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J. S. ELAM

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ELECTRICALLY OPERATED TIME LAPSE TRAFFIC SIGNAL

Filed Feb. 16, 1946

3 Sheets-Sheet 1

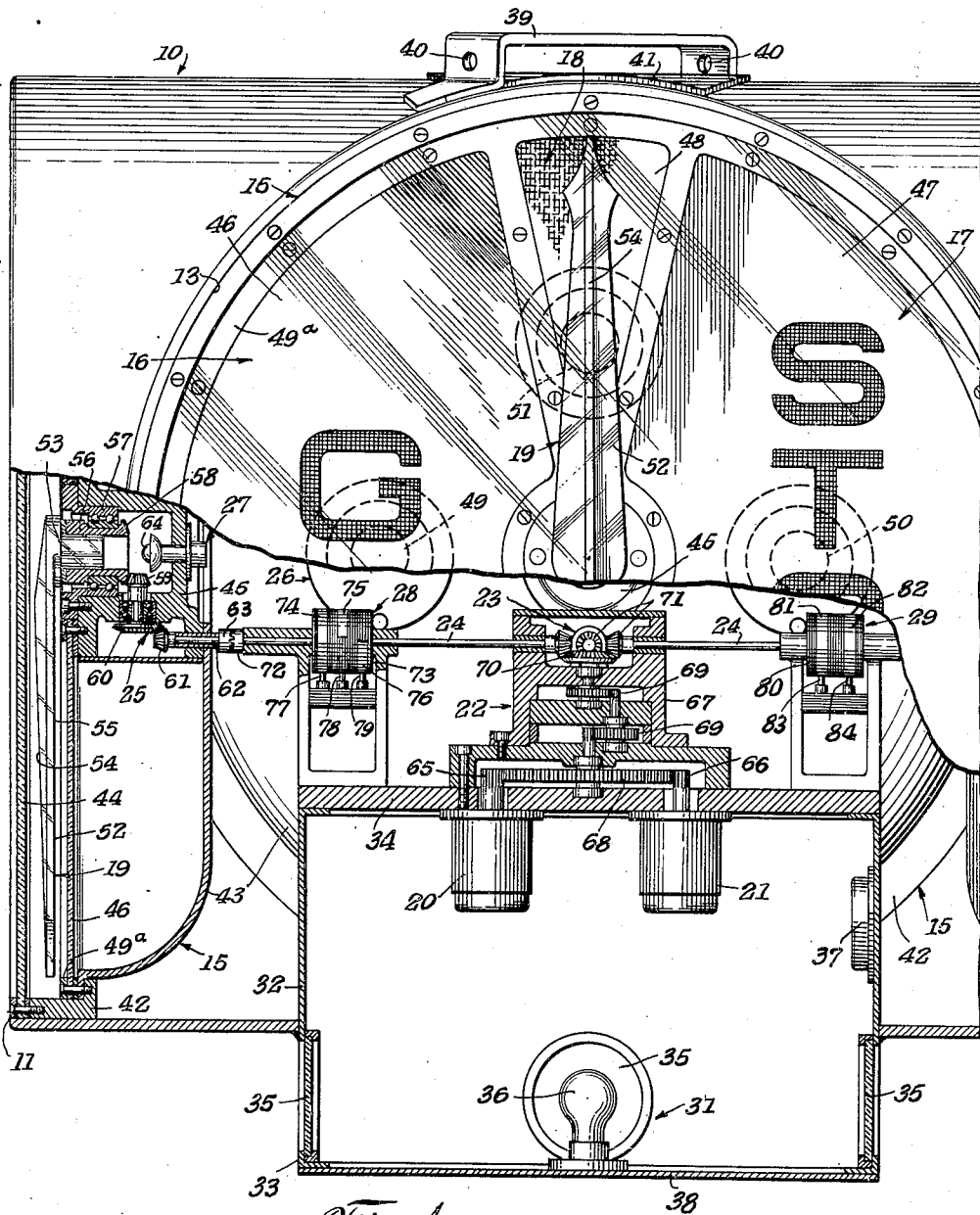


Fig. 1.

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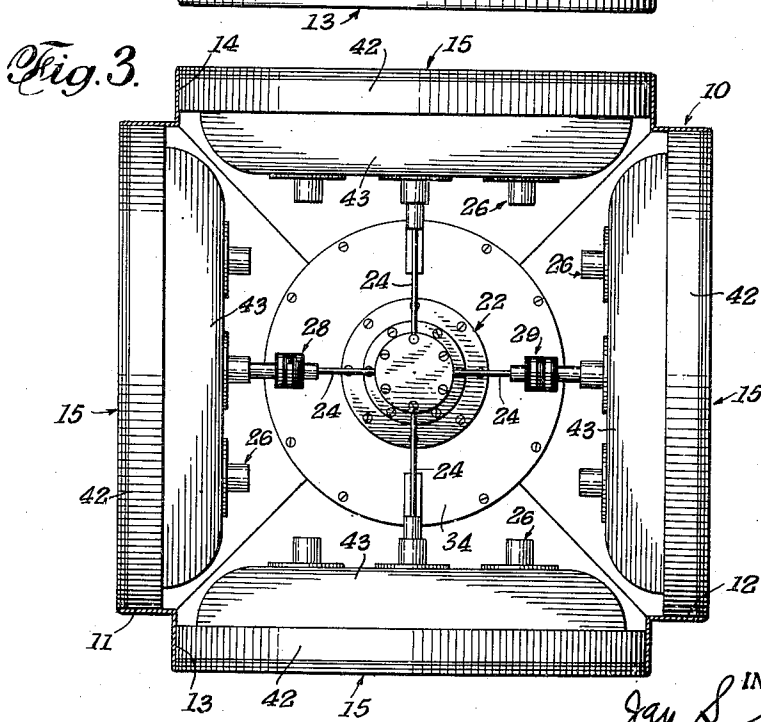
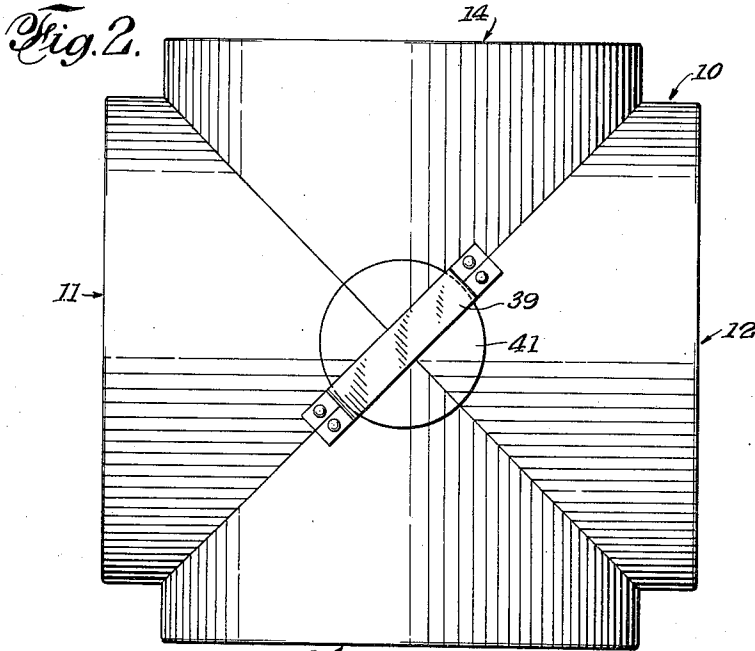
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3 Sheets-Sheet 2



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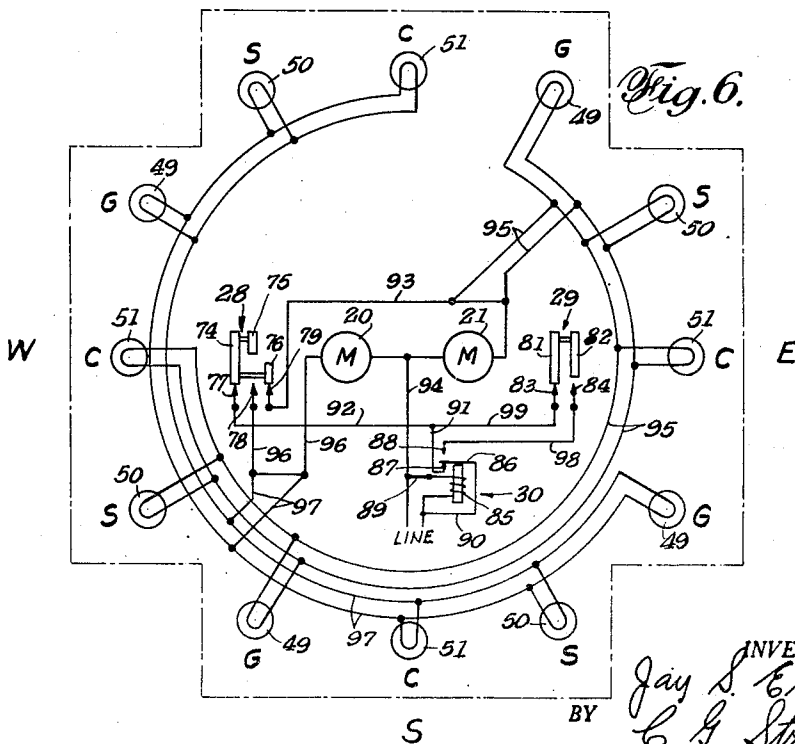
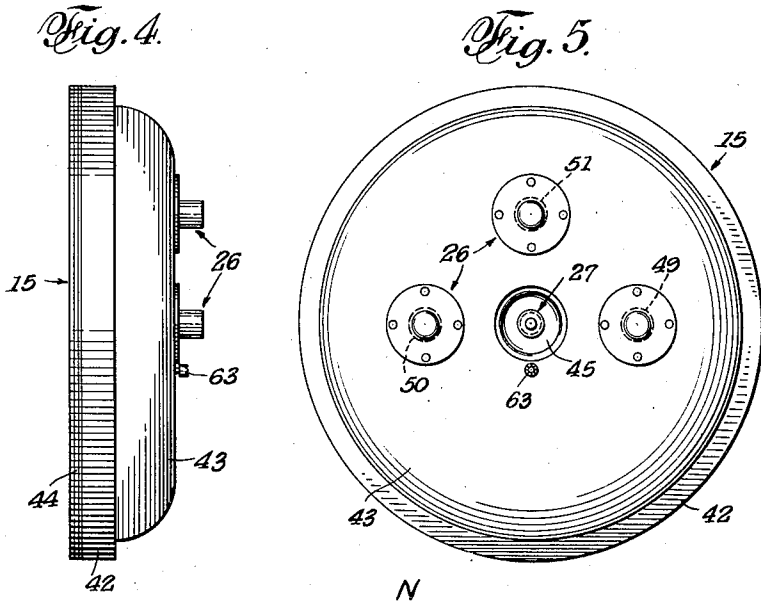
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3 Sheets-Sheet 3



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# UNITED STATES PATENT OFFICE

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## ELECTRICALLY OPERATED TIME LAPSE TRAFFIC SIGNAL

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Application February 16, 1946, Serial No. 648,028

7 Claims. (Cl. 177-337)

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This invention relates to traffic signals and has for its primary object to provide a novel and improved signal structure affording both motorists and pedestrians a better visual conception of the time relationship of the "Go" and "Stop" periods.

Another object of the present invention is to provide a traffic signal embodying illuminated "Go" and "Stop" areas and provided with pointer or index means sweeping said areas whereby both motorists and pedestrians can visualize that portion of the "Go" or "Stop" period that remains before a signaling change becomes effective.

Another object of the invention is to provide a traffic signal of the character referred to which embodies novel means for illuminating pointer or index means for improved visibility.

Another object of the invention is to provide a traffic signal incorporating novel and improved means for moving or driving an index means for the type referred to at two different rates of speed so that traffic in one direction may have a longer "Go" period than traffic in the other direction.

A further object of the invention is to provide a traffic signal embodying novel means effecting the change from a "Go" period at one rate of speed to a "Go" period at a different rate of speed whereby traffic at an intersection can be controlled in accordance with the volume of traffic moving along respective directions through the intersection.

A further object of the invention is to provide a traffic signal embodying novel means, when the signaling period is suspended, for automatically bringing the index means to a neutral position with respect to the "Go" and "Stop" areas of the signal.

A still further object of the invention is to provide a traffic signal embodying blinker signals which become automatically effective as warnings to motorists and pedestrians when the operation of the index controlled signal is suspended.

A still further object of the invention is to provide a traffic signal capable of being designed as a multi-face structure controlling three, four, five or more point intersections, and adapted for suspension at the center of such intersections or to be mounted on corner posts, as desired.

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My invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes one embodiment of the present invention, which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a broken partial elevational, partial sectional view of a traffic signal constructed in accordance with the present invention.

Fig. 2 is a plan view thereof on a reduced scale.

Fig. 3 is a plan sectional view thereof.

Fig. 4 is a side view of a signal unit employed in the invention.

Fig. 5 is a rear view thereof.

Fig. 6 is a wiring diagram showing the manner of controlling the various lamps and the index pointers of the traffic signal in Fig. 1.

The traffic signal which is shown in the drawing comprises a four-sided structure for controlling a four point intersection. The signal comprises, generally, a housing 10 having aligned openings 11 and 12, and aligned transverse openings 13 and 14; identical signal units 15 mounted in each opening embodying a "Go" area 16, a "Stop" area 17, a "Caution" area 18, and an index or pointer 19 mounted to sweep said areas in the manner of a clock hand; a pair of electric motors 20 and 21 mounted in the housing; reduction gearing 22 driven by said motors; means 23 driven by the reduction gearing for driving the pointers 19 through drive shafts 24 and gearing 25 within each unit 15; means 26 for illuminating the "Go," "Stop" and "Caution" areas of each unit 15; means 27 for illuminating the pointers 19; commutator means 28 for controlling the motors 20 and 21 and the illuminating means 26; commutator means 29 for bringing the motors to a position whereby the pointers are brought to rest at a neutral position with respect to the areas 16, 17 and 18 of the units 15; electric means

30 controlling the latter; and blinker means 31 operatively effective upon suspension of operation of the traffic signal.

The housing 10 comprises, essentially, similar intersecting tubes affording the mentioned openings 11, 12, 13 and 14, and a cylindrically tubular vertical housing part 32 extending from the interior of the housing downward through the bottom thereof to provide a depending cuff 33. The upper portion of the housing part 32 is provided with a base or platform 34 serving to support the motors 20 and 21 and the reduction gearing 22. The cuff 33 is provided with the means 31 which comprises transversely aligned lenses or windows 35 through which are visible the light of a lamp 36 controlled by a blinker switch 37. A cover plate 38, for the bottom of the cuff, affords access to the means 31 for servicing thereof. The plate 38 may serve to mount the housing upon a post, if desired. However, the housing shown is provided with a bracket 39 at the top thereof and formed with holes 40 whereby the housing can be suspended from an overhead wire. Access to the interior of the housing is afforded by a removable plate 41 at the top, as shown, or otherwise suitably located.

Each unit 15 comprises a frame 42 designed to snugly fit the respective openings 11, 12, 13 and 14, a shell 43 carried by the frame 42 and serving as a housing for the illuminating means 26, a transparent front closure window 44, and a centrally disposed preferably cast unit 45 carried by the shell 43 and serving to carry the pointer 19, the gearing 25 and the illuminating means 27. Each unit 15 further includes a light passing green "Go" panel 46, red "Stop" panel 47, and an amber "Caution" panel 48. The panels 46, 47 and 48 are suitably proportioned and are held in place by a frame 49a which defines the panels. The mentioned areas 16, 17 and 18 are formed by the respective panels 46, 47 and 48 as they are seen through the transparent window 44. It will be later seen that the lamps 49, 50 and 51 mounted in each unit 15 illuminate the areas 16, 17 and 18 in synchronous relation with the movement of the pointer 19.

Each pointer 19 is formed of a light piping material, such as "Lucite" and comprises an arm 52 formed with a hub 53 mounted at the center of the casting 45. The hub is so positioned as to receive the light from the means 27 and to direct the same along and throughout the length of the arm 52. In order to give the pointer luminosity, it is provided with a sloping front face 54 whereby light is projected forward according to the properties of "Lucite." The rear face 55 of the pointer is rendered opaque so as not to pass light from the illuminating means 26. Located between the window 44 and the panels 46, 47 and 48, the illuminated pointer is readily visible.

The hub 53 of the pointer 19 is mounted in a sleeve 56 which in turn is carried by the casting 45 by means of anti-friction bearings 57. The gearing 25 comprises a bevel gear 58 on the sleeve 56, a bevel pinion 59 in mesh therewith, a bevel gear 60 mounted with the pinion 59, and a bevel pinion 61 in mesh with the gear 60. The pinion 61 is carried by a shaft stud 62 extending from the unit 15 inwardly toward the interior of the housing 10. The gearing arrangement is such that the speed of rotation of the pointer 19 is considerably less than that of the shaft stud 62. The outwardly extending end of said shaft stud is provided with coupling element 63. The pointer illuminating means 27 comprises a lamp 64 car-

ried by the casting 45 and provided with a suitable reflector for directing its light toward and through the pointer hub 53.

The motors 20 and 21 are essentially similar and may operate at similar or at different speeds. In the present instance, the motors are mounted on the under side of the platform 34 to project into the housing part 32. The motor 20 is provided with a drive pinion 65 on the end of its armature shaft. Similarly, the motor 21 is provided with a smaller drive pinion 66.

The reduction gearing 22 mounted on the upper side of the platform 34, is driven by said pinions 65 and 66. Depending on which motor is in operation, said gearing is driven at different rates of speed. A suitable support 67 is provided for the reduction gearing which comprises a relatively large gear 68 engaged by both pinions 65 and 66, and one or more pairs of reducing gears 69 which effect a drive from the gear 68 to a bevel gear 70. With the motors 20 and 21 operating at the same speed, it will be evident that the motor 20 will drive the bevel gear 70 faster than will the motor 21. When one motor is in operation, the armature shaft of the other is merely idling as driven by the gear 68. From the foregoing it will be seen that the relatively high speeds of the motors 20 and 21 result in two low but different speeds of rotation of the bevel gear 70.

The means 23 includes the bevel gear 70 and a plurality of bevel pinions 71 in mesh therewith. For the four-sided signal shown, four bevel pinions are provided for driving the shafts 24. Each shaft 24 is provided with a coupling element 72 for driving connection with the respective coupling elements 63 of the units 15.

The means 28 is employed for controlling the motors 20 and 21 and comprises an electric commutator mounted on one of the shafts 24. The commutator comprises a drum 73 having a complete band 74 and two partial bands or segments 75 and 76 suitably proportioned to provide a "Go" period for one direction of traffic of either the same or a shorter period than for the other direction. For "Go" periods of the same length, the segments 75 and 76 would be of equal length, i. e., substantially semi-circular. For "Go" periods of different lengths, one segment would be longer than the other in a related proportion to the difference in the lengths of the "Go" periods. The band 74 and segments 75 and 76 are provided with contacts 77, 78 and 79, respectively. Each segment 75 and 76 is electrically connected to the band 74, as seen in the diagram of Fig. 6.

The commutator means 29 comprises a drum 80 on another of the shafts 24. This commutator comprises a complete band 81 and a partial band or segment 82. The latter has only a small gap of some 5° of its circumference. The band 81 is provided with a contact 83 and the segment 82 with a contact 84. The band 81 and segment 82 are electrically connected as shown.

The means 30 comprises an electromagnetic switch having a coil 85, an armature 86 controlled thereby and contacts 87 and 88 engageable by the armature.

One manner of electrically connecting the motors 20 and 21, the lamps 49, 50 and 51, the commutators 28 and 29 and the means 30 is shown in Fig. 6. The "Go" lamps 49 for opposed and aligned directions of control of the signal are connected with the "Stop" lamps 50 and the "Caution" lamps 51 for the transverse directions of control of the signal. Assuming the signal to be oriented to an east-west and a north-south

thoroughfare intersection, a common connection is made across the circuit of one motor 20 of the east and west "Go" lamps 49 and the north and south "Stop" lamps 50 and "Caution" lamps 51, and a common connection is made across the circuit of the other motor 21 of the north and south "Go" lamps 49 and the east and west "Stop" lamps 50 and "Caution" lamps 51.

A time controlled or otherwise controlled switch 89 may be incorporated in the signal or otherwise disposed for controlling the signal. With the switch 89 closed, the coil 85 is in electric circuit to cause the armature to engage contact 87. The current will then flow from the line through conductor 90, armature 86, conductors 91 and 92, contact 77, band 74, that segment 75 or 76 which is engaged with its contact 78 or 79, respectively, in this case, segment 76 and contact 79, conductor 93, motor 21, and conductor 94 which is the other leg of the electric line. The circuit thus established will operate motor 21 to drive all of the pointers 19 at a one rate of speed. A parallel connection across the motor 21 is made by conductors 95 to the north and south "Go" lamps and east and west "Stop" and "Caution" lamps. These lamps will be lighted during operation of motor 21. The various pointers 19 are oriented so that the north and south pointers are sweeping or traversing the "Go" areas as the east and west pointers are traversing first the "Caution" and then the "Stop" areas.

As the commutator 28 is rotated by the motor 21, the segment 76 will leave contact 79 and segment 75 will engage contact 78. The circuit through motor 21 will be broken and the current will now flow from band 74, segment 75, contact 78, conductor 96 and motor 20 to line conductor 94 to cause a drive of the pointers 19 at a different rate of speed. A parallel connection across the motor 20 is made by conductors 97 to the east and west "Go" lamps and the north and south "Stop" and "Caution" lamps. These latter lamps will be lighted during operation of motor 20. The signal will continue to operate with the motors 20 and 21 alternatively driving the pointers 19.

When current to the coil 85 is interrupted by opening of the switch 89, said coil will release the armature 86 which will engage contact 88. The commutator 29 will now be placed in the circuit between conductors 90 and 92. The current will flow from conductor 90, armature 86, contact 88, conductor 98, contact 84, segment 82, band 81, contact 83, and conductor 99 to conductor 92. Whichever motor 20 or 21 is in circuit will continue to operate until the gap in segment 82 registers with contact 84 when the circuit is broken to the motors and the lamps of the signal. By synchronizing the position of the gap in the segment 82, with the positions of the pointers 19, the latter come to rest in a neutral position. One pair of aligned pointers will come to rest in front of the "Caution" areas of opposed signal faces and the other pair will come to rest at the division between the "Go" and "Stop" areas. In this manner confusion to motorists and pedestrians is obviated.

When the switch 89 is again closed, the operation as above outlined will be established. Upon opening of the switch 89, the blinker means 31 may be set into operation in a conventional manner.

The generally simple electrical circuit above outlined may be further simplified by using a low voltage single line grounded circuit wherein each

lamp and motor is connected to a common electrical ground as, for instance, the signal housing. Modifications in the circuit may be incorporated. The switch 86 may be of the toggle make and break type, and the commutator means 28 may be designed to include additional segments for the caution lights 51 instead of their operation together with their respective stop lights 50. The pointer light 64, of course, is simply connected to remain lighted at all times except when the commutator means 29 opens the circuit.

While I have illustrated and described what I now regard as the preferred embodiment of my invention, the construction is, of course, subject to modifications without departing from the spirit and scope of my invention. I, therefore, do not wish to restrict myself to the particular form of construction illustrated and described, but desire to avail myself of all modifications that may fall within the scope of the appended claims.

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

1. A traffic signal comprising a plurality of similar units each having "Go" and "Stop" areas facing in different directions, a pointer in each unit movable to traverse said areas, reduction gearing connected with said pointers, a relatively large gear connected with said reduction gearing, and a pair of motors included in an electric circuit, pinions on said motors and in mesh with said larger gears, said pinions having unequal diameters and arranged alternately to move all of said pointers at different rates of speed.

2. A traffic signal comprising a plurality of similar units each having "Go" and "Stop" areas facing in different directions, a pointer in each unit movable to traverse said areas, a pair of driving motors, mechanical connections including reduction gearing connected to said pointers, a large gear connected with said reduction gearing, diametrically unequal pinions on the motors in mesh with said large gear, and means effecting an automatic switch-over from one driving motor to the other to vary the speed of travel of said pointers.

3. A traffic signal comprising a plurality of similar units each having "Go" and "Stop" areas facing in different directions, a pointer in each unit movable to traverse said areas, a pair of driving motors having diametrically unequal pinions, a large gear in mesh with said pinions, mechanical connections including reduction gearing and said large gear connecting the pointers, and means effecting an automatic switch-over from one driving motor to the other, said latter means comprising an electric commutator driven by said reduction gearing for varying the speed of traverse of said pointers.

4. In a traffic signal, reduction gearing including a large gear, a pair of motors each having a diametrically unequal pinion in mesh with said large gear for alternately driving the reduction gearing at different rates of speed, a plurality of pointers driven by the reduction gearing an electric circuit including said motors, means controllable by said reduction gearing for automatically including one or the other of said motors in said circuit, and traffic signaling areas associated with and traversed by said pointers, respectively.

5. A traffic signal comprising a housing having openings facing in different directions, a similar unit in each opening and having visual traffic-directing areas, translucent pointer means traversing said areas of each unit and each said

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means having a mounting portion, means to illuminate said mounting portion and thereby render luminous each pointer means, and means for illuminating said areas each in synchrony with the movement of its associated pointer.

6. In a traffic signal, a pair of motors, an electric circuit for driving said motors alternately, a plurality of pointers driven alternately by each motor, a plurality of traffic-directing lights connected with each motor circuit, said lights being illuminated only when the respective motor is operating reduction gearing between said motors and connected to said pointers, and means in said circuit alternately driven by said motors for alternately closing said electric circuits, said latter means comprising a pair of commutators having a common current conducting band and phased segments connected in each respective electric circuit.

7. A traffic signal having "Go" and "Stop" areas facing in different directions, reduction

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gearing, pointers connected to said gearing, a pair of electric motors, an electric circuit including said motors and a switch, a large gear connected to said reduction gearing, diametrically unequal pinions on said motors in mesh with said large gear, and a pair of commutators on said reduction gearing governing the flow of current to one motor or the other to regulate the speed of travel of said reduction gearing and said pointers.

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#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
1,847,903	Schulbert	Mar. 1, 1932
1,850,897	Shepherd	Mar. 22, 1932
1,852,989	Walrath et al.	Apr. 5, 1932
1,905,378	Gechter	Apr. 25, 1933