April 10, 1934. E. C. TAYLOR 1,954,272

SIGNAL SWITCH

Filed Dec. 7, 1929 3 Sheets-Sheet 1

Fig. 1

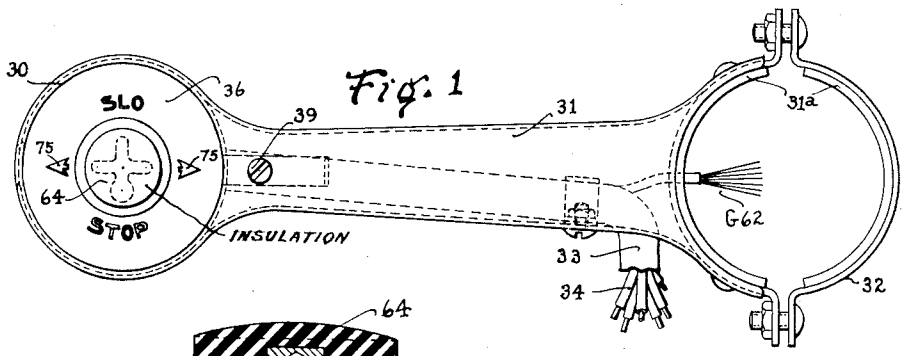


Fig. 2

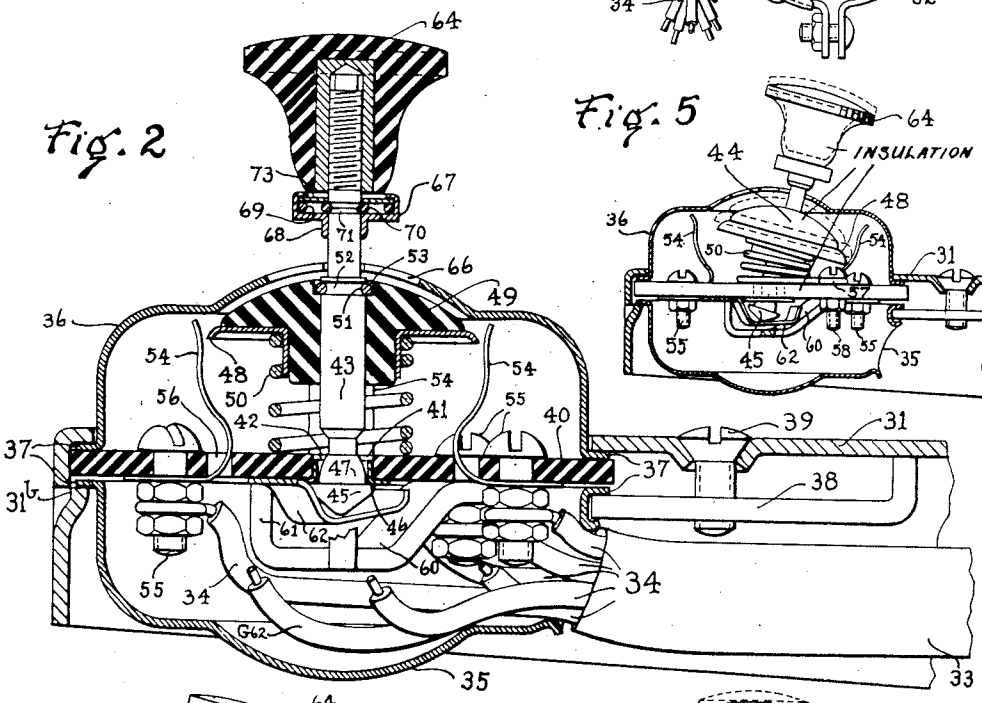


Fig. 5

Fig. 3

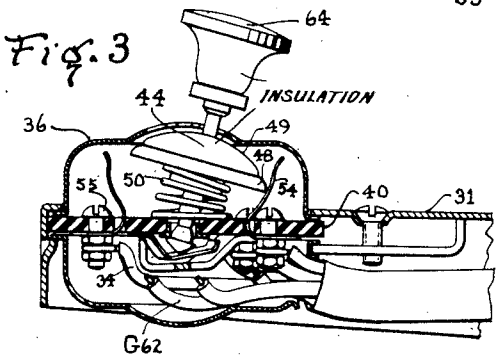
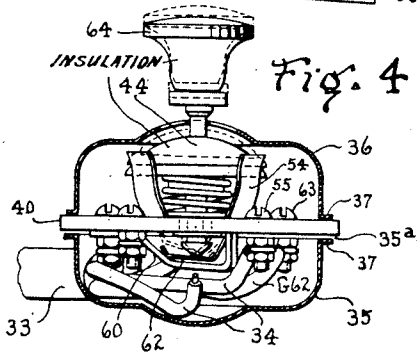


Fig. 4



BY

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SIGNAL SWITCH

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Fig. 6

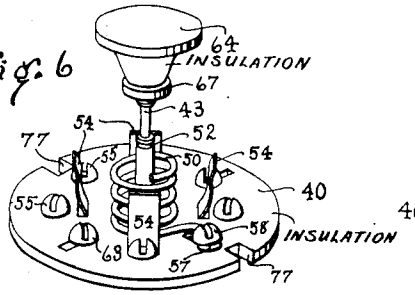


Fig. 10

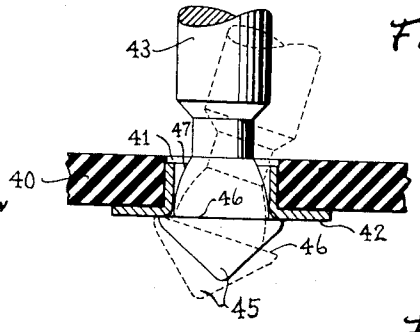


Fig. 7

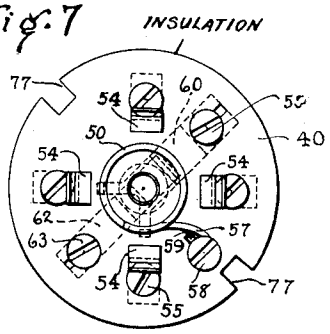


Fig. 13

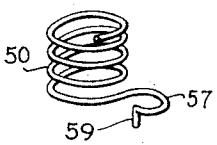


Fig. 11

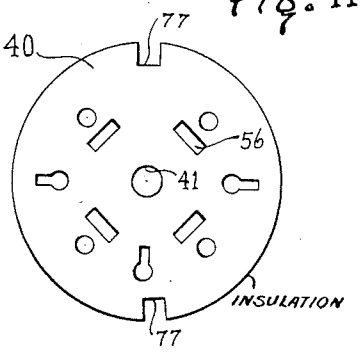


Fig. 8

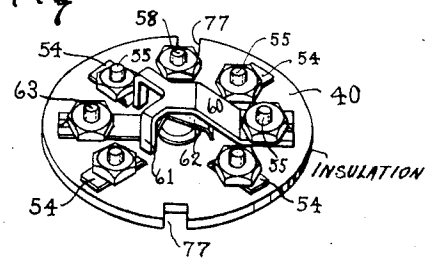


Fig. 14



Fig. 12

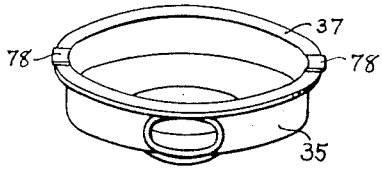


Fig. 9

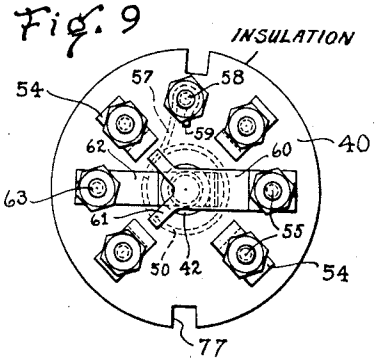


Fig. 15

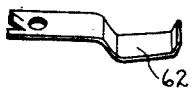
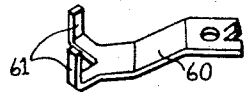


Fig. 16



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SIGNAL SWITCH

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Fig. 18

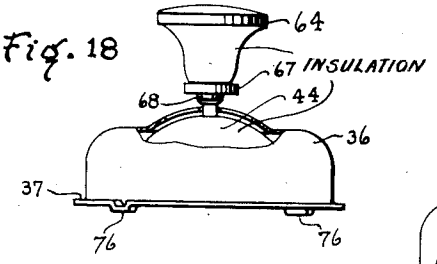


Fig. 19

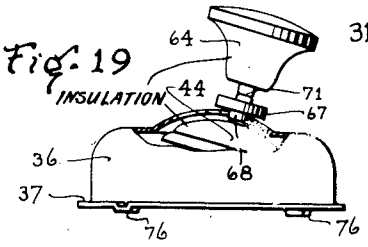


Fig. 21

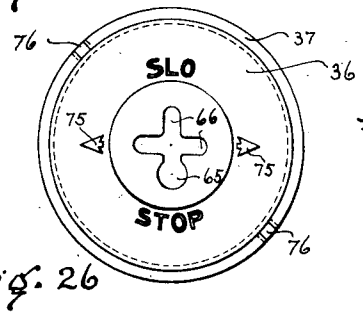


Fig. 26

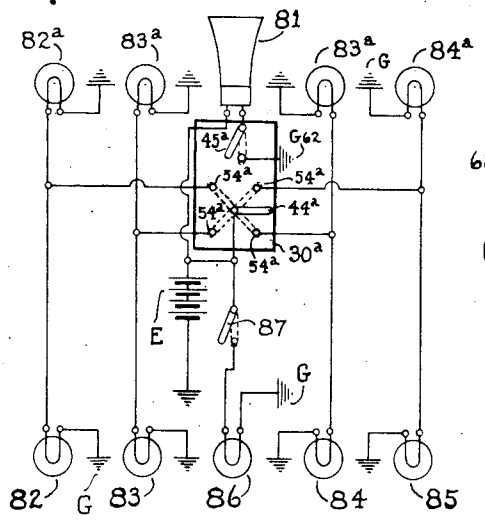


Fig. 17



Fig. 20

Fig. 27

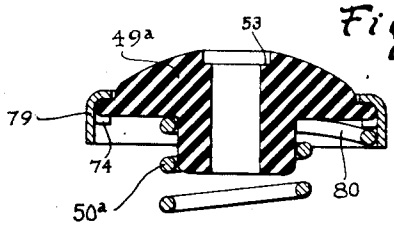


Fig. 28

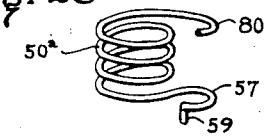


Fig. 29

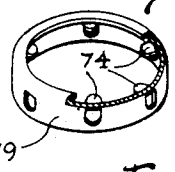


Fig. 22

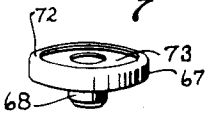


Fig. 24

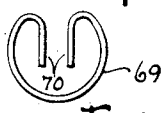
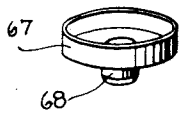


Fig. 23



Fig. 25



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Patented Apr. 10, 1934

1,954,272

UNITED STATES PATENT OFFICE

1,954,272

SIGNAL SWITCH

Edward Cooper Taylor, Yonkers, N. Y.

Application December 7, 1929, Serial No. 412,332

10 Claims. (Cl. 200—6)

This invention relates to improvements in circuit-controlling means and in signal systems, and more particularly with reference to certain features, the invention relates to improvements in multi-contact switches especially constructed and adapted for selective control of a plurality of electric circuits of signaling systems, and more especially such signaling systems as are used on vehicles for facilitating movements thereof in traffic.

It is a general object of the invention to provide an improved circuit-controlling arrangement especially adapted for vehicle and similar signaling systems whereby the various control operations may be executed with great ease and expedition.

A more particular object of the invention is to provide an improved circuit-controlling arrangement for systems of the class mentioned, whereby audible and visual signals may be given and wherein the audible signal may be sounded when any one of a plurality of the visual signals is being displayed.

A further object is to provide an improved universal mounting for the signal or contact actuator of the signaling system.

Another object is to provide an improved actuator for signaling systems whereby, upon movement of the actuator in certain planes, visual traffic control signals will be displayed, whereas movement of the actuator in a plane at an angle to the other movements will cause sounding of an audible signal.

Still another object is to provide an improved switch for controlling signal systems which is especially well adapted for mounting adjacent to a steering wheel of an automobile for easy control by the driver.

Another object is to provide an improved means for locking the circuit actuator in circuit-closing position.

Another object is to provide an improved assembly for an actuator for multiple contact, signal switches.

Another object is to provide an improved arrangement for mounting the flexible contacts of circuit-controlling switches whereby good metallic engagement of the contacts is assured and long life of the contacts provided for.

Another object is to provide an improved switch arrangement whereby a plurality of circuits may be selectively controlled and another circuit may be controlled by the same control means when one of the first circuits is closed, or when all are open.

Another object is to provide an improved assembly for multi-contact signal switches whereby disassembly and replacement of parts are facilitated.

Other objects will be in part pointed out in the following detailed description of certain illustrative but preferred embodiments of the invention and will be in part obvious in connection therewith.

The invention accordingly comprises the features of construction combinations of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a more complete disclosure of the nature and objects of the invention, reference is had to the following detailed description and to the accompanying drawings in which:

Figure 1 is a plan view of a form of the improved multi-contact switch with a mounting therefor;

Fig. 2 is an enlarged central, vertical, longitudinal section through the switch;

Fig. 3 is a view similar to Fig. 2 but on a smaller scale and showing the actuator in a different position;

Fig. 4 is an elevation showing the switch parts in another position, the switch casing being in section and parts being removed;

Fig. 5 is a view similar to Fig. 4, viewing the switch from a different angle and one of the spring contacts and other parts being removed;

Fig. 6 is a partially disassembled perspective;

Fig. 7 is a plan of the insulating base plate with contacts attached;

Fig. 8 is a bottom perspective of the base plate;

Fig. 9 is a bottom plan thereof;

Fig. 10 is an enlarged fragmentary central section of the mounting for the actuator stem;

Fig. 11 is a plan of the base plate per se;

Fig. 12 is a perspective of the lower part of the casing;

Figs. 13, 14, 15 and 16 are perspective views of individual parts of the switch;

Fig. 17 is a perspective of a spring-locking ring for the contact disk assembly;

Fig. 18 is an elevation of the upper part of the casing, parts being removed and in section;

Fig. 19 is a view similar to Fig. 18 showing the operation of the switch-locking device;

Fig. 20 is an elevation similar to Fig. 5 with parts of the casing removed, the switch being shown in a different position;

Fig. 21 is a plan view of the casing with the actuator removed;

Figs. 22, 23, 24 and 25 are views of individual parts of the switch lock;

Fig. 26 is a circuit diagram;

Fig. 27 is a fragmentary central section of a modified form of contact disk;

Fig. 28 is a perspective view of the contact collar or disk of Fig. 27, and

Fig. 29 is a view of a modified form of a switch lock part.

While the invention is shown herein as embodied in a vehicle signal system for which it is especially well adapted, yet it will be understood that it is adapted also for other uses and in other similar systems wherein it is desired to selectively control a plurality of circuits.

Referring to the drawings for a detailed description of the embodiments of the invention there shown, the improved switch indicated generally at 30 is carried by a supporting arm 31 which may be provided with a clamp 32 for attaching it in position adjacent the steering wheel of an automobile, the clamp shown being adapted to clamp the support to the steering column. The supporting arm 31 may be provided with an internal passageway for housing the cables 33 carrying the control wires 34, which are attached to the several contacts of the switch.

The switch casing comprises a lower part 35 and an upper complementary part 36 being appropriately shaped to house the various switch elements. The switch casing parts may be provided with peripheral outwardly extending flanges 37 which are adapted to be received between and supported by lugs or parts of the supporting arm 31. A clamp 38 is adapted to engage one of the flanges 37 and a securing screw 39 is provided whereby the casing may be clamped in position at the extremity of the supporting arm 31.

A base plate 40 of insulating material such as fibre or mica is clamped in position between the flanges 37 of the casing and thus also is held permanently in position by means of the clamp 38. This base plate is provided with a central opening 41 which is preferably reinforced by a bearing plate or seat 42, which functions to support the stem 43 of the switch-controlling actuator indicated generally at 44.

This actuator stem extends at its lower end through the aperture of the base plate and is formed at its lower extremity to provide an actuator head 45. This actuator head at its upper part is slightly greater in diameter than the adjacent part of the stem, thus forming a bearing surface 46 which, in the form shown, extends peripherally around the stem. This bearing surface 46 contacts with the lower face of the plate 42, thus permitting the stem 43 to tilt or rock in any required direction upon the bearing surface 46 as a fulcrum, as clearly seen in Fig. 10.

Adjacent to the peripheral bearing surface 46, the stem is formed to provide a curved guiding surface 47 which cooperates with the adjacent parts of the bearing plate 42 to center the stem, but offers no obstruction to the rocking movement of the actuator stem. Also, the stem adjacent the guiding surface 47 may be reduced in diameter, as clearly seen in Fig. 10, so as to permit the stem to move bodily downwardly to a limited extent, the purpose of which will be clear later on; this also permits tilting of the stem.

Above the base plate as clearly seen in Fig. 2, a metallic contact disk 48 is supported by the actuator stem through the intermediary of an insulating bushing or disk 49. Contact disk 48 is thus insulated from the stem 43. A compression spring 50 is compressed between the base plate 40 and the contact disk 48, being in contact with the latter to provide electrical connection. This spring urges the actuator upwardly causing the bearing surface 46 to engage the seat afforded by plate 42, thus tending to center the actuator stem and to maintain it in neutral position as shown in Fig. 2.

A securing device for holding the actuator 44 in position upon the stem 43 is provided by a spring locking ring 51 adapted to engage in a peripheral groove 52 of the stem, and to seat in a depression 53 formed in the upper surface of the insulating disk 49. Thus, the locking ring prevents relative upward movement of the insulating disk upon the stem 43. Downward movement, however, is permitted whereby the locking ring may be readily engaged or disengaged.

In the embodiment shown there are four contacts, these being in the form of yielding contact springs 54 embodying strips of metal secured to the base plate 40. The contacts 54 are secured at their lower ends to the under surface of the base plate by means of connecting studs 55. From their connections the contact springs extend upwardly through apertures 56 in the base plate, the upper yielding ends thereof being positioned in proximity to the edge of the contact plate 48, but normally spaced from the latter. This arrangement provides a connection for the contact springs which lessens the tendency of the latter to break through continued flexure thereof, thus increasing the life of the contacts. Also, the back walls of the apertures 56 provide limiting stops to limit movement of the contact springs toward the contact disk 48. The appropriate circuit wires 34 will be connected to the respective connecting studs 55.

As shown in Figs. 6 and 13, the actuator spring 50 is provided with a connecting loop 57 for connection to a connecting stud 58 to which a main lead wire is connected. Also, for the purpose of anchoring this connecting loop in position, an angularly disposed extension or lug 59 may be provided which can extend into an appropriate aperture in the base plate 40. This anchors the connecting loop in position during insertion or removal of the connecting stud 58. The spring 50 thus functions as a conductor between the contact disk and the stud 58.

Mounted upon the underside of the base plate 40, as clearly shown in Figs. 2, 8 and 9, there is a contact plate 60 having a central portion spaced from the adjacent surface of the base and having spaced supporting extensions 61 adapted to contact with the base. The yielding contact plate 62 has its contact portion adjacent the contact plate 60 and extends therefrom between the supports 61 to a connecting stud 63. The contact part of contact spring 62 is juxtaposed to the actuator head 45 of the actuator stem 43. Longitudinal downward movement of the stem therefore will press the spring plate 62 into contact with plate 60, thus effecting closure of a circuit at this point to sound an audible signal. As clearly seen in Fig. 2, the contact will be made by the curved outer end of the spring plate 62 which moves with a sliding or wiping action against the adjacent inclined portion of the contact plate 60, thus providing a self-cleaning contact.

At its upper end the actuator stem 43 passes through an opening in the casing 36 and an ac-

tuator handle 64 may be secured to the upper end for manual operation. As best seen in Fig. 21, radiating slots 65 and 66 extend outwardly from the center of this opening. These slots form guideways for selectively positioning the lateral movements of the actuator stem in different directions from its central position. Thus the actuator is guided to selectively control closure of different circuits at the respective contact springs 54. It will be observed, moreover, that such contacts will be made with sliding or wiping actions of the edge of the contact disk 48 with the respective spring contacts 54, thus keeping the contacts clean and assuring good electrical connections.

Referring particularly to Figs. 2, 19 and 21, it will be seen that the slot 65 is enlarged somewhat at its outer end having a restricted inner portion. A locking member 67 is slidably mounted upon the upper part of the stem 43 having a downwardly projecting locking stud 68 of a diameter which will pass within the enlarged portion of slot 65, but will not pass through the restricted portion.

A retaining spring 69 is carried by the locking member 67 having spaced arms 70 adapted to engage in a circumferential slot 71 in the stem. This retaining spring will, therefore, hold the locking member 67 in raised position as shown in Fig. 2. Downward pressure, however, will release the retaining spring from its groove and the locking member 67 may be slid downwardly along the stem 43. When the stem is swung to the position of Fig. 19 and the locking member 67 moved downwardly as described, the locking stud 68 engages in the slot 65. The switch actuator will thus be locked in position to close certain of the contacts which in the embodiment shown will be the stop signal or light which may thus function as a parking light.

Some of the structural details of the locking member 67 are shown in Figs. 22, 23, 24 and 25. The central apertured plate or disk 73 is held in position above the spring 69 by the inwardly crimped or flanged portion 72 of the casing member. Fig. 25 shows the casing member before the crimping thereof.

As shown in Figs. 1 and 21, the casing 36 may be provided with certain legends or indicia to indicate the signal given when the actuator 44 is moved in different directions. For example, the arrowheads 75 indicate that right or left-hand turn signals are given, the legend "slo" indicates that a slow signal is displayed while the signal "Stop" indicates that a stop signal is displayed.

In order that the upper part 36 of the casing may be readily placed in its proper position upon the insulating base 40 with the slots 65 and 66 correctly positioned with reference to the respective contacts, (see Figs. 6, 20, 21, etc.) lugs 76 may be provided on the casing adapted to engage in corresponding seats or recesses 77 in the base plate. These seats are unequally spaced in opposite directions about the disk 40. That is, when two seats are used they are spaced more than 180 degrees (180°) apart in one direction and less than 180 degrees (180°) apart in the opposite direction, and the lugs 77 upon the casing 36 are correspondingly spaced. Thus the lugs will seat in the corresponding recesses 77 and the casing will be properly centered only when the casing is in correct operative position, with the guiding slots and contacts bearing the correct respective relation with reference to each other.

As shown in Figs. 12, 20, etc., the lower part 35 of the casing may be provided with lugs 78 spaced about 180° apart and forming bearings resting against the under side of the base disk 40 at points thereon angularly spaced from the points of contact of the supporting flange 37 with the supporting lug 31^b and with the clamp 38. The lugs 38 thus form fulcrums for the lower casing 35 by virtue of which, when the clamp 38 is tightened, the disk base 40 and the upper casing 36 are firmly seated in position in the support 31.

A slightly modified form of actuator and actuator disk is shown in Figs. 27, 28 and 29. In this form the metallic contact member is in the form of a ring or collar 79 mounted upon the insulating bushing 49^a, generally similar to the bushing 49, which may be similarly mounted upon the actuator stem 43. The actuator spring 50^a is similar to actuator spring 50 but is provided at its upper portion with an extension 80 positioned for contacting with the contact ring 79 to provide an electrical connection.

Fig. 26 shows a typical diagram of connections in which the improved multi-contact switch is indicated diagrammatically at 30^a. A battery or source of energy is indicated at E and ground connections at G. A horn or audible signal 81 is shown and also signal lamps 82, 83, 84 and 85. These signal lamps may be mounted for operating any appropriate form of traffic control signal. For example, the lamp 82 may illuminate a left-hand turn signal, the lamp 83 a slow signal, the lamp 84 a stop signal, and the lamp 85 a right-hand turn signal. The signals controlled by these lamps may be mounted at the rear of an automobile.

Similar lamps 82^a, 83^a, 84^a and 85^a may also be utilized, if desired, to control a similar traffic signal positioned at the forward end of an automobile; also a tail lamp 86 is shown controlled by a switch 87.

In the diagram the actuator is represented at 44^a and the actuator head corresponding to head 45 at 45^a. Contact 62 is represented at 62^a and contact 54 at 54^a.

The operation of the improved controlling system will now be understood in view of the foregoing detailed description and the disclosure of the diagram of Fig. 26. When it is desired to execute a right-hand turn signal, the actuator 44 is swung to the right toward the arrow 75. The actuator will be positioned and guided in this movement by the corresponding slot 66 and the contact disk 48 will engage the corresponding spring contact 54 (54^a in the diagram), thus illuminating the right-hand turn lights 85 and 85^a. Similarly, when a left-hand turn is about to be made, the actuator will be swung to the left illuminating the signal lamps 82 and 82^a. Appropriate movements of the actuator will also illuminate the lamp 83 for a "slow signal", or lamp 84 for a "stop signal". All of the different signals are, therefore, selectively controlled by the selective action of the actuator 44. If it is desired to operate the stop signal for a parking light, the actuator is locked in stop position by means of the lock 67 described, thus maintaining lamps 84 and 84^a in illuminated condition.

If it is desired to operate the audible signal 81 at any time, either when any one of the visual signals is displayed, or when none of them is displayed, it is only necessary to press downwardly upon the handle 64 thus closing contacts 60, 62 (62^a in Fig. 26) to complete the circuit through the audible signal 81. The audible sig-

nal may thus be initiated and discontinued during operation of any of the visual signals, or it may be controlled separately and independently of the visual signals. After operation of the actuator to any position, it is urged toward neutral position by cooperation of the spring 50 and the rocker bearing surfaces 46, 42. Also the actuator stem will be returned by spring 50 to neutral position after downward bodily movement thereof to operate the audible signal.

It will be observed, referring to Fig. 1, that insulating bushings 31a are provided to insulate the supporting arm 31 from the support to which the latter is attached, such, for example, as a steering column of an automobile. The conductor G62 (Figs. 1, 4 and 26) connects the binding post 62 to ground. This arrangement permits the audible signal or other selected circuit to be independently controlled by operation of the handle 64. It will thus be seen that the circuit including the conuctor G62 is entirely independent of the other circuits and that all of the circuits are under the selective control of a single actuator.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention what I claim as new, and desire to secure by Letters Patent, is:

1. In a switch, in combination, a plurality of contacts, a contact actuator, means whereby said actuator may be moved in different planes to selectively close different contacts, means whereby said actuator may be moved in a plane at an angle to said first mentioned planes to selectively close another contact, automatic means including a single spring for returning the actuator to neutral position after contact operation thereby, and locking member movably mounted on said actuator for locking said actuator in one of its contact closing positions.

2. In a switch, in combination, a plurality of contacts, a contact actuator including a stem provided with a peripheral bearing surface, a multiple fulcrum supporting seat with which said bearing surface rockably engages so as to move to selectively close the contacts, and means urging said bearing surface against said supporting seat thus tending to move the stem to neutral position, said stem having a spheriodally curved guiding surface adjacent said bearing and cooperating to center the same.

3. In a switch, in combination, a base plate having an opening, a plurality of contacts carried by said plate, a contact actuator having a stem passing through said opening and having a bearing forming a multiple fulcrum adjacent the latter upon which the stem may rock in different directions, said stem having a spheriodally curved guiding surface adjacent said bearing and cooperating to center the same.

4. In a switch, in combination, a plurality of contacts, a contact actuator including a stem, a mounting device including a multiple fulcrum seating flange adjacent one end of said stem for swinging movement thereof in different planes and also for longitudinal movement, a spring operatively connected to said stem and stressed to center the stem through cooperation with said multiple fulcrum seating flange, means whereby said contacts are selectively operated upon swinging or longitudinal movement of said stem, and means including guiding slots to guide the swinging movement of the stem so as to effect selective closing of the contacts.

5. In a switch, in combination, a plurality of contacts, a swinging actuator for selectively closing the contacts, means including guiding slots to selectively control swinging movement of the actuator, and an adjustable lock carried by the actuator and engaging a slot to lock said actuator in contact closing position.

6. In a switch, in combination, a base plate having openings, a plurality of spring contacts secured to said base plate and having free ends extending through said openings, an actuator mounted on said base plate and having a free end extending through one of the said openings for movements in different directions, said actuator including a universal fulcrum seating flange adjacent its mounting end, and having adjacent to the latter on said actuator a rockable automatic centering bearing surface cooperating with the latter said opening to neutralize off center action of said seating flange, means to exert a stress upwardly on said actuator, said means operatively cooperating with said seating flange to automatically neutralize said movements in different directions of said actuator, a contact member carried by said actuator and adapted to selectively engage said spring contacts upon movement of the said actuator in said different directions.

7. In a signal switch, in combination, a plurality of circuit-closing contacts, a contact actuator, a lateral and longitudinal universal mounting for said actuator including a fulcrum seating bearing adjacent mounting end of said actuator and extending peripherally therearound, a seat for said fulcrum seating bearing, a spring operatively connected to said actuator cooperating to exert an upwardly stress on said universal lateral and longitudinal mounting and on said seat to automatically neutralize lateral and longitudinal movements of said actuator, and means whereby any one of a plurality of said contacts may be selectively closed, and means whereby said actuator may be actuated to close another said contact for operation of an audible signal when one of the other said contacts is closed to operate a visual signal.

8. In a signal switch, in combination, a plurality of circuit-closing contacts, a contact actuator, a universal mounting for said actuator including a fulcrum seating flange adjacent the mounting end of said actuator, a spring operatively connected to said actuator to exert an upwardly stress on said seating flange to automatically neutralize the universal movements of said actuator, and means whereby any one of a plurality of said contacts may be selectively closed for control of visual signals, and means whereby said actuator may be actuated to close another contact for operation of an audible signal when one of the said other contacts is closed to operate a visual signal, or when all of the first mentioned contacts for visual signals are open.

9. In a switch, in combination, a plurality of contacts, a universal contact actuator, means for automatic neutralizing action of said actuator including a seat, a fulcrum seating bearing adjacent mounting end of said actuator and extending peripherally therearound whereby the said actuator may be moved laterally to close one of said contacts and longitudinally to close another said contact, a spring operatively con-

nected to said actuator and stressed upwardly cooperating with said seat and said fulcrum seating bearing to automatically neutralize said lateral and said longitudinal movements.

10. In a switch, in combination, a plurality of contacts, a contact actuator including a seating flange adjacent its mounting end, a universal mounting for said actuator for swinging and for bodily movements, a spring operatively connected to said actuator cooperating to exert an upward stress on said seating flange to automatically neutralize said swinging and said bodily movements of said actuator, and means for selectively closing contacts upon either swinging or bodily movements of said actuator.

EDWARD COOPER TAYLOR.