

B. L. SCHWARTZ.

SIGNAL.

APPLICATION FILED NOV. 24, 1917.

Patented July 8, 1919.

3 SHEETS—SHEET 1.

1,309,222.

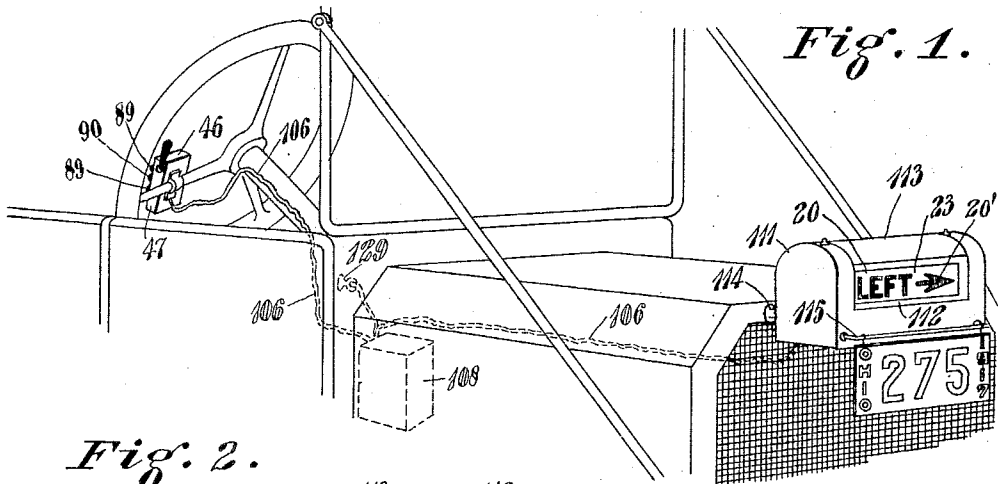


Fig. 2.

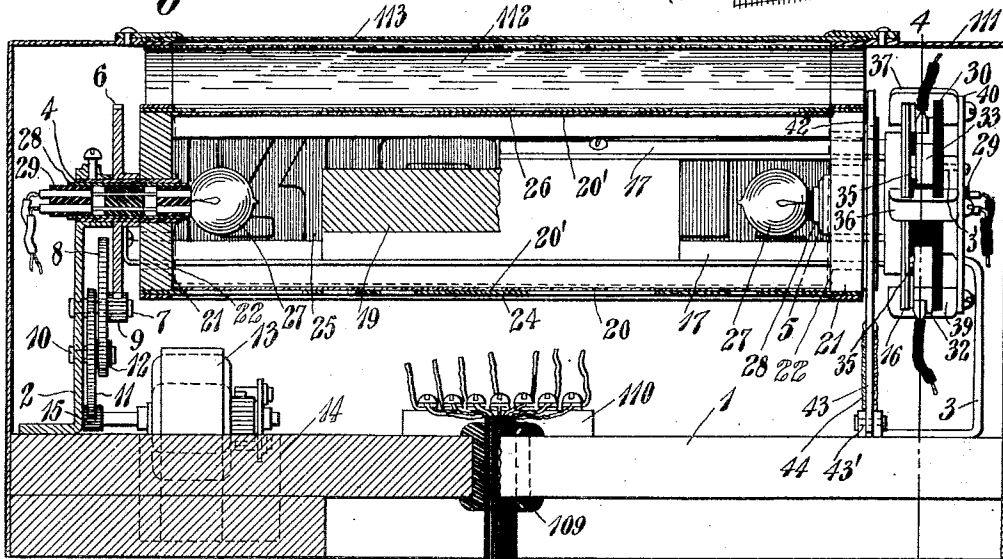
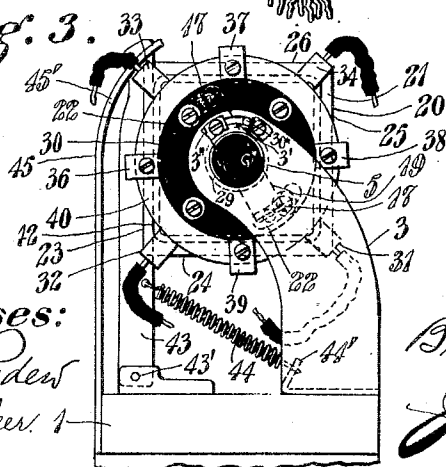


Fig. 3.



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Fig. 4.

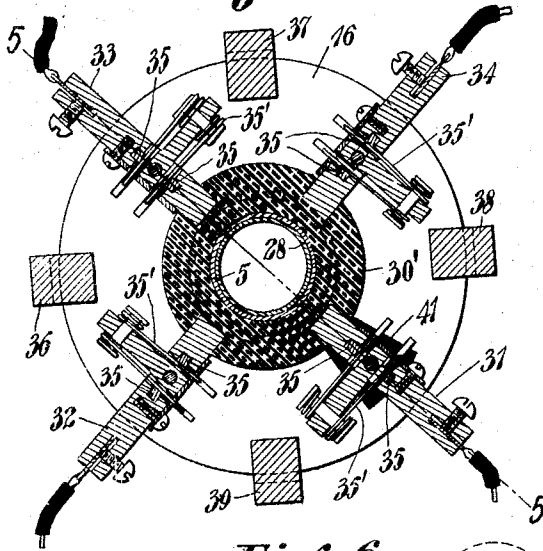


Fig. 5.

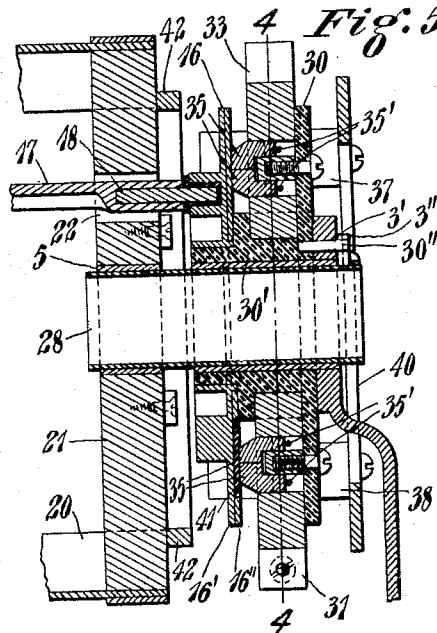
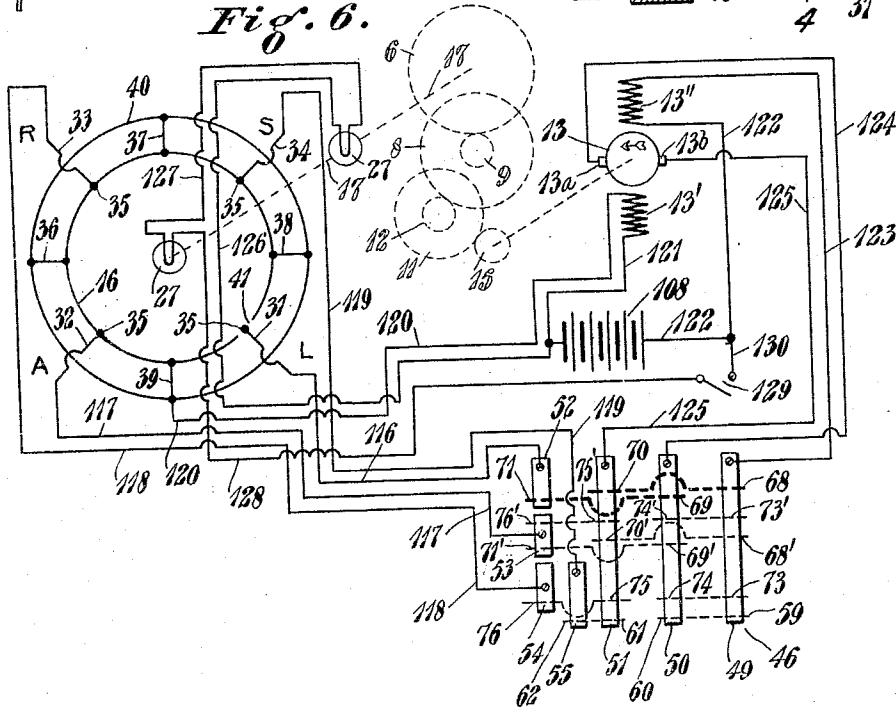


Fig. 6.



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3 SHEETS--SHEET 3.

Fig. 7.

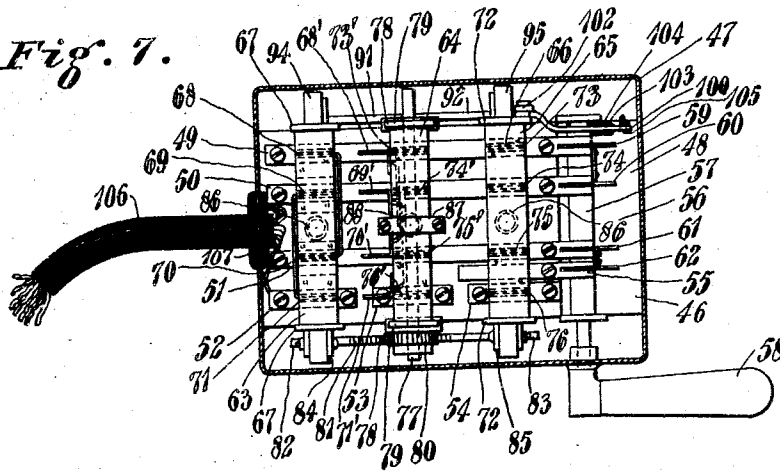


Fig. 8.

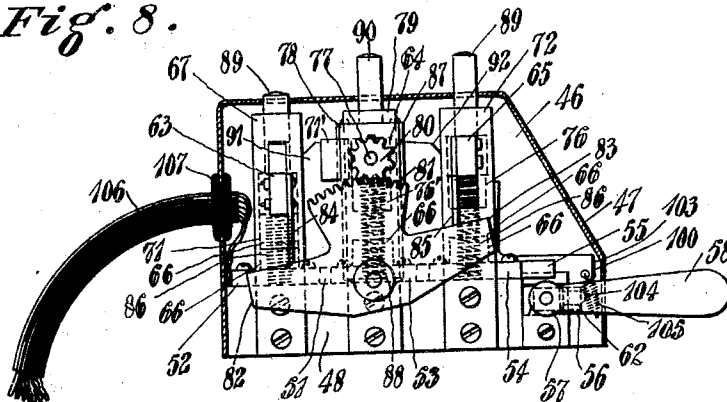
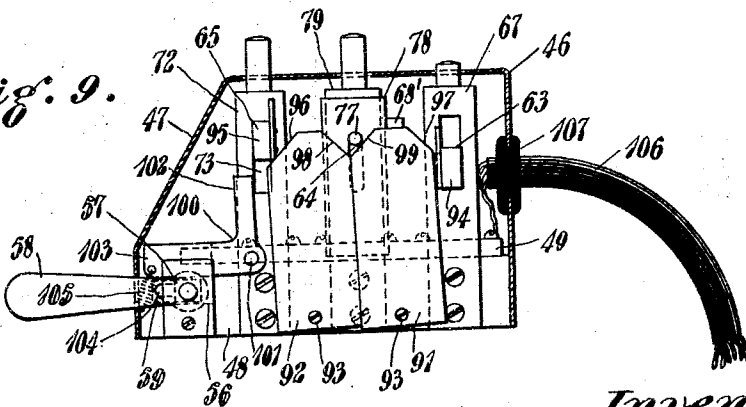


Fig. 9.



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UNITED STATES PATENT OFFICE.

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SIGNAL.

1,309,222.

Specification of Letters Patent.

Patented July 8, 1919.

Application filed November 24, 1917. Serial No. 203,775.

To all whom it may concern:

Be it known that I, BERNARD L. SCHWARTZ, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Signals, of which the following is a specification.

My invention relates to direction indicators and signals, and its more especial object is to indicate the intended movements or stoppages of automobiles.

My invention consists in the combination of parts and in the details of construction and arrangement of parts as will hereinafter be more fully described and claimed.

In the drawings:

Figure 1 is a general perspective view of the front part of an automobile equipped with my signal;

Fig. 2 is a transverse vertical section partly in elevation through the signal box;

Fig. 3 is a view of the right end of the interior mechanism, as shown in Fig. 2;

Fig. 4 is a vertical cross-section on a plane corresponding to the line 4-4 of Fig. 5;

Fig. 5 is a vertical section on a plane corresponding to the line 5-5 of Fig. 4;

Fig. 6 is a diagram showing the electrical connections to the various parts;

Fig. 7 is a plan view of the switch with the top of the casing and the buttons removed;

Fig. 8 is a side elevation of the same with the side of the casing removed; and

Fig. 9 is a side elevation looking from the other side with that side of the casing removed.

The base 1 is of oblong formation and has near respective ends, standards 2 and 3 fixed to and extending up therefrom. These standards have aligned tubular studs 4 and 5, respectively. Mounted to turn on the tubular stud of the standard 2 is the gear 6. On a stud 7 fixed in the standard 2 below the gear 6 are a gear 8 and a pinion 9 turning together, the latter meshing with the gear 6. There is another stud 10 in the standard 2 below and to one side of the gear 8 and on this turn a gear 11 and pinion 12, said pinion meshing with the gear 8. An electric motor 13 is mounted in a recess 14

in the base 1 and has on its shaft a pinion 15 meshing with the gear 11.

At the other end of the device there is an interrupter comprising the contact disk 16 turning on the hollow stud 5 like the gear 6 does on the hollow stud 4. A pair of bars 17 extend from the gear 6 to the disk 16, preferably being permanently attached to the gear 6 and insulated therefrom and removably fitting on studs 18 in the disk 16. These bars are parallel to the common axes of the gear 6 and disk 16, and are preferably fixed to each other and reinforce each other by means of a connecting piece 19 near the middle of the device, which is preferably continuous to conceal the rear inside of the signal-box from the front.

The tubular studs 4 and 5 extend in toward each other past the gear 6 and disk 16, respectively, and the indicator-box 20 of substantially square cross-section has its square ends 21 journaled on the hollow studs 4 and 5, respectively, with segmental slots 22 through which extend the bars 17.

The four oblong sides 23, 24, 25 and 26, one of which is removable to permit access to the inside of the box 20, are provided with perforations in the form of such characters as to indicate the desired signal in each instance, so that by turning the box through a quarter revolution, the indication may be changed from one to the other. As seen in Fig. 1, the side 23 has perforations in the form of the letters "L-E-F-T" and an arrow-head pointing to the left side of the automobile to indicate that the vehicle is about to turn to the left. I prefer to provide the next side 24 below with the perforations to represent the word "A-H-E-A-D." The next side 25 with perforations to indicate the word "R-I-G-H-T" and an arrow-head pointing to the right, and the last side 26 with perforations to indicate the word "S-T-O-P." With these indications, turning the box 21 a quarter turn backward, the word "A-H-E-A-D" is brought into view in front. It will be understood that this will be the normal position of the indicator-box, and then a quarter turn backward or forward will bring into view the indication "L-E-F-T" or "R-I-G-H-T," as the case

may be. A half revolution will bring into view the word "S-T-O-P." It will be understood that one of these signal-boxes may be provided on the rear of the vehicle the same as on the front, as is well-known in the art and need not be more particularly described or shown herein. Thus, the rear signal-box indicates to the driver of a vehicle following that the vehicle bearing the signal will travel straight ahead or will slow down and turn to the left or right, as the case may be, or will stop, thus notifying the driver at the rear to curb the speed of his vehicle accordingly. The signal-box at the front indicates to pedestrians and to the traffic officers the intended direction of the vehicle, so that the danger to pedestrians is minimized and the progress of the vehicle is facilitated because it may readily obtain the right of way when the traffic officers readily understand its intended direction.

In practice, I prefer to color the sides around the perforations white and provide red transparent material 20' such as celluloid across the perforations. Thus, the characters are distinct by daylight, and by providing light inside the indicator-box, the characters are made to appear distinct at night. This lighting is afforded by means of small electric lamps 27 mounted in the inner ends of the sockets 28 that pass through the tubular studs 4 and 5 and receive connecting plugs 29 in their outer ends which have terminals making connection with the lamp terminals through the bodies of the sockets 28 in a well-known manner, as seen at the left in Fig. 2, and which is not deemed to require more detailed explanation.

Also rotatably mounted upon the hollow stud 5 is a disk 30 of insulating material having a hub 30' of the same material. Mounted radially on this disk 30 between it and the contact disk 16 are four brush-holders 31, 32, 33 and 34 in which are mounted the brushes each comprising two sections 35 yieldably held against the adjacent face of the contact disk 16 by springs 35' (Fig. 4.) Clamping arms 36, 37, 38 and 39 are secured to a ring 40 at regular intervals around the disk 30 and hooking over the contact disk 16 to hold it toward the disk 30 against the pressure of the brushes 35.

The contact disk 16 has fixed in it within the zone traversed by the brushes 35, an insulating segment 41. This is preferably accomplished by making the disk of two thicknesses of metal 16' and 16'' with the segment 41 inlaid in the thickness 16'' and backed by the thickness 16'. Thus, as the disk 16 rotates relative to the brushes 35, this insulating segment 41 will successively insulate the brushes from the disk 16.

The standard 3 has in it a segmental slot 3' (Fig. 3) concentric with the tubular stud 5 and the disk rotatably mounted thereon,

and the disk 30 has a pin 30'' projecting into this segmental slot 3'. Adjustable plates 3'' at opposite ends of the slot are engaged by the pin 30'' upon rotation of the disk 30 one way or the other, and determined by their degree of separation, the degree of rotation of the disk 30. It will be understood that it is the purpose of this slot 3' and pin 30'' to permit the disk 30 to turn along with the disk 16 and the bars 17 by virtue of the friction of the brushes 35 and clamping arms 36, 37, 38 and 39 with the disk 16, until these bars 17 have engaged corresponding ends of the segmental slots 22 in the ends 21 of the indicator-box 20, and thus started the rotation of the indicator-box. The purpose of permitting the bars 17 to thus have lost motion relative to the indicator-box is to permit the motor 13 to start with a minimum of load, and also to permit the indicator-box to have some degree of adjustment independently of the motor 13 and gearing.

The end of the indicator box 20 next to the disk 16 has a flange 42 which presents four straight sides parallel with the sides 23, 24, 25 and 26 of the indicator-box, but having curved junctions next to the corners of the box. A stop-bar 43 has a pivotal mounting 43' on the base 1 and extends up substantially vertically with a straight side to lie against any one of the four straight sides of the flange 42. A tension-spring 44 is connected to this stop-bar 43 slightly below the flange 42 and is connected to a suitable lug 44' on the base 1 under the indicator-box, so as to yieldably hold the stop-bar 43 against the flange 42, but allow the stop-bar to swing forward as the indicator-box 20 is rotated and brings the rounded corners of the flange 42 past the stop-bar 43. A guide-bar 45 (Fig. 3) is fixed to the front side of the base 1 and extends up in front of the stop-bar 43 with a slot 45' in its upper end part receiving the upper end part of the stop-bar 43 and acting as a guide therefor. This stop-bar 43 is thus adapted to bring the indicator-box 20 so that the front side is presented in the proper position for indicating, as soon as the indicator-box has approached as near this position as the driving bars 17, acting in the segmental slots 22, will bring it. It will thus be seen that the stoppage of the motor 13 at a precise point is immaterial, because of the lost motion and the adjustment effected independently of the motor and gearing by the spring-actuated stop-bar 43. Also, after this adjustment the parts are prevented from moving, under momentum, so far as to carry the segment 41 past the brush, when the bars 17 reengage the ends 21 at the other ends of the segmental slots 22.

The switch 46 comprises a casing 47 upon a rectangular insulating base 48 on which are mounted long bars 49, 50 and 51, three

aligned short bars 52, 53 and 54, and a bar 55 between the bar 54 and bar 51. The base 48 has a low place 56 at one end out over which the bars 49, 50, 51 and 55 project with vertical slits in their end parts. Journalled across this low place 56 is an insulating bar 57 with a handle 58 on one end by which it is adapted to be given a quarter revolution. Projecting from this bar 57 normally horizontally, are two U-shaped contact plates, one with members 59 and 60 and the other with members 61 and 62, so positioned that when the handle 58 is raised, the contact members 59, 60, 61 and 62 enter the slits in the end parts, respectively, of the bars 49, 50, 51 and 55.

Extending across over these bars are insulating blocks 63, 64 and 65, and the bars have, under the respective blocks, upwardly opening pairs of tongues 66.

The block 63 is mounted to slide up and down in side standards 67 fixed to the edges of the bars 48 and has, on its lower side, four separate tongues 68, 69, 70 and 71 adapted, when the block 63 is depressed to enter, respectively, between the tongues of the bars 49, 50, 51 and 52. Alternate ones 68 and 70 and 69 and 71 of these members are connected, as indicated in Fig. 7.

The block 65 is mounted to slide up and down in side standards 72 extending up from the edges of the base 48 and has on its lower side two U-shaped connecting plates, one having the tongues 73 and 74, and the other having the tongues 75 and 76, which, when the block 65 is depressed, enter, respectively, between the tongues of the bars 49, 50, 51 and 54.

The middle block 64 is journaled by a shaft 77 passing longitudinally through it in small cross-heads 78 that slide up and down on slotted side standards 79 extending up from the edges of the base 48. At one side of the switch, the shaft 77 has fixed on it a pinion 80 that meshes with a segment 81 also journaled on the cross-head 78 below the pinion and having arms 82 and 83 extending over past the standards 67 and 72 on that side of the switch. The blocks 63 and 65 have projections 84 and 85 adapted to engage, respectively, with the arms 82 or 83 as the one block or the other is depressed. The parts are so proportioned that a depression of the block 63 as represented in Figs. 8 and 9, swings the segment 81 over toward this block and rotates the middle block 64 a quarter revolution; and a depression of the block 65 by engagement of the part 85 with the other arm 83 swings the segment 81 the other way and swings the middle block 64 back through its quarter revolution.

On the side of this block 64 that is turned down by depression of the block 63 are U-shaped contact plates similar to those on the block 66 with members 73', 74', 75' and

76'; and on the side that is turned down when the block 65 is depressed are four separate contact members 68', 70' and 71'; alternate ones 68' and 70' being connected together, and the other alternate ones 69' 70 and 71' being connected together, as indicated in Fig. 7.

The blocks 63 and 65 are yieldably held up by helical springs 86 compressed between them and the base 48; and the middle block 64 has a non-rotatable middle bearing 87 between which and the base 48 is compressed a helical spring 88 that yieldably holds up this middle block. The blocks 63 and 65 have buttons 89 and the bearing 87 of the middle block 64 has the button 90 projecting upward through openings in the casing 47.

On the side opposite from the segment 81 are a couple of guard plates 91 and 92 having pivots 93 in the side of the base 48, and with their upper parts lying between extensions 94 and 95 on the blocks 63 and 65, respectively, and meeting at the middle under a projection of the shaft 77 of the middle block at this side. The upper end parts of these plates 91 and 92 have inclined edges 96 and 97, respectively, adjacent to the projections 94 and 95 of the blocks 63 and 65, and opposite inclined edges 98 and 99 next to the projection of the shaft 77. Also, there is a dog 100 having a pivot 101 in the side standard 72, and having a member 102 that projects up close to the projection 95 of the block 65 and another member 103 that projects out over the rotatable bar 57 which has a lug 104 on the same side as it has the contact members, 59, 60, 61 and 62, that engages with and raises the member 103 and pushes the member 102 over under the projection 95, preventing depression of the block 65 if the bar 57 is turned to bring its contact members in the slits of the bars 49, 50, 51 and 55. This member 103 is normally held down by a small tension-spring 105 connected to it and to the base 48, so that the member 102 is normally held out of the way of the projection 95 when the bar 57 has its contact members out of contact with the aforesaid bars. This construction just described, prevents simultaneous operation of the block 65 and bar 57; and it will be seen that the plates 91 and 92 prevent simultaneous operation of any two of the blocks 63, 64 or 65, because the projection 95 of the block 65 will crowd the plates 91 and 92 over toward the projection 94 of the block 63; or, the projection 94 will crowd the plates over toward the projection 95; and for the middle block 64 to descend, its shaft 77 must pass between the plates 91 and 92, spreading them, for which it is necessary that both projections 94 and 95 be up out of the way of these plates.

The various wires connecting to the various bars are combined in a cable 106 which

enters through an opening having an insulating bushing 107 in one end of the casing 47; and as indicated in Fig. 1, this cable 106 runs to the battery 108 and to the signal box at the front end of the vehicle where it enters (Fig. 2) through an opening with an insulating bushing 109 in the base 1 of the signal-box, and passes to a distributing block 110, from whence the various connections are made to the various parts of the signal mechanism. This mechanism is inclosed by a casing 111 which is open at the front, top and also at the back, as indicated in Fig. 2, across which opening is stretched a sheet 112 of transparent material such as celluloid. If desired, the top of this space may be covered by a plate 113. Preferably, the top of the casing and of the transparent sheet 112 and this plate 113 are semi-cylindrical to readily shed moisture. By having the back as well as the front of the casing transparent, the driver is enabled to see whether the signal has operated properly. For instance, when the "left" indication is displayed forwardly, as shown, the "right" indication will be seen inverted through the opening in the rear of the casing. The driver will soon learn to verify the signal by such means. The casing 111 is hung on the vehicle by means of suitable brackets 114 (Fig. 1) and may have on the lower part of its front, a bar 115 for attachment of the license tag of the vehicle, as indicated in Fig. 1.

The connections of the wires that run through the cable 106 are indicated in the wiring diagram of Fig. 6; as are also the various connections made by manipulating the switch 46.

In this diagram, the contact disk 16 of the interrupter is indicated by an inner incomplete circle and the ring 40 by the outer complete circle with the clamping arms 36, 37, 38 and 39 represented by short radial lines joining the two circles horizontally and vertically. The brushes 35 are represented by the spots intermediate of these radial lines on the inner circle 16, and their holders 31, 32, 33 and 34 by lines curving over the outer circle 40. One of these brushes is provided for each side of the indicator-box, which is not represented in the diagram. The driving frame made up of the members 17 and 19 is indicated by the upwardly inclined line 17 and the various gears and pinions through which this is driven by the motor 13 are shown in dotted lines and indicated by their corresponding numbers with the pinion 15 joined to the conventional indication of the motor 13 by a slanting line representing the motor shaft.

The battery 108 is represented conventionally as a primary battery; although it will be understood that this may be a secondary or storage battery, or a magneto or dynamo,

or any other suitable source of current. The switch 46 is represented by its seven bars with their corresponding numerals, while the contact members of the blocks 63, 64 and 65 and the bar 57, are indicated by the heavy dotted lines with their parts numbered to correspond to the showing in Fig. 7.

It will be seen in Fig. 6 that the spot representing the brush of the brush-holder 31, is in the gap of the incomplete circle 16. This gap represents the insulating segment 41. The "left", "ahead", "right" and "stop" brush-holders 31, 32, 33 and 34, respectively, are further indicated for convenience by the letters "L", "A", "R" and "S". It will be seen that the insulating segment 41 is in contact with the "left" brush; thus corresponding with the position indicated in Fig. 1. and also with the position of the block 63 of the switch, as indicated in Figs. 7, 8 and 9. Also, the indication of the connections of this block in the diagram of the switch 46 in Fig. 6, is made in heavier dotted lines to indicate that this is the circuit closed in the example.

Referring then to Fig. 6, it will be seen that a conductor 116 connects the "left" brush to the rear short bar 52 of the switch; a conductor 117 connects the "ahead" brush to the middle short bar 53 of the switch; and a conductor 118 connects the "right" brush to the front short bar 54 of the switch; while a conductor 119 connects the "stop" brush to the short intermediate bar 55 and the front of the switch.

The outer ring 40 and all of the clamping arms, and consequently the disk 16 with which these make constant contact, are connected by a conductor 120 with one end of one of the field-coils 13' of the motor 13, the other end of which coil is connected by a conductor 121 to one terminal of the battery or other source of current 108. The other terminal of this battery or source of current 108 is connected by a conductor 122 to one end of the other field-coil 13'' of the motor 13, the other end of which coil connects by a conductor 123 to the extreme right hand long bar 49 of the switch 46. One of the brushes 13^a of the motor 13 connects by a conductor 124 to the next long switch-bar 50 and the other brush 13^b of the motor 13 has a conductor 125 connecting it to the remaining long switch-bar 51.

In the completed circuit for indicating "left", the current will travel, for instance, from one terminal of the current source 108 by conductor 122, through motor field-coil 13'', conductor 123, long switch bar 49, alternate contacts 68 and 70 of the block 63, long switch bar 51, conductor 125, through the armature of the motor in one direction, as indicated by the small arrow, conductor 124, middle long switch-bar 50, alternate contact members 69 and 71 of the block 63,

rear short switch-bar 52, conductor 116, brush-holder 31 and its brush 35, contact disk 16 (until insulating disk 41 reaches the brush 35, as indicated in Fig. 6) from this
 5 contact disk 16 through the clamping arms, and ring 40 and conductor 120 through the other field-coil 13' of the motor 13, and the conductor 121 to the remaining terminal of the current source 108. The result of this
 10 current flow through the motor armature in this direction is, it will be understood, to rotate first the driving-frame comprising the bars 17, and then with this, the indicator-box 20 from whatever position they
 15 may have been in until the insulating disk 41 makes contact with the brush 35 in this circuit; thereby breaking the circuit, so that the motor 13 will soon stop driving the mechanism. It will be understood that at
 20 this juncture the indicator has been rotated nearly enough to its position presenting its "left" side forward to be completely brought into this position by the action of the spring-actuated stop-bar 43, as herein-
 25 before set forth.

When the block 63 was depressed to cause this action, it turned downward the contact members 73', 74', 75' and 76' on the middle rotatable block 64 of the switch 46, as seen
 30 in Fig. 7. This middle block, it will be understood, is the "ahead" element of the switch; and when it is depressed in this position (the block 63 having risen under the action of its spring 86 as soon as pressure
 35 was removed from its button 89) a new circuit is completed from current source 108 through elements 122, 13'', 123, long switch bar 49, contact members 73' and 74' thus
 40 turned down on the middle block 64, middle long switch-bar 50, conductor 124, through the motor armature in the direction opposite to that of the arrow, through the conductor 125, left long switch-bar 51, the remaining two contact members 75' and 76'
 45 thus turned down on the middle block 64, through the middle short switch-bar 53, conductor 117, brush-holder 32 and its brush 35, contact disk 16, clamping arms and ring 40, conductor 120, remaining field-coil 13', conductor 121, back to current source 108. The
 50 result of completing this circuit is to turn the motor opposite to that in the direction in which it was just turned to set the signal for "left" indication; rotating the driving-frame and indicator-box 20, reversely until the insulating segment 41 reaches the brush
 55 35 of this "ahead" brush-holder 32, as indicated by "A" in Fig. 6; whereupon the motor 13 stops and the indicator-box will be set to the "ahead" position by the action
 60 of the stop-bar 43.

Supposing now that "right" is to be indicated. The block 65 is depressed, turning the middle block 64 a quarter revolution and
 65 bringing down its four alternately connected

contact members, while the contact members of this block 65 go between the tongues of the bars 49, 50, 51 and 54. Thus, a circuit is completed from the current source 108
 70 through the elements 122, 13'', 123, long switch-bar 49, contact members 73 and 74 of the block 65, middle switch-bar 50, conductor 124, through the motor armature in direction opposite to that indicated by the diagram, to the conductor 125, left long
 75 switch-bar 51, contact members 75 and 76 of the depressed block 65, front short switch-bar 54, conductor 118, brush-holder 33 and its brush 35 for "right" indication, clamping arms and ring 40, conductor 120, field-coil 13'', conductor 121, back to current source
 80 108. It will be seen that this will turn the indicator-box according to the process hereinbefore described from "ahead" position directly to "right" position, as determined by
 85 the insulating segment 41 reaching the brush 35 of the "right" brush-holder 33 interrupting the circuit and stopping the motor, leaving the indicator-box 20 to be adjusted accurately to "right" position by the stop-
 90 bar 43.

Supposing now that the block 65 has been released and raised by its spring 86, and the "ahead" middle block 64 in the new position it has assumed is now depressed. A
 95 new circuit is completed from the current source 108 through elements 122, 13'', 123, long switch-bar 49, alternate contact members 68' and 70' of the depressed block 64, left long switch-bar 51, conductor 125,
 100 through the motor armature in the direction of the arrow, conductor 124, middle long switch-bar 50, through the other alternate contact members 69' and 71' of the depressed block 64, through the middle short switch-
 105 bar 53, conductor 117, brush-holder 32 and its brush 35, contact disk 16, clamping arms and ring 40, conductor 120, field-coil 13', conductor 121, back to the current source 108. The result is to rotate the motor in the
 110 direction opposite to that in which it has just been rotated, bringing the indicator-box by the process described, directly back from its "right" position to its "ahead" position.
 115

When it is desired to set the indicator-box at "stop" position, all of the bars 63, 64 and 65 being held up by their springs, the handle 58 is raised, bringing the contact members 59, 60, 61 and 62 into the slits of
 120 the three long switch-bars 49, 50, 51, and the intermediate short bars 55, respectively. The result is to close the circuit from the current source 108 through the elements 122, 13'', 123, right long switch-bar 49, contact
 125 members 59 and 60, middle long switch-bar 50, conductor 124, through the motor armature in the direction opposite to that of the arrow in the diagram, conductor 125, left long switch-bar 51, contact mem-
 130

bers 61 and 62, intermediate short bar 55, conductor 119, brush-holder 34 and its brush 35, contact disk 16, clamping arms and ring 40, elements 120, 13" and 121, back to the
 5 current source 108. The result is to rotate the indicator-box by the process hereinbefore described, from whatever position it may be in to the "stop" position. It will be understood that this rotation may be
 10 through one-fourth, one-half or three-fourths of a revolution, since the rotation is always in the same direction. This excessive rotation is deemed immaterial here, because of the relative infrequency of its use,
 15 and the fact that in the majority of cases, the stoppage is for a considerable time, so that plenty of time is afforded for the shifting.

While this excessive rotation is not undesirable in connection with setting to the
 20 "stop" position, it is highly desirable to be able to shift directly from "right" or "left" to "ahead" position, or from "ahead" position to either "right" or "left" directly, on
 25 account of the need for prompt action in making these latter signals during progress of the vehicle.

As shown in Fig. 6, the two electric lamps
 27 are in series from one terminal of the
 30 current source 108 through conductors 126, 127, 128, a switch 129 and a short conductor 130 and the conductor 122 to the other terminal of current source 108; the switch 129 being opened or closed to extinguish or light
 35 the lamps. It will be understood, however, that this lamp circuit may have another source of current, and its switch 129 may be located as desired. As shown in Fig. 1, the switch 129 is located on the dashboard of the
 40 vehicle. I show the switch 46 mounted on the steering wheel of the vehicle; but it will be understood that it may be mounted in any other convenient position. It will also be understood that either a single signal-box
 45 may be provided on the front of the vehicle or a single box on the rear, or boxes at front and rear operated in a single circuit and controlled by a single switch like the switch 46 with corresponding connections which
 50 will be well understood by those skilled in the art in view of the foregoing description and the illustration herein. It will also be understood that my invention is capable of other minor variations, and therefore,
 55 while I have specifically shown and described an example of an embodiment of my invention, I do not wish to be understood as being limited precisely thereto, but having thus exemplified the invention sufficiently
 60 to enable it to be practised by those skilled in the art, what I claim as new and desire to secure by Letters Patent is:

1. In a signal, a movable indicator element, electrically actuated motive apparatus
 65 to move said element, driving means for said

indicator element, actuated by said motive apparatus and permitting said element and said driving means to move independently of each other, means to supply current to said apparatus, and means to control said
 70 current for starting and stopping said apparatus, and stop means for said indicating element to stop said element in its independent motion.

2. In a signal, a movable indicating element, electrically actuated motive apparatus to move said element, driving means for said indicator element, actuated by said apparatus and permitting movement of said element and said driving means independently
 80 of each other, an interrupter comprising a contact element moving with said indicating element, and having an insulated part and a series of brushes in contact with said contact element and held stationary, whereby said
 85 insulating part passes successively into contact with said brushes, means to supply current to said motive apparatus through any one of said brushes, means to control said current for starting said motive apparatus,
 90 contact of said insulating part with the respective brush discontinuing supply of current to said motive apparatus, and means to stop said indicating element in its independent movement, whereby said indicating element
 95 is adapted to arrest the momentum of said motive apparatus and prevent said insulating part from passing out of contact with said brush.

3. In a signal, a movable signal-box, a
 100 driving means for said signal-box permitting movement of said box independently of said driving means, electrically actuated motive apparatus for said driving means, a current source, a commutating switch, and a circuit
 105 including said current source, commutating switch and motive apparatus, whereby various manipulation of said switch variously applies current to said motive apparatus to variously position said driving
 110 means and indicator-box, the movement of said driving means independently of said indicator-box permitting said actuating means to start with a minimum load.

4. In a signal, a rotatable indicator-box
 115 with a plurality of sides each carrying an indicating character and adapted to be brought successively into view by rotation of said box, a driving element engaging with said box to drive it but permitting motion
 120 of said box independently of said element, a yieldably mounted stop-bar to control the motion which said box has independently of said driving element, motive means for actuating said driving element, and means for
 125 controlling the operation of said motive means.

5. In a signal, a movable indicator-box and driving means therefor and an electric
 130 motor to actuate said driving means, said

indicator-box and driving means being movable independently of each other, an interrupter comprising a contact element moving with said driving element, and a plurality of brushes making frictional contact with said contact element, to make electrical connection and to move therewith, means limiting the movement of these brushes in such proportion to the movement of said box and driving element independently of each other that said brushes are properly adjusted to said box during part of a revolution thereof, an insulating part on said contact element to successively contact with each of said brushes, a current source, a commutating switch, and a series of conductors, whereby, by manipulation of said switch, any one of said brushes may be included in circuit with said current source and motor to impart rotation to said driving element and indicator-box, said rotation being terminated when said insulating part makes contact with the particular brush and yieldable means to adjust said signal-box by virtue of its movement independently of its driving element when this rotation is terminated, the extent of said insulating part independent to the extent of said relative movement being such that said insulating part is prevented from passing out of contact with the particular brush by reengagement between the adjusted indicator-box and said driving means arresting the momentum of said driving means, contact element and motive apparatus.

6. In a signal, a rotatable indicator-box with a plurality of sides each carrying an indicating character and adapted to be brought successively into view by rotation of said box, a driving element engaging with said box to drive it but permitting motion of said box independently of said element, a yieldably mounted stop-bar to control the motion which said box has independently of said driving element, means supporting said brushes and rotatable coaxially with said contact element and insulated from said brushes, means to limit the rotation of this means to a partial revolution in such proportion to the rotation of said indicator-box independently of said driving means that said brushes are adjusted into their proper position relative to said indicator-box by turning with said contact element due to their frictional contact therewith, a motor comprising distinct field-coils, and an armature rotatable within the magnetic field of said coils, a current source, a commutating switch, and a series of conductors connected to said brushes, field-coils, armature, current source and switch, whereby a circuit may be completed through any one of said brushes and through said current source and said field-coils and armature in series, and whereby said circuit is interrupted when said insulating piece makes contact with the par-

ticular brush, so that the indicator-box is given partial revolutions by manipulation of said switch to bring any one of said indicating characters into view.

7. In a signal, an indicator-box comprising a plurality of sides each bearing an indicating character and ends having substantially central bearings, and each having a segmental slot substantially concentric with its bearing, a driving element extending longitudinally of said box through said slots in both ends and having bearings coaxial with said ends, motive apparatus, and operative connection from said apparatus to said driving element to rotate it, said box being rotatable independently of said driving element to the extent permitted by said segmental slots but rotating with said driving element upon engagement of said element with corresponding ends of the slots, a stop-bar mounted to swing substantially at right angles to the axis of said indicator-box, means yieldably holding said stop-bar toward said box, bearing means for said stop-bar on said box whereby said stop-bar is swung out from said box as one side thereof is passing out and a succeeding side is passing into view, but whereby said stop-bar moves inward toward said box and by cooperation with said bearing means stops said box with the particular side in correct indicating position as permitted by the movement which said box has independently of said driving means, and means for controlling the operation of said motive apparatus.

8. In a signal, an indicator-box comprising a plurality of sides each having an indicating-character-representing light-transmitting part, and ends supporting said sides, and having substantially central bearings, and each having a segmental slot substantially coaxial with said bearing, a driving frame comprising bars extending through said slots, and a continuous connecting piece between said bars to conceal an inner side of said box from view through another side, but terminating short of the ends of said box to leave spaces near the ends, hollow studs, sockets extending through said hollow studs, lamps mounted in said sockets and projecting into said spaces near said ends of said box, connecting plugs for said lamps in the outer ends of said sockets extending outside said hollow studs, whereby said lamps may remain stationary while said driving frame and indicator box rotate, said indicator-box having movement independently of said driving frame by virtue of the relation of its segmental slots to the bars extending therethrough, a stop-bar pivoted to swing in a plane across the axis of said driving frame and indicator-box, means to yieldably hold said stop-bar toward said box, bearing means on said box for said stop-bar, whereby said

stop-bar is moved away from said box as one of its sides passes out of and its succeeding side passes into view, but is pulled toward said box and brings said box into
5 proper position to display said succeeding side by virtue of said rotation that said box has independently of said driving frame,

motive means for rotating said driving frame and box, and means for controlling the operation of said motive means.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."