

Sept. 23 , 1924.

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A. C. GAYNOR

ELECTRIC SWITCH APPARATUS AND SYSTEM

Filed Feb. 12, 1921

3 Sheets-Sheet 1

Fig. 1.

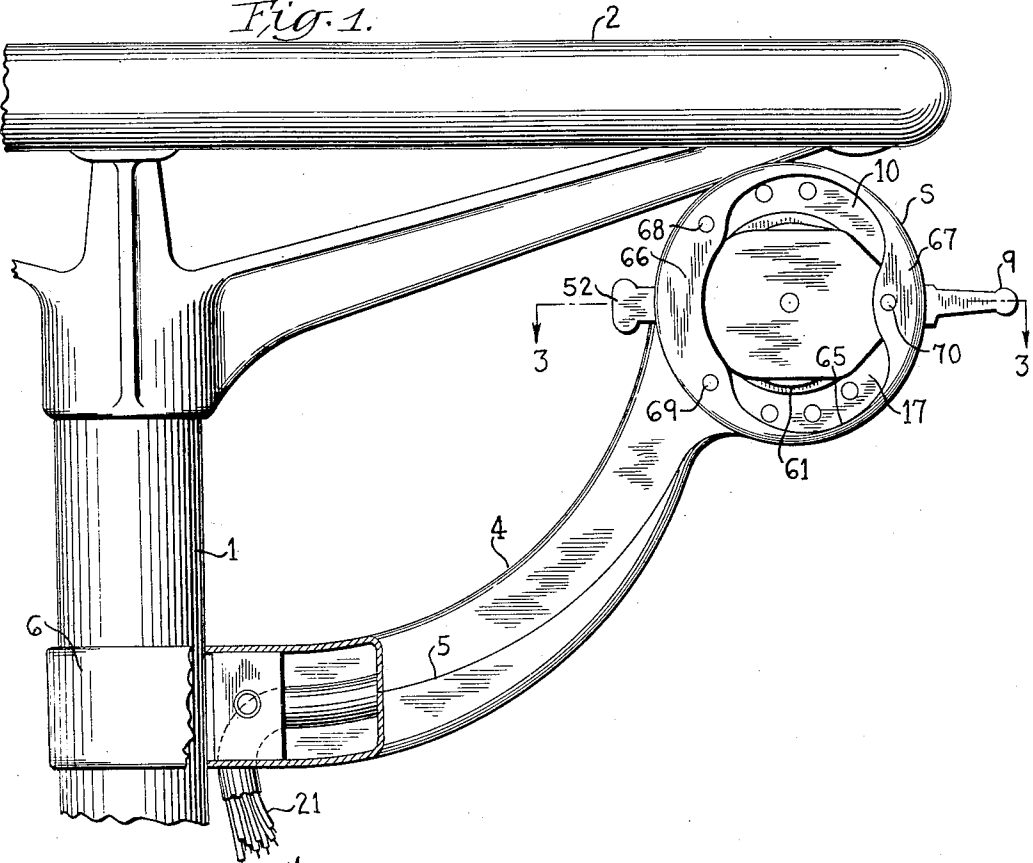
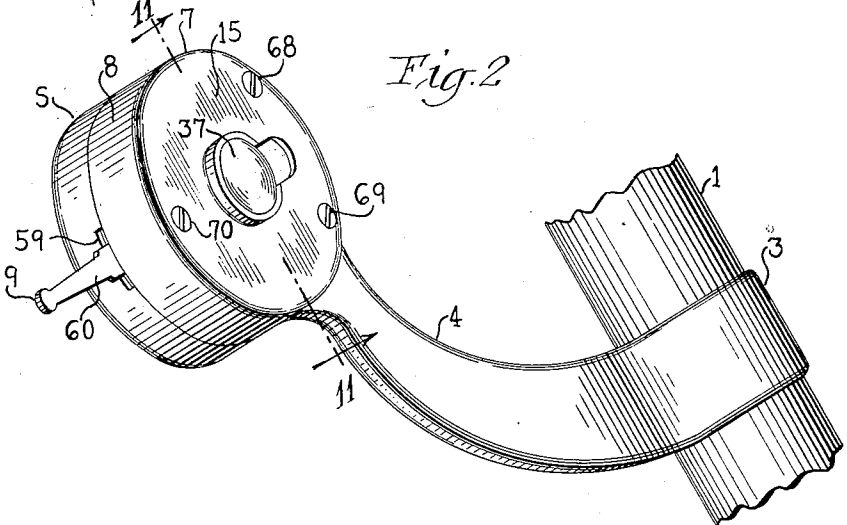


Fig. 2



Standard Electric

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Sept. 23, 1924.

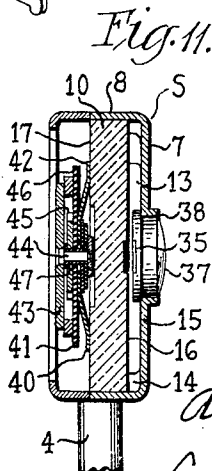
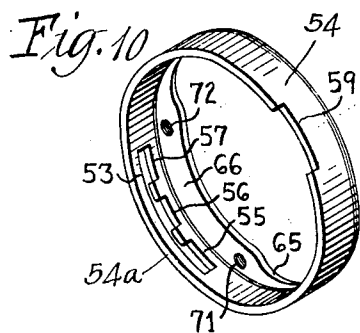
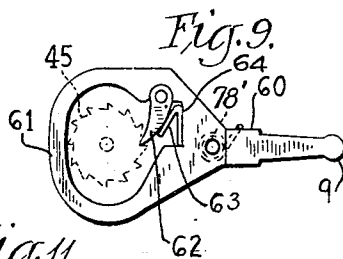
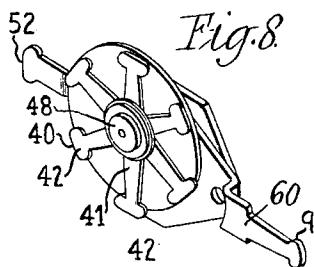
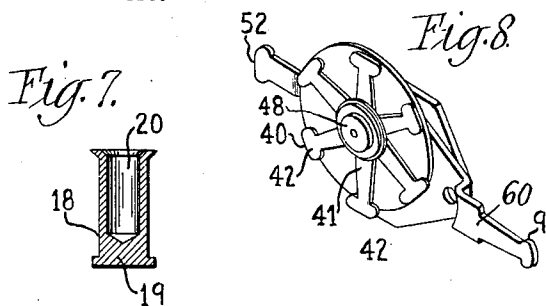
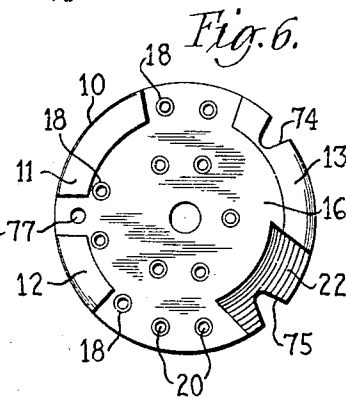
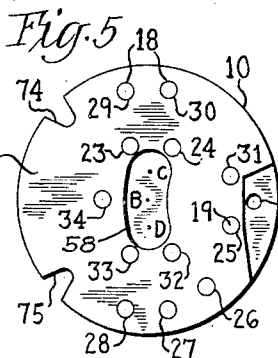
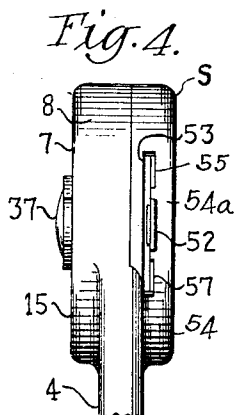
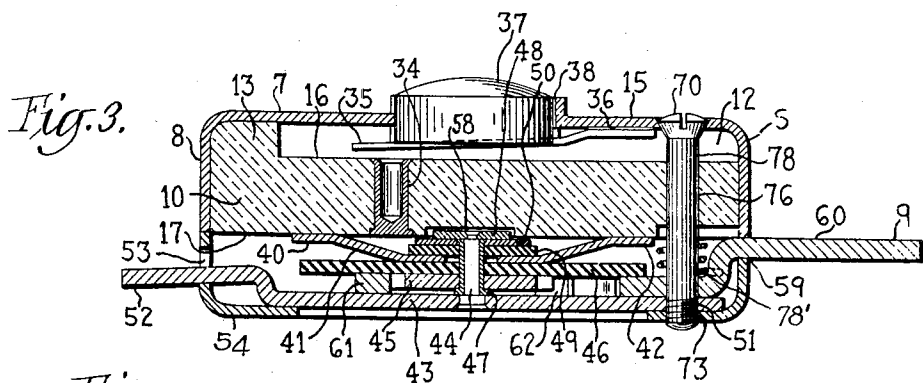
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ELECTRIC SWITCH APPARATUS AND SYSTEM

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3 Sheets-Sheet 2



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ELECTRIC SWITCH APPARATUS AND SYSTEM

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3 Sheets-Sheet 3

Fig. 12.

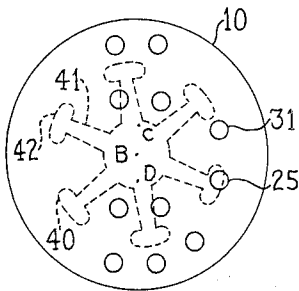


Fig. 13.

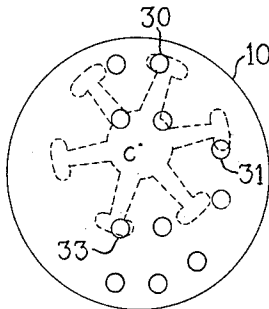


Fig. 14.

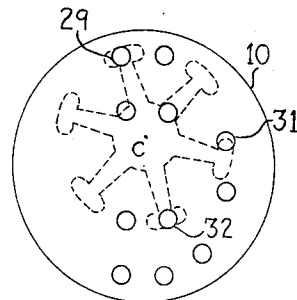


Fig. 15.

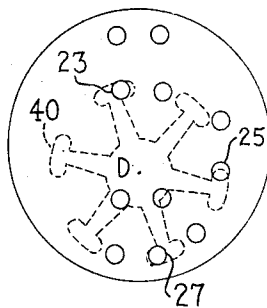


Fig. 16.

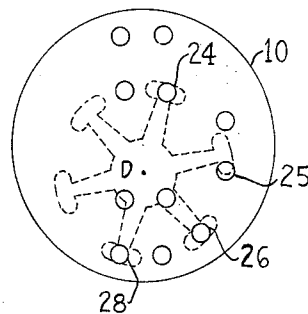
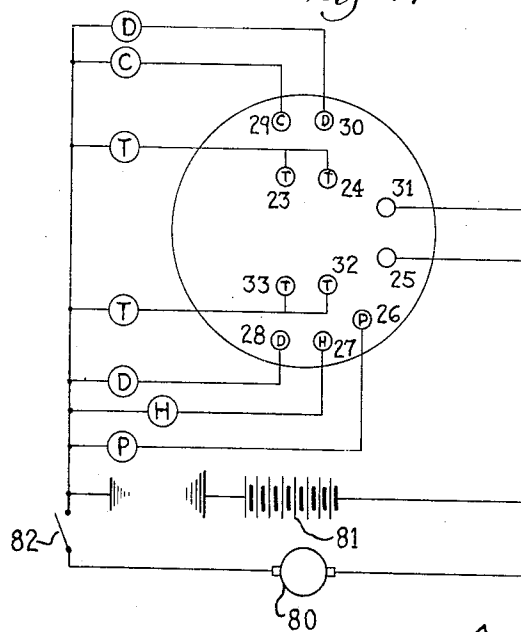


Fig. 17.



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UNITED STATES PATENT OFFICE.

ARTHUR C. GAYNOR, OF STRATFORD, CONNECTICUT.

ELECTRIC SWITCH APPARATUS AND SYSTEM.

Application filed February 12, 1921. Serial No. 444,382.

To all whom it may concern:

Be it known that I, ARTHUR C. GAYNOR, a citizen of the United States, and a resident of Stratford, county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Electric Switch Apparatus and Systems, of which the following is a specification.

This invention relates to electrical apparatus and with regard to the more specific features thereof to switch mechanism for the control of electrical circuits on motor vehicles.

The invention is an improvement upon that of my copending application, Serial No. 346,522, filed December 22, 1919, and is primarily designed to provide a simpler construction and one susceptible of cheaper and easier manufacture. Briefly, the present invention in common with the prior invention above referred to, provides mechanism which shall be susceptible of manipulation for making circuit adjustments desired while the vehicle is in motion without diverting the attention of the driver, chauffeur or pilot from the controls and which shall in effect substantially eliminate the need for exercise of selection or judgment in the making of any switch connection desired while the vehicle is in motion. According to a preferred feature of the invention, a simple switch mechanism is provided for the lighting system of the vehicle which may be set to suit different conditions of use as, for instance, for road or for city use, and which shall be readily operable for connecting the lamps in any of the various combinations required under each of the different conditions of use.

Another feature of the invention is the embodiment in the same construction with the lighting switch and without increasing the dimensions of the box, of an independently operable electric switch preferably for actuating an electric horn.

Referring now to the accompanying drawings in which is shown one of various possible embodiments of the several features of this invention,

Fig. 1 is a side elevation of my switch mechanism mounted in place, parts of the bracket being shown broken away,

Fig. 2 is a perspective of the switch mechanism as mounted in place, viewed from the side of the switch operating finger piece and the horn button,

Fig. 3 is a transverse sectional view on an enlarged scale taken along the line 3—3 of Fig. 1,

Fig. 4 is a side view of the switch box viewed from the side of the switch setting lever,

Fig. 5 is a face view of the insulating slab,

Fig. 6 is a reverse view of the insulating slab,

Fig. 7 is a detailed view on an enlarged scale of one of the stationary switch contact constructions,

Fig. 8 is a perspective view of the switch setting member with the switch spider mounted thereon,

Fig. 9 is a plan view of the switch operating lever member showing the position of the ratchet in dotted lines,

Fig. 10 is a perspective view of the switch cover,

Fig. 11 is a section taken along the line 11—11 of Fig. 2,

Fig. 12 is a diagrammatic view of the switch in "off" position,

Figs. 13, 14, 15 and 16 are diagrammatic views of the switch showing various operative positions, and

Fig. 17 is a diagrammatic view of the electrical connections for my switch.

Similar reference characters refer to similar parts throughout the various views of the drawings.

Referring now to the drawings, I have shown a steering column 1, of an automobile with the usual form of steering wheel 2 mounted thereon. Attached to the steering column I provide a bracket 3 preferably provided with a hollow arm 4 formed from a sheet metal blank bent into a tube welded together as at 5. One end of the arm is bent to partially embrace the steering post, and a clasp member 6 is pivoted thereto and interlocked therewith in any desired manner substantially as set forth in my copending application above referred to. The details of the bracket securing means being no part of my present invention are not set forth herein.

At the outer end of the arm is disposed the switching unit designated in its entirety by the letter S. Preferably the switching unit comprises a flat cylindrical box 7, the base or box member 8 of which is integral with the bracket arm, being blanked and formed in one piece therewith. As shown in Fig.

1, the base of the box 7 is in a vertical plane and of such length that the outer end of the switch mechanism is adjacent the rim of the steering wheel, the switch mechanism being preferably provided with a switch operating finger piece 9 adjacent the rim of the wheel. The driver, chauffeur or pilot may thus manipulate the switch by simply raising the finger piece 9 with the little finger without removing either hand from the steering wheel.

Referring now to the detailed construction of my switch mechanism, I provide an insulating contact carrying slab or disk 10 preferably of micarta or equivalent material, of a diameter such as to fit with small clearance within the box member 8 and having integral peripheral flange segments 11, 12 and 13 to provide for a space 14 between the end wall 15 of the box member 8 and the adjacent or rear side 16 of the insulating slab for a purpose which will appear more fully below. Flush with the front or contact surface of the insulating slab as at 17 there are a plurality of contacts, the preferred arrangement of which will appear more fully below. Each of the contacts comprises a tubular rivet 18, (see Fig. 7) extending transversely through the insulating slab, the ends being swaged over in the usual manner. Preferably one end of the rivet is solid as at 19, the rivet being open or tubular at the rear surface of the slab as at 20. The electrical leads or conductors 21 are preferably soldered one in the open end of each of the contact rivets, all said conductors extending along a cut-away portion 22 near the periphery of the slab aligned with the tubular bracket arm 4 for connection to the battery or other source of current and to the lamps or other translating device controlled by the switch, which will be described more fully below.

In the specific form of switch shown in the drawings, I have indicated twelve fixed contacts upon the insulating slab, the contacts 23, 24, 25, 26, 27 and 28 being arranged approximately on the arc of a circle having its center at D eccentric of the slab 10 and the contacts 29, 30, 31, 32 and 33 being on the arc of another circle of the same diameter having its center at C. The center of the slab is shown at B intermediate the two centers C and D.

All of the above contacts are used in the operation of the lighting circuits as will appear more fully below and the remaining or twelfth contact 34 is for the horn circuit only, the said contact being as shown in Fig. 11 in the path of a switch blade 35 soldered as at 36 at one end to the interior of the box member 8 and under control of the insulating push button 37 projecting through an opening 38 in the center of the base. It will be understood that the electric horn is

grounded so that upon depression of the push button, the horn circuit will be closed.

Cooperating with the stationary contacts on the slab, I provide a movable switch member preferably in the form of a spider 40 having six arms 41 each provided with an integral contact shoe 42. This spider is approximately of the same radius as the circles on which the fixed contacts are arranged and it will be seen that when the center of the spider is aligned with the center C, the contact shoes of the spider may contact only with contacts on the circle having the point C as its center. When the axis of the spider is aligned with center D, the shoes may coact only with contacts on the circle having point D as its center. When the spider is arranged coaxially of the base, that is, with its center aligned with point B it may coact only with contacts 25 and 31 and with none of the remaining contacts.

The spider is preferably disposed relative to the casing and the fixed contacts specifically as follows:

The spider is mounted to turn about a pin 44 which extends at right angles to a setting or support plate 43. The spider is formed rigid and concentric with a ratchet wheel 45 but is insulated therefrom by an insulating backing disk 46. A rivet 47 encircles pin 44 and is secured thereto, the rivet preventing separation of the spider, the backing disk and the ratchet, but permitting the spider unit to be rotated thereabout. The head 48 of the rivet is insulated from the spider by a washer 49 and a metallic washer 50 superposed upon washer 49 prevents excessive wear of the latter. The setting plate has an aperture 51 at one end at which it is pivotally supported near the periphery of the casing. Integral with the setting plate there is formed a finger piece 52 extending radially outwardly through an elongated slot 53 in the flange 54^a of a metallic cover plate 54 for the switch unit box. The slot is formed with lateral notches 55, 56 and 57 into any of which it is adapted to fit. The resiliency of the arms of the spider tends to urge the setting plate upon which it is mounted toward the cover plate so that when the finger piece 52 is brought into alignment with any of the notches, the arm will be effectively snapped into engagement therewith.

An arcuate depression 58 is formed in the face of the insulating slab, the head 48 of the rivet for the spider riding in said depression as the setting plate is moved about its pivot 51 from one setting to another. It will be understood that when the setting piece 52 is in notch 55, the center of the spider will be aligned with the point C, when in notch 56 it will be aligned with the point B and when in notch 57 with the point D.

By preference the indications "Off," "City" and "Road" or their equivalents (not shown) are provided upon the box or cover member to identify the notches. It will be apparent that for setting the switch in any of the three possible positions, it is merely necessary to move the setting piece 52 out of the notch in which it was previously set and to shift it into alignment with the notch corresponding to the switch setting desired, whereupon the setting piece will automatically snap into position in said notch. By this arrangement, the spider axis will be firmly retained against displacement from its setting.

Preferably, I provide a single mechanism for adjusting the spider about its axis, to effect the various different connections required in use, when the spider is set for "road" use and when it is set for "city" use, all as will appear more fully below. For this purpose, I preferably provide a switch operating lever 9 generally similar to the switch operating lever set forth in my copending application, said lever being interposed between the insulating backing disk 46 at the rear of the spider and the supporting or setting plate 43. An operating arm 60 of the lever 9 projects preferably from the cover of the box through a notch 59 in the flange 54 thereof, substantially diametrically opposite the slot 53 therein to constitute the finger or operating piece. The operating lever 9 is pivoted as will appear more fully below to be moved about the same axis as setting plate 43.

The operating lever actuates the switch contact spider through a pawl and ratchet mechanism, the ratchet wheel 45 of which has already been referred to. The specific construction of this mechanism being substantially identical with that of my copending application above referred to, it may briefly be noted here that the inner arm of the operating lever is preferably in the plane of the ratchet member and is formed in the shape of a loop 61 encircling ratchet wheel 45 as best shown in Figs. 3 and 9. A pawl 62 cooperating with the ratchet is pivotally secured by fitting at its base into a corresponding recess in the inner periphery of the loop. A U-shaped leaf spring 63 has one leg fitting into a rectangular recess 64 in the inner arm of the operating lever, the other leg pressing against the side of the pawl to maintain it in engagement with a ratchet tooth.

Preferably, the ratchet is formed with twice as many teeth as the spider has arms. In the particular device shown in the drawings, the ratchet has twelve teeth. It will thus be apparent that by each ratchet operation, the spider will be rotated through half the angle between adjacent arms, so that the spider has two effective positions about its axis.

The base of the cover member is preferably cut away as shown at 65 leaving substantially two short segmental portions 66 and 67 for securing the same in place. In the preferred construction, three screw pins 68, 69 and 70 are used for securing the parts in assembled relation. The base and the cover are each provided with three apertures 71, 72 and 73 for the screw pins, the said three apertures being at different distances from each other so as to provide but one possible position of registry. The insulating slab is provided with transverse notches 74 and 75 at its periphery along which two of the securing screws may project, thereby holding the slab in place against rotation about its axis and the third screw 70 extends through a hole 77 through the insulating slab. The pin 70 serves as a common pivot for the setting plate 43 and for the operating lever 9, and when the latter is operated it is restored by the spring 78'.

The setting finger piece 52 as heretofore noted, will project outwardly through the slot 53 in the cover 54 and the operating lever arm or finger piece 60 extends radially outwardly through the notch 59 in the cover 54. Although the cover plate is shown open or cut away it will be understood that the base thereof might be a complete disk.

In Fig. 17 I have shown diagrammatically the preferred form of circuit in which my switch may conveniently be used. By way of illustration I have indicated merely diagrammatically the ordinary form of electrical generator 80, the storage battery 81 and the usual automatic switch 82. The eleven stationary contacts of the lighting switch and the spider 40 are indicated in their approximate relative positions.

Contacts 28 and 30 are connected to the dimmer lights, indicated by the letter D, contact 27 to the headlights indicated by the letter H, contacts 23, 24, 32, and 33 to the tail light indicated by the letter T, contact 29 to the curb or side lights indicated by the letter C, and contact 26 is connected to the pilot light indicated by the letter P. Contact 34 for the horn is not shown in Fig. 17, as the spider at no time comes into cooperation therewith.

By my present invention, the same lighting combinations are attained as in my copending application, although in the present case all of the stationary contacts are simple rivet constructions. As in the copending application when the switch is in position for "city" running (Figs. 13 and 14), the spider may place the dimmer and the tail lights in circuit as shown in Fig. 13, the other lights being out of circuit. In Fig. 14 in which the spider has each arm disposed angularly midway between the positions of the arms in Fig. 13, the tail light

and curb light are in circuit and the remaining lights are out of circuit.

When the switch is adjusted for "road" use it will be seen that the spider may be set in place with the head and tail lights in circuit and the remaining lights out of circuit as in Fig. 15. When the spider is in the position of Fig. 16 with each arm angularly midway between the arms in Fig. 15, the dimmer, tail, curb and pilot lights are in circuit and the remaining lights are out of circuit.

When the switch is in "off" position, (Fig. 12), it is contacted only with one or both of the ground contacts 25 and 31 and none of the shoes is at any time in electrical connection with any of the other contacts. When the center of the switch is in the position shown in Fig. 12, the switch is, therefore, always inoperative. It will be seen that some arm of the spider is at all times in engagement with either ground contact 25 or with ground contact 31 so that when any of the fixed contacts 23 to 33 inclusive is engaged by the spider as in Figs. 13, 14, 15 and 16, a circuit is closed from the ungrounded terminal of the battery, through the lights in circuit, to the switch contacts corresponding to said lights, and then through the spider 40 to ground by way of ground contact 25 to 31 and through ground to the grounded terminal of the battery.

In operation, when it is desired to run in the city after dark, the finger piece 52 of the setting plate 43 is shifted to notch 55 corresponding to "city" position and will automatically snap thereinto after it is brought into alignment therewith as heretofore described. When the setting plate is thus set, the center of the spider is in the position shown in Figs. 13 and 14, and when the spider is in the angular position of Fig. 13, the dimmer lights and the tail light only are in circuit. When the car is to be brought up to the curb for a stop the chauffeur or driver merely raises the finger piece 60 with his little finger without needing to remove his hand from the steering wheel, and by this motion the operating lever 9 through the pawl rotates the ratchet wheel 45 through one tooth, thereby rotating the spider about its axis through thirty degrees into the position shown in Fig. 14, in which the dimmer lights are off and the tail and curb or side lights are on. In the lifting of operating lever 9, energy is stored in spring 78 and when the finger is removed from finger piece 60, the spring 78 urges lever 9 about its pivot, to restore finger piece 60 to its normal position of rest.

When it is desired again to start the automobile, the driver will, while grasping the steering wheel, again depress the operating lever in the manner just described advancing

the spider through a further angle of thirty degrees, and the switch is thus again brought to the effective position shown in Fig. 13, each arm occupying the position previously occupied by the arm immediately preceding it. The dimmer and tail lights are thus again on for city travel.

In the "city" position of the switch, as shown in Figs. 13 and 14, the headlight contact 27 and the pilot light contact 26 are out of the range of the spider, as neither of these lights is to be used in ordinary city operation.

When it is desired to run on the highways or in the country, the setting piece is merely shifted from the "city" notch to the "road" notch. By this adjustment, the setting plate is moved about its pivot and carries with it the spider, shifting the axis of the spider together with the ratchet wheel 45 into the position shown in Figs. 15 and 16, whereupon the setting finger piece 52 snaps into place in notch 57 in the cover flange to retain the setting plate and with it the spider in the adjusted position.

Successive depressions of the finger piece 60 in the same manner as above described in connection with city use, will now place the switch in either the position shown in Fig. 15 or that shown in Fig. 16. In the position of Fig. 15, the head and tail lights are on, the dimmer and pilot lights off. In Fig. 16 the dimmer, tail and pilot lights are on and the head light is off. The curb or side light contact 29 is out of the range of the spider when set for road use, as such light is ordinarily not used when traveling on a highway. Thus, in road use, when running with the bright headlights on, if the chauffeur should wish to eliminate the glare on seeing an approaching vehicle, he merely depresses the finger piece 60 with his little finger without having to remove his hand from the steering wheel, and thereby substitutes the dimmer lights for the head lights, and also puts on the pilot light. When the danger is past, a further depression of the finger piece re-establishes the circuit of Fig. 15 in which the head and tail lights are on, and the dimmer and pilot lights off.

During the day time when no lights are needed, the setting piece is disposed in the notch 56 corresponding to "off" position. The axis of the spider is thus retained in alignment with point B and all of the lighting contacts are out of the range of operation of the shoes. Depression of the finger piece will have no effect on the lighting switch as shown in Fig. 12 and as above described.

The push button 37 is conveniently accessible without removing the hand from the steering wheel and as will be apparent the horn may be sounded by a simple de-

pression thereof, bringing the switch blade 35 into engagement with contact 34 and thus closing the circuit.

It will thus be seen that I have provided a simple, inexpensive and compact, combined lighting and horn switch in which the various lighting operations above pointed out and the operation of sounding the horn may be conveniently performed without removing the hand from the steering wheel and without distracting the attention from the regular operation of the vehicle.

As in the case of my copending application above referred to, it will be understood that the present switch also is applicable to forms of vehicles other than automobiles, such as boats and airplanes and that the switch may be used for control circuits other than lighting and horn circuits. It will be apparent that the invention could be carried forward for use in relations in which more than two switch settings or in which more than two possible positions for each setting are desired.

It will also be apparent that the switch setting means controlled by the setting finger piece and the switch operating means controlled by the operating finger piece may be used to advantage in certain relations independently of each other.

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

1. The combination in an electric switch, of a box, a base therein, a plurality of contacts fixed thereon, said contacts being arranged in circular groups, each group having a different center, a spider, a setting plate for the latter pivoted with respect to said base, and an operating means for said plate formed integral therewith and extending from said box, whereby said plate may be shifted to bring said spider into cooperation with any of said groups of contacts.

2. The combination in an electric switch, of a box, a movable switching member in said box having operating means accessible from the exterior thereof, and a pivoted member for setting the position of said switch, said member having operating means rigid therewith and projecting from said box.

3. The combination in an electric switch of a cylindrical box, a plurality of contacts located therein, a switching member for cooperation with said contacts and pivotally mounted in said box, setting means for said switching member extending outwardly through the side wall of said box, and stop means for retaining said setting means and with it said switch against accidental displacement from set position.

4. The combination in an electric switch, of a plurality of contacts, a switching element for cooperation therewith, a setting

member for said switching element, a wall, said setting member extending outwardly from said wall, and notches in said wall by which said setting member is retained against displacement, one notch corresponding to each position of setting, and means for operating said switching element.

5. The combination in an electric switch, of a cylindrical box, a plurality of contacts mounted in said box and insulated from each other, a switching element in said box for cooperation with said contacts, a setting member for said switch having an integral operating finger piece extending outwardly through an elongated slot in the side of said box, and notches in said slot for retaining said finger piece against displacement from any position of setting.

6. The combination in an electric switch, of a cylindrical box, a plurality of contacts mounted in said box and insulated from each other, a switching element in said box for cooperation with said contacts, a setting member for said switch extending outwardly through an elongated slot in the side of said box, and notches in said slot for retaining said projecting end against displacement from any position of setting, said switching element including a resilient element, whereby said projecting end will snap thereinto when brought into alignment with any said notch.

7. The combination in an electric switch, of a base, a plurality of contacts fixed therein, said contacts being arranged in a plurality of circular groups, each group having a different center, a cover for said base, a switch contact spider pivoted with respect to said base and a setting member for said spider extending outwardly through said cover and connected to said spider to set the same for cooperation with any one of said groups.

8. The combination in an electric switch, of a cylindrical box member, a plurality of contacts fixed therein, said contacts being arranged in a plurality of circular groups, each group having a different center, a setting plate pivoted near the periphery of said box, a switch contact spider rotatably mounted upon said plate near the center of said box, said plate having an integral finger piece projecting from the side of said box, whereby said spider may be disposed in coaxial relation with any one of said groups, and means for manipulating said spider to make alternative circuit connections with contacts of any selected group.

9. The combination in an electric switch, of a box including a flanged cover member, a setting plate pivoted near the periphery of said box, a switching member rotatably mounted upon said plate near the center of said cover, a finger piece integral with said plate, projecting through a slot in the side

of said cover for effecting the settings, and an operating lever having a common pivot with said plate, said lever having one arm interposed between said switch member and
 5 said plate, and the second arm projecting from said box and constituting a finger piece.

10 10. The combination in an electric switch, of a box including a cover member, a setting plate and an operating lever, said plate and lever having a common pivot in said box, a switch contact spider rotatably mounted on said setting plate, a ratchet wheel rigid and coaxial with said spider, said lever carrying
 15 a pawl cooperating with said ratchet wheel, said setting plate having a finger piece at the free end thereof, integral therewith and extending through a slot in said box to set the position of the pivot of said
 20 spider.

11. The combination in an electric switch, of a box including a cover member, a setting plate and an operating lever, said plate and lever having a common pivot in said box,
 25 a switch contact spider rotatably mounted on said setting plate, a stationary contact carrying slab coacting with said spider, a ratchet wheel rigid and coaxial with said spider and facing said setting plate, said
 30 operating lever having an arm straddling said ratchet wheel and carrying a pawl cooperating with said ratchet wheel, said setting plate having a finger piece at the free end thereof, integral therewith and extending
 35 through a slot in said box to set the position of the pivot of said spider.

12. The combination in an electric switch, of a cylindrical box member, a plurality of contacts fixed therein, said contacts being
 40 arranged in a plurality of circular groups, each group having a different center, a cover member for said box, a setting plate and an operating lever having a common pivot near the periphery of said box, a switch contact
 45 spider rotatably mounted upon said setting plate, said setting plate having a finger piece integral therewith, projecting through a slot in the side of said box for setting said spider in coaxial relation with any said
 50 group, and a pawl and ratchet connection between the operating lever and the spider.

13. The combination set forth in claim 12 in which the spider has resilient arms and in which notches are provided at one side of
 55 the slot, one corresponding to each of the various settings, whereby the finger piece will snap into any of said notches when brought into alignment therewith, thereby preventing undesired shifting of the setting
 60 plate.

14. In apparatus of the character described, in combination, a metallic box comprising a box member and a cover, an insulating slab retained in said box, contacts
 65 extending through said slab, a switching

member disposed in said cover and pins extending transversely through said base, and said cover and near the periphery thereof to retain said elements in assembled relation, said pins coacting with said slab to
 70 prevent rotation of the latter.

15. In apparatus of the character described, in combination, a box including a box member, an insulating slab therein and a cover member therefor, switch contacts
 75 upon said insulating slab, a switch member in said cover for cooperation with said contacts, operating means for said switch extending outwardly from said box, a plurality of screw pins extending transversely
 80 through said base, and said cover to retain said parts in assembled relation, one of said pins extending also through said slab and serving as a pivot for said operating means.

16. In apparatus of the character described, in combination, a metallic box comprising a box member and a cover, an insulating slab in said box, said slab having
 85 integral lugs near its periphery for spacing one side of said slab from said base of said box member, contacts extending transversely of said slab, current leads secured to said contacts at the rear faces thereof, a switch setting member, a switch pivotally
 90 mounted thereon, operating means for said setting member extending outwardly from said box, an operating means for said switch extending outwardly from said box, screws extending transversely through said
 95 base, and said cover, one of said screws serving as a common pivot for both of said operating means.
 100

17. A composite switch comprising a box, switch mechanism therein, a switch setting member, a switch operating member accessible from the exterior of said box, and a
 105 second switch operating member accessible from the exterior of said box for controlling a circuit independently of that controlled by said first switch operating member.
 110

18. The combination set forth in claim 17 in which the setting member and the first switch operating member extend from the side of said box at points substantially diametrically opposite each other.
 115

19. A composite switch comprising a cylindrical box, switch mechanism therein comprising a lighting switch setting member extending outwardly from the side of
 120 said box, a single switch operating member extending outwardly from the side of said box and a push button near the center of a face of said box for closing an electric circuit.

20. The combination in an electric switch, of a cylindrical box, an insulating slab therein having contacts arranged in a plurality of circular groups of equal diameter
 125 having different centers, a switch spider for cooperation with said contacts, a setting
 130

plate for said spider pivoted in said box having a finger piece extending outwardly through an elongated slot in the side of said box, notches in the side of said slot to
5 determine the various positions of setting, and an operating lever for said spider having a pivot common with that of said setting plate, said operating lever having a finger piece extending outwardly from the side of
10 said box at a point substantially diametrically opposite said first slot.

21. The combination in an electric switch of a box including a box member and a flanged cover member, an insulating slab
15 in said box member having contacts arranged in a plurality of circular groups of equal diameter having different centers, a

switch spider for cooperation with said contacts, a setting plate for said spider pivoted in said box, having a finger piece extending
20 outwardly through an elongated slot in the side of said box, notches in the side of said slot to determine the various positions of setting, an operating lever for said spider pivoted in said box and having a finger
25 piece extending outwardly therefrom, through a notch in the rim of the cover flange.

In witness whereof I have hereunto set my hand at Stratford, county of Fairfield, 30 State of Connecticut, this 1st day of February, 1921.

ARTHUR C. GAYNOR.