set a signaling means in front and rear to indicate an intention to turn and the direction of that turn by the driver of the particular car.

A further object of the invention is the provision of a single operating lever for actuating the movable switch element, which lever may be hand or foot operated, and in associated details is compelled to function positively and directly in moving the movable element of the switch to an absolutely accurate circuit controlling position.

A further object of the invention is the utilization of the normal directional signaling means in a distinctive corelation, or the provision of independent signaling means for indicating a contemplated reverse movement of the vehicle, such reverse signaling means being brought into action through movement of the transmission reverse control, being maintained during such reverse movement, and automatically discontinued on release of the transmission reverse. The automatic reverse-indicating signaling means is effective and completely operative regardless of the signaling position of the movable element of the switch.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a more or less diagrammatic view of the upper and lower sections of the switch casing, showing the relative relation of the contacts.

Fig. 2 is a bottom plan of the upper section of the casing.

Fig. 3 is a top plan of the lower section of the casing.

Fig. 4 is a top plan of the rotor of the switch.

Fig. 5 is a bottom plan of the same.

Fig. 6 is a longitudinal section through the rotor.

Fig. 7 is a broken longitudinal sectional view of the bottom switch casing and lower portion of the rotor, showing the positioning pin and sockets therefor.

Fig. 8 is a longitudinal section through the upper section of the switch housing, showing the operating lever in place.

Fig. 9 is a section of the housing section, rotor, and with operating lever in elevation.

Fig. 10 is a more or less diagrammatic view showing the means for automatically controlling the reverse signaling means.

The invention will be described in connection with an automobile signaling system, wherein the operative circuits are grounded through the frame as usual, but it is to be understood that if used under other conditions the circuits may be independently complete. It is to be further understood that where any part is referred to as insulated, any and all types of insulation capable of use are contemplated.

The switch element constituting the primary feature of the present invention is made up of

substantially rectangular upper and lower block sections 1 and 2, each formed in its meeting face with an elongated depression 3, semi-circular in cross section, which depressions together constitute a cylindrical concavity for the reception of the movable switch member 4, hereinafter termed the rotor. The relation of the rotor and its concavity is such that the rotor, when in place, is permitted a rotary and limited longitudinal movement for circuit controlling function.

The depression 3 of the block 1 is formed near one end, hereinafter termed the forward end, and on each side of the longitudinal center line, with two embedded or otherwise secured contact plates, those plates on one side being indicated at 5 and 6, and those on the other side being indicated at 7 and 8. These plates are connected through conductors 9, 10, 11, and 12, respectively with the more or less conventional headlights 13 and 14. The conductors 9 and 11, leading from the contact plates 5 and 7, lead to and energize the normal full lighting element of the headlights, while the conductors 10 and 12, leading from the plates 6 and 8, lead to and energize the light dimming agent of whatever type of the headlights. The contact plates 5, 6, 7, and 8 are relatively narrow longitudinally of the concavity, but elongated transversely of the concavity for appropriate control of the headlight circuits by the rotor, as will later appear.

The rear portion of the concavity is provided with contact spaced contact plates 15 and 16, arranged on each side of the longitudinal center of the concavity, each plate being relatively narrow transversely of and elongated longitudinally of the concavity for proper rotor service in circuit control, to be later explained.

The lower block section 2 is provided in the rear portion of the concavity 3 with contact plates 17 and 18, similar to the plates 15 and 16 in the upper block section 1, and considering the positions of the plates 17 and 18 relative to the plates 15 and 16 in the complete assemblage and when the rotor is neutral, such plates 17 and 18 are parallel to and in the same circular plane as and vertically in line with the plates 15 and 16. At the forward end the lower block section is provided with contact plates 19 and 20, which are of a width equal to the transverse length of the plates 5, 6, 7, and 8 with their edges practically in alinement with the ends of such plates 5, 6, 7, and 8. A conductor 21 leads from the plate 15 to the directional signal 22 of the headlight 14, while a conductor 23 leads to the directional signal 24 of the headlight 13. A conductor 25 leads to the directional signal 26 of one taillight 27 from plate 17, while plate 18 is connected by conductor 28 to the directional signal 29 of the other taillight 30.

Spaced pairs of upstanding contact posts 31 and 32 are carried at the rear of the lower section 2, conductors leading from one post of each pair to the respective taillights, 27 and 30, such conductors being indicated at 33 and 34, while the remaining post of each pair is connected to the contact plates 19 and 20, conductor 35 leading to plate 19 and conductor 36 leads to plate 20. The conductors 33 and 34 are designed to energize the normal running lights of the tail lights. These posts of each pair are not in electrical connection, but are designed to be bridged in the use of an automatic reversing switch to be later described.

A rotor 37 is mounted in the concavity formed in the housing blocks 1 and 2, being of insulating material or of other material appropriately insulated at desired points. The rotor is of cylindrical form and is provided in each end with an axially arranged shaft section, one projecting beyond the forward end as at 38 and the other extending beyond the rear end as at 39. These shaft sections are rigid with the rotor and are provided immediately beyond the ends of the rotor with cylindrical bearing members, 40 and 41, respectively, which seat in materially reduced extensions of the depression of each housing block to provide for free longitudinal and rotary movement of the rotor, and to also provide a means for conducting current to the respective shaft sections. The forward bearing member 40 is provided with a rigid metallic connector 42, leading through the housing block section 1 to the surface thereof, where is provided conventional means for connection of a conductor 43, leading from a battery, preferably the car battery, the conductor preferably leading through the ordinary lighting switch of the automobile, as 44. The rear bearing member 41 has a similar connector 45 leading through the block section 1 and connected by a conductor 46 directly with the battery.

The forward shaft section 38 is connected, preferably by coil springs to spaced contact pins 47 and 48 extending through and beyond the surface of the rotor for cooperation with the respective sets of contact plates 5, 6 and 7, 8, the pins being mounted to maintain spring contact with the plates while complete ejectment is prevented.

The rear portion of the top of the rotor has a single pin 49, designed to cooperate with the contact strips 15 and 16 of the upper section of the casing when the rotor is turned for directional signaling as hereinafter described. The bottom of the rotor has pins 51 and 52 arranged for cooperation with the contact plates 19 and 20 of the lower section of the casing, and a single pin 53 arranged for cooperation with either of the contact plates 17 or 18. The various contact pins of the rotor are spring pressed as described to insure electrical contact with the contact plates, the springs serving to conduct the current from the shaft sections 38 and 39 which are energized through the bearings 40 and 41.

The rotor is formed at about its intermediate length in its upper surface with a depression 54 having a pin 55 extending across the same, longitudinally of the rotor. The upper section 1 of the switch casing is formed with an appropriate opening 56 to register with the depression 54 of the rotor, with channels 57 leading in both directions from the opening 56, transverse the section. An operating lever 58 is arranged in the opening 56, having therein an angular, preferably rectangular body 59 from which extends a handle portion 60 above the section 1. The body 59 of the lever is formed with an opening 61, through which the rod 62 extends, such rod being rotarily supported in the channels 57. A pin 63 is fixed in the rod 62 and pivotally mounted in the walls of the opening 61 of the lever. The lever 58 is thus mounted for swinging movement in both longitudinal and transverse directions relative to the switch casing. The lower end of the lever 58 is forked to embrace the pin 55 of the rotor as at 64, Fig. 9, so that the rotor may follow the movements of the operating lever. The body of the lever 58 is mounted for swinging movement in the opening 56, and the walls of this opening above and below the line of the rod 62 are in-

clined outwardly from the body of the lever. The degree and location of the inclined portions are such as to provide accurate limits for the movement of the lever in whatever direction it is moved, to thus correspondingly accurately position the rotor.

As will later appear in the description of the operation the rotor is movable to any one of six different positions, and as lever 58 is capable of being moved by the hand or by the foot, it is desirable to provide means for accurately positioning the rotor under a possible somewhat incomplete movement of the lever. To this end the upper surface of the lower section of the casing is provided with a spring pressed pin 65 and the bottom of the rotor formed with six depressions 66 to receive the pin. The depressions are accurately arranged so that when the pin 65 is located in the particular depression the rotor will be exactly and correctly positioned as predetermined by the location of the depression. Each pair of depressions, laterally and longitudinally, are connected by a web 67 which inclines upwardly from a point intermediate the connected web-joined depressions, so that if the movement of the rotor is not exactly completed by the movement of the lever 56, the pin 65 will ride down the particular web under the tension of the spring into the selected depression.

The invention includes as an essential feature a construction wherein an independent and distinctive signal may be given when the intention of the driver is to reverse or back the vehicle. This signal while herein described as utilizing the directional signals employed in indicating direction, may if preferred be independent signals of distinctive character.

The reversing signal, which is automatic in its action is shown more particularly in Fig. 10. The lower section 2 of the switch casing is extended rearwardly and formed in its lower surface with an appropriate channel 68, the rear portion of which is reduced as compared with the forward portion. A control block 69 is slidably mounted in this channel and held against separation therefrom by a removable bottom plate 70 and an end plug 71. The block is shaped to fit the channel and the rear surface of the block carries contact plates 72 and 73 which bridge the pins 31 and 32, heretofore referred to, the bridging plates being shown in Fig. 1, and the pins 31 and 32 extending through the section 2 into the path of the plates on the block. The forward portion of the block carries a contact plate, which when the block is in its rear and normal position is spaced from two contact strips 74 and 75 connected electrically by conductors 76 and 77 with contact plates 17 and 18. An intermediate energizing strip 78 is connected to the adjacent bearing 41. The strips 74, 75, and 78 depend in the path of the contact plate 79 on the control block.

The conventional or any preferred type of transmission, indicated generally at 80, has the reversing rod 81 naturally movable rearwardly, that is toward the left in Fig. 10. The transmission wall has an opening 82 in line with the reversing rod and in the opening is threaded a sleeve 83, having a lock nut 84 for maintaining adjustment of the sleeve 83. Slidable in the sleeve 83 is a plunger 85, having a stem 86 moved by a spring 87 in opposition to reversing movement of the reverse rod 81.

The free end of the sleeve 83 is provided with a gland 88 to protect against the entrance of dirt or moisture, and this gland secures in place a head 89 of a Bowden wire sheath 90, the opposite end of which is anchored in the plug 71 closing the channel 68 in the lower section of the switch casing. The wire in the sheath, as at 91 is connected to the stem 86 of the plunger 85 and anchored at the opposite end to the control block 69. When the reverse rod 81 is in normal position the spring 87, through the wire 91 retains the control block 69 in rear or normal position, while when the reverse rod 81 is operated, in reversing the direction of the vehicle, the spring is compressed and the wire 91 acts to move the control block forward to operative position. In the normal position of the control block the contact strips 72 and 73 function to bridge the posts 31 and 32, while in the operative position of the control block, the strips do not function, while the contact strip on the control block moves into contact with the strips 74 and 75 and finally into contact with the strip 78 to energize the reverse signal, as will appear in the description of the operation.

Operation

The operation of the switching means is as follows: This description can best be read from Fig. 1, wherein the contact points on the upper surface of the rotor are indicated in full lines and the contact points on the lower surface of the rotor are indicated in dotted lines. Assuming the rotor in normal position, and the operating lever 58 moved rearwardly, the rotor contact points 47 and 48 are in electrical engagement with the contact strips 5 and 7, and the rotor contact points 51, 52 are in contact with the plates 19 and 20. The headlights and tail lights are thus in running light condition, the current from the plates 19 and 20 reaching the taillights through conductors 35 and 36, the posts 31 and 32, bridged by the plates 72 and 73 of the reverse control block which is now in normal position. The operating lever may be moved forwardly which moves the contacts 47 and 48 to the adjacent plates 6 and 8, without disturbing the taillight energization, owing to the size of the plates 19 and 20. Thus the headlights may be dimmed or fully lighted according to the wiring of the plates 5, 6, 7, and 8. If it is desired to indicate a turn, the operating lever is moved, for example to the right, turning the rotor to the left on the upper portion and to the right on the lower portion. The contact 49 moves into contact with the plate 15 and the contact 53 with the plate 18. The contact 48 moves off the plate 7 or 8 which it may engage, and contact 51 moves off plate 19 without disconnecting contact 52 with plate 20. From the circuits described the operation noted will put out the running lights of the right headlight and taillight and energize the direction signals for right turn. The movement of the operating lever in the opposite direction will correspondingly put out the left headlight and taillight running light and set the direction signals for left turn. When the reverse movement of the transmission is effected, the control block 69 is forced forwardly, moving the plates 72 and 73 to break the running lights of both taillights and making contacts with strips 74, 75 and 78 to set both direction signals of the taillights at the same time advising reverse travel of the vehicle.

The use of the term insulating herein is intended to mean any type of insulation that may be preferred and that the entire part or only

the necessary section of such part may be insulated.

Furthermore, the reference herein to indication signals is intended to mean any usual or preferred type of such signal as may respond to electrical energization, such as lights, symbols, or markings including words, which may be illuminated when necessary for indication purposes.

What is claimed is:

1. A signal switch for automobiles, including a housing comprising upper and lower independent sections formed in their meeting faces with a semicircular depression to constitute a cylindrical concavity extending axially of the housing, a rotor movable longitudinally and transversely in said concavity, the face of the depression in one section having spaced pairs of contact plates of relatively narrow width axially of the depression and relatively elongated transversely arranged at one end of the depression and spaced contacts of relatively greater width axially of the depression and of materially less transverse length arranged at the opposite end of the depression, the face of the depression in the other section having contacts at one end of materially greater axial length than the first mentioned contacts and of equal transverse dimensions with that of the first mentioned contacts, and contact pins on the rotor and selected pair of the first mentioned contacts and contact pins on the rotor to maintain contact with the contact plates of materially greater axial length, the first mentioned contact pins maintaining contact when the second mentioned contact pins are free of contact with their contact plates.

2. A signal switch for automobiles, including a housing comprising upper and lower independent sections formed in their meeting faces to together provide an axially-ranging concavity, a rotor movable in said concavity, means for selectively rotating and axially moving the rotor, a pair of contact pins on each diametrically-opposed surfaces at one end of the rotor, a single contact pin on each diametrically opposed surface at the opposite end of the rotor, contact plates for the upper pair of rotor contact pins, said plates being of an axial length materially less than their transverse length, and contact plates for the lower pair of rotor contact pins, said latter plates being of the same transverse length as the first mentioned plates and of an axial length equal to the combined axial length of the first mentioned plates.

3. A construction as defined in claim 2, including a rear set of contact pins carried by one section and in electrical connection with the contact plates of relatively greater axial length.

4. A construction as defined in claim 2, wherein the means for operating the rotor includes a lever mounted in the upper housing section and having a predetermined movement axially and transversely of the housing, and a connection between said lever and the rotor, together with cooperating means on the rotor and lower housing section to fix the rotor against casual displacement in any lever set-position.

5. A construction as defined in claim 2, wherein the rotor is mounted on spaced shafts having bearing in the housing sections, the shafts being in circuit with the contact pins for current flow.

6. A construction defined in claim 2, including contact pins carried by one of the housing sections and in electrical connection with the plates of relatively greater axial length, and a member responsive to movement of a control part of the automobile for bridging such pins.

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