Feb. 23, 1932. T. A. BOOR 1,846,987

TRAFFIC SIGNAL

Filed Sept. 29, 1930 4 Sheets-Sheet 1

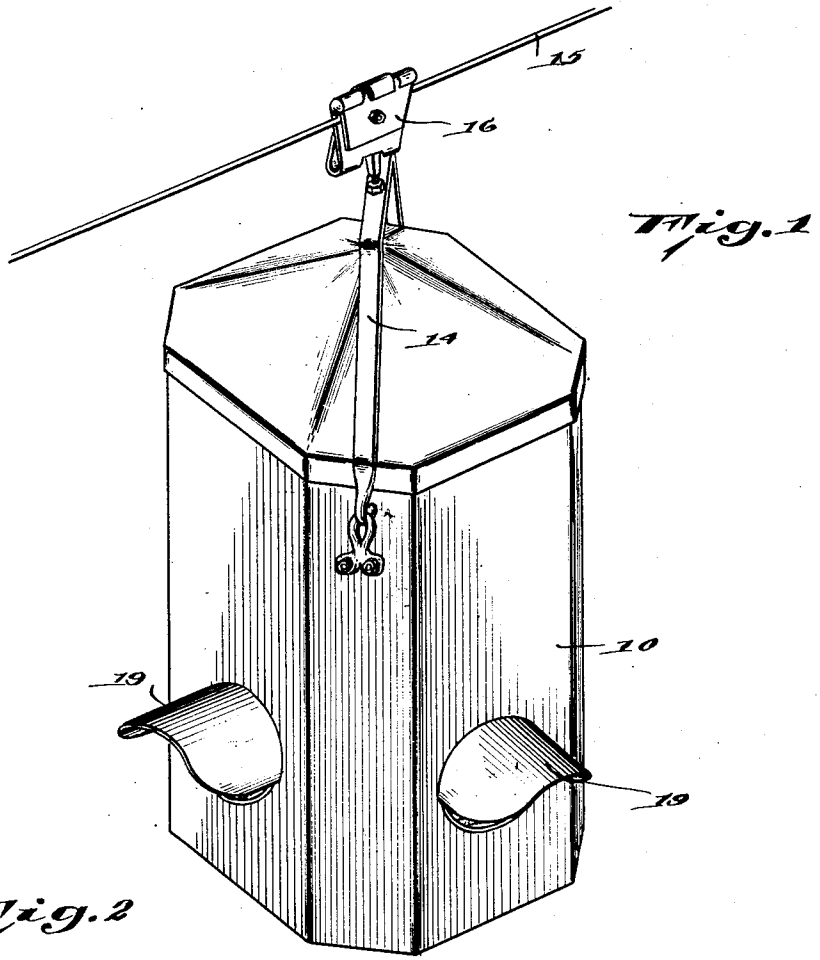
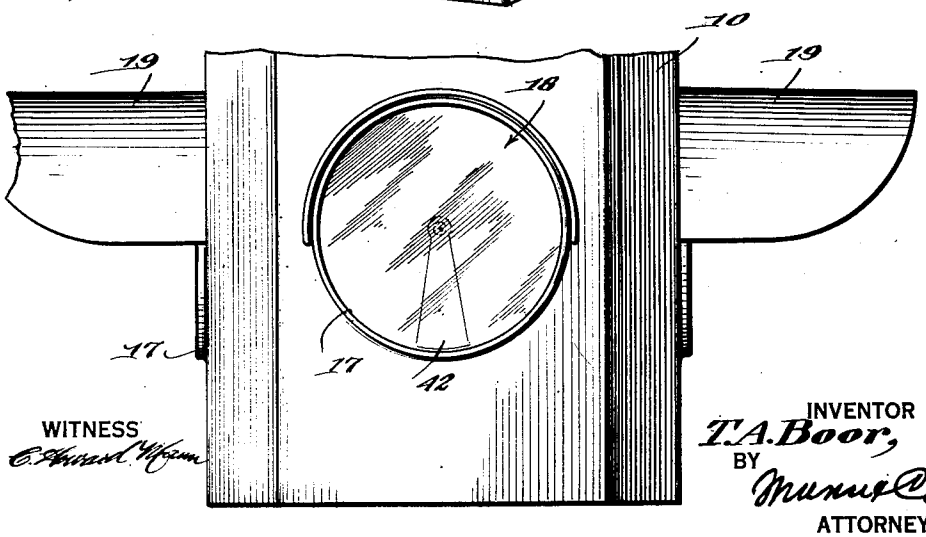


Fig. 1

Fig. 2



WITNESS

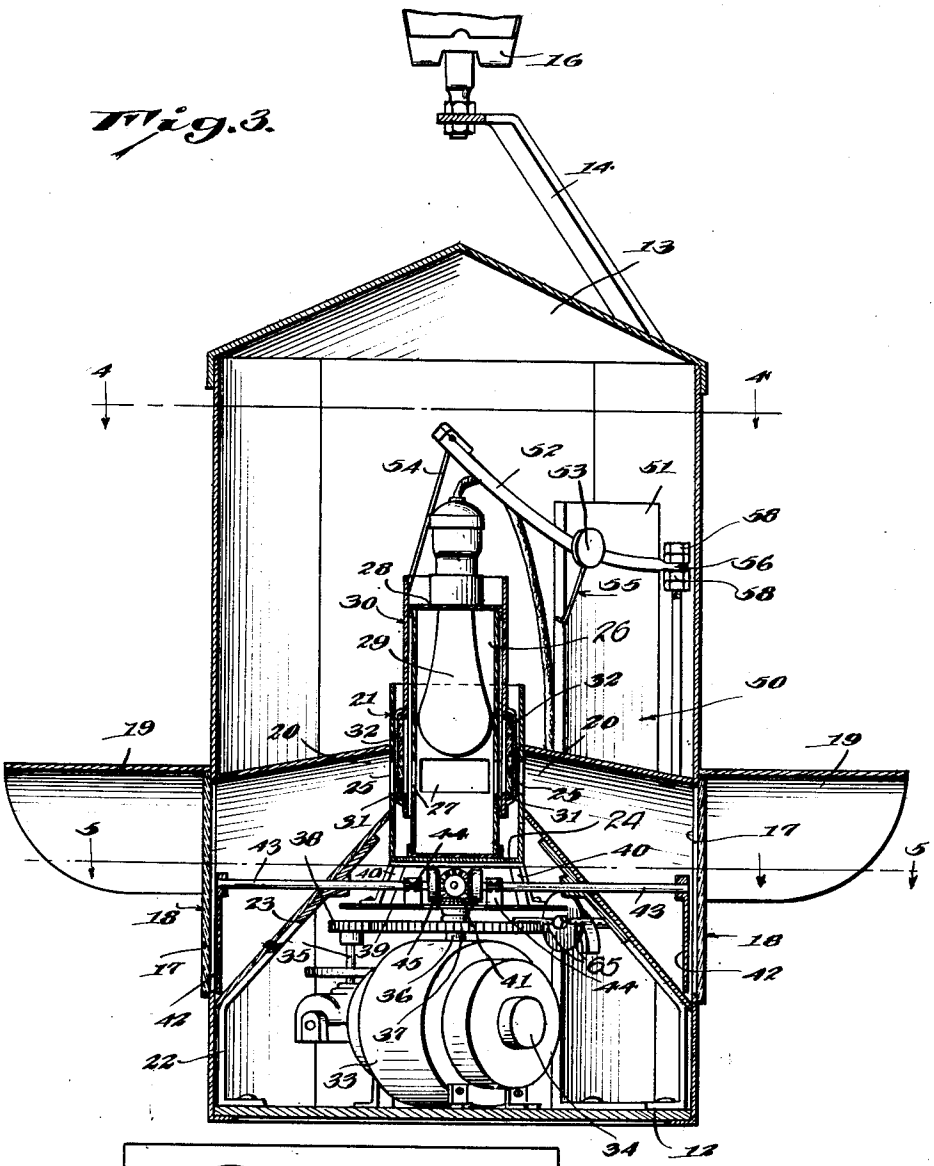
INVENTOR
T. A. Boor,
BY
ATTORNEY

Feb. 23, 1932. T. A. BOOR 1,846,987

TRAFFIC SIGNAL

Filed Sept. 29, 1930 4 Sheets-Sheet 2

Fig. 3.



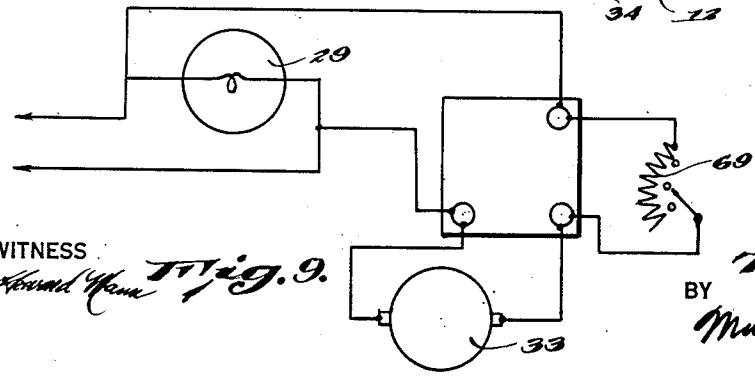


Fig. 9.

WITNESS

INVENTOR
T. A. Boor,

BY
Munn & Co.
ATTORNEY

Feb. 23, 1932. T. A. BOOR 1,846,987

TRAFFIC SIGNAL

Filed Sept. 29, 1930 4 Sheets-Sheet 3

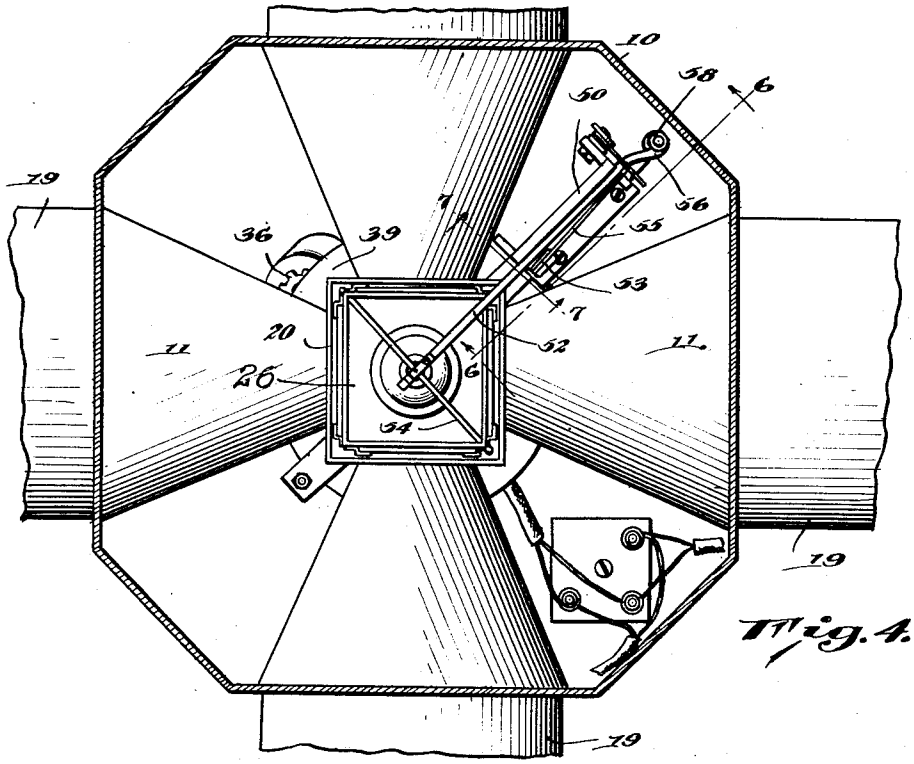


Fig. 4.

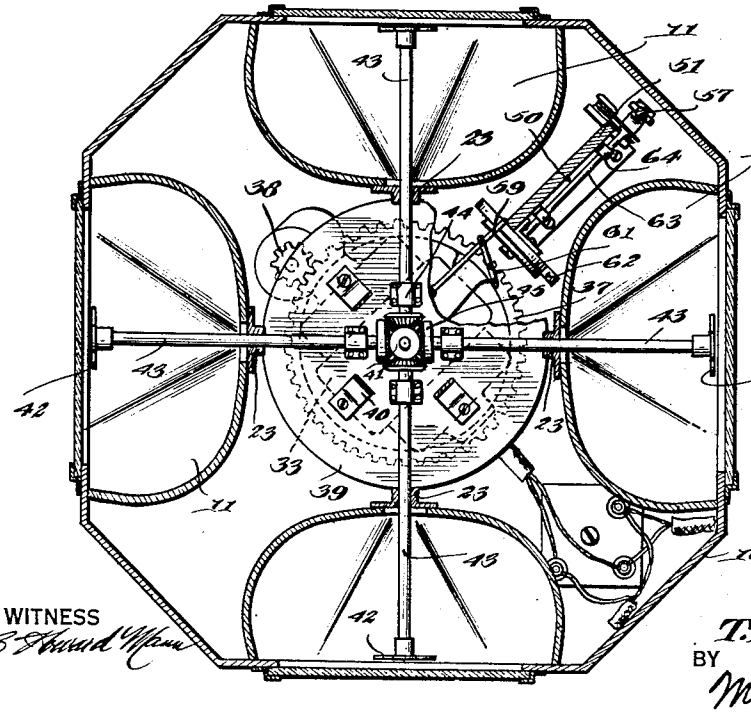


Fig. 5.

WITNESS
E. Howard Munn

INVENTOR
T. A. Boor,
BY
Munn & Co
ATTORNEY

Feb. 23, 1932. T. A. BOOR 1,846,987

TRAFFIC SIGNAL

Filed Sept. 29, 1930 4 Sheets-Sheet 4

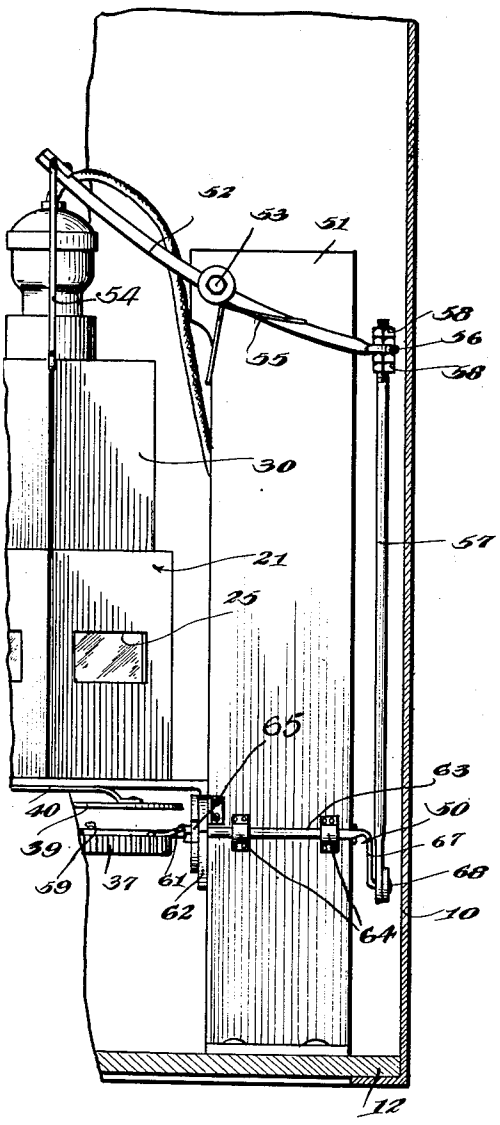


Fig. 6.

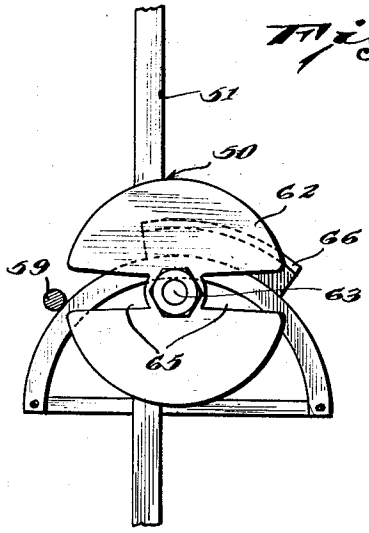


Fig. 7

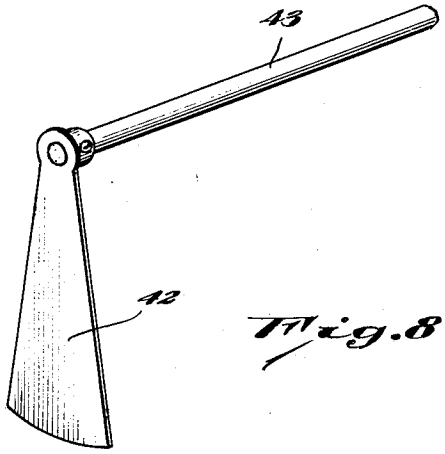


Fig. 8

WITNESS
C. Howard Hopkins

INVENTOR
T. A. Boor,
BY
Munn & Co
ATTORNEY

Patented Feb. 23, 1932

1,846,987

UNITED STATES PATENT OFFICE

THEODORE A. BOOR, OF ASHVILLE, OHIO

TRAFFIC SIGNAL

Application filed September 29, 1930. Serial No. 485,224.

My invention relates to traffic signals especially applicable for use at street intersections, and consists in the constructions, arrangements and combinations herein described and claimed.

In prior devices of this character it has been common practice to employ signal arms or lights operable at suitable intervals to indicate a start or stop of traffic. These devices are objectionable in that while they direct traffic, no means is provided for indicating the next change of the signal, thus often causing confusion and accidents.

It is therefore an object of my invention to provide a traffic signal embodying the usual "stop" and "go" signals and operable therewith an indicator means for displaying the length of time that will elapse before a change of direction of movement of the traffic will occur.

A further object of the invention is the provision of a traffic signal in which a plurality of signal lamps and the indicator means are operable through a single motor.

A still further object of the invention resides in the provision of a lamp housing employing a single lamp for displaying traffic signals to a plurality of display windows.

It is a still further object of the invention to provide a lamp shutter mechanism timed synchronously with the indicator mechanism and operable from a single motor.

Additional objects, advantages and features of invention reside in the construction, arrangement and combinations herein shown and claimed. In the accompanying drawings forming a part of this application,

Figure 1 is a perspective view of my signal,

Figure 2 is a fragmentary enlarged view of the signal housing, illustrating the indicator,

Figure 3 is a vertical sectional view of the signal,

Figure 4 is a horizontal cross section on the line 4—4 of Figure 3,

Figure 5 is a similar view on the line 5—5 of Figure 4,

Figure 6 is a vertical section on the line 6—6 of Figure 4,

Figure 7 is an enlarged detail of the gear for operating the lamp shutter, the view having been taken approximately on the line 7—7 of Figure 4,

Figure 8 is a detail perspective of the indicator.

Figure 9 is a diagrammatic view of the electrical circuits.

In carrying out my invention, I provide a housing 10, of octagonal shape and having four signal compartments 11. The housing 10 has a base 12 and top 13, and is adapted for suspension from a support 15 through a bail 14 and fastening 16.

Each of the compartments is provided with a window 17, within which there is suitably secured a lens 18, preferably of ground glass. Immediately above the window 17 there is provided a shield 19, adapted to protect the glass 18 from stray lights, which might tend to reduce the efficiency of the indicator device.

Reference is now made to Figure 3, wherein it will be seen that the compartments 11 are formed of sheet metal and bent into substantially cone-shape, their reduced ends 20 being presented inwardly and secured to a housing 21. Supporting brackets 22 are secured upon the base 12 and have arms 23 extended parallel to the lower side wall of the compartments for securement thereto by soldering or otherwise. As previously stated, the reduced end 20 of the cone-shaped compartments are secured to the housing 21, while the large ends are suitably secured to the walls of the signal housing 10.

The housing 21 is closed at one end to provide a base 24, the opposite end being open for reception of a shutter mechanism presently to be described. Apertures 25 are formed in the housing 21 which are aligned with respective apertures of compartments 11.

Centrally of the housing 21 there is rigidly mounted a lamp housing 26, suitably apertured as at 27, these apertures aligning with the apertures 25 of the housing 21. The housing 26 is of a length to project considerably above the housing 21, and is closed by a cap 28. An incandescent lamp socket is fixed to the cap 28, the lamp 29 projecting down-

wardly into the housing 26, so as to project light through the apertures 25 and 27. From the foregoing, it will be apparent that the lamp 29 may be readily removed from the housing 26 by merely removing the cap 28 and withdrawing the cap, lamp and socket as a unit.

Reciprocable upon the housing 26 there is a shutter 30 having suitable signal lenses 31 and 32. The lens 31 represents the "go" signal, while the lens 32 represents the "stop" signal. Ordinarily, the "go" signal has been characterized by a green color and the "stop" signal by a red color, and this arrangement may be followed here, although other color combinations may be changed by the mere substitution of the required colored lenses 31—32.

It should also be noted that the lenses 31—32 positioned diametrically opposite each other are arranged with their green lenses 31 at the bottom and the red lens 32 positioned immediately thereabove. However, the lenses which are arranged at right angles thereto are reversely positioned, that is to say with the red lens upon the bottom and the green lens thereabove. Thus, while the "go" signal will be indicated for one line of traffic, a "stop" signal will be displayed for the opposite line of traffic.

Mounted upon the base 12 of the signal house, I provide a drive mechanism, which in the present instance, includes a motor 33 from the shaft 34 of which there is driven a stud shaft 35. Centrally of the motor 33, I provide a shaft 36 rigidly secured to the casing of the motor, and upon this shaft a large gear 37 is revolubly mounted. A gear 38 is keyed upon the stud shaft 35 and is in mesh with the gear 37, as clearly illustrated in Figures 3 and 5. A plate 39 is rigidly attached to the bottom 24 of the housing 21 by straps 40, this plate being centrally apertured to accommodate a gear 41 rigidly secured upon the shaft 35, and rotatable therewith.

Each of the compartments 11 has an indicator 42 disposed therein, and positioned immediately behind the glass 17. The indicators 42 are supported upon respective shafts 43 journalled through the compartment wall and supporting brackets 23 and in bearing 44 carried by the plate 39. Each of the shafts 43 has splined upon its inner end a bevel gear 45 which meshes with the gear 41.

From the foregoing, it will be seen that upon energization of the electric motor 33, the indicators 42 will be caused to rotate.

In order to produce the necessary reciprocating movement to the shutter 30, I provide an intermittently operated trip mechanism, generally indicated by the reference character 50. For a full understanding of the mechanism, reference is made particularly to Figures 3, 6 and 7. A support 51 is illustrated as mounted upon the base 12 extending vertically adjacent the lamp housing 30 but extended slightly thereabove.

Adjacent the upper end of the support 51 a lever 52 is pivotally mounted as at 53, one end thereof extending slightly beyond the longitudinal center of the housing 30. The upper end of the housing 30 is connected to the lever by a bail 54. The pivot 53 also preferably includes a spring 55 normally holding the lever 52 and housing 30 in raised position, as shown in Figure 3.

The opposite end of the lever 52 is provided with an apertured head 56 which receives an operating rod 57 therethrough. The rod is suitably threaded for adjusting nuts 58, whereby the throw of the lever 52 may be regulated.

Upon the upper surface of the gear 37 a pin 59 is pivotally mounted as at 60, the free end projecting beyond the periphery of the gear 37. A stop 61 limits the swinging movement of the pin, in one direction, during rotation of the gear 37. The pivot 60 does not bind the pin rigidly to the gear, but permits a limited up and down movement, for a purpose to now be described.

A Geneva gear 62 is keyed upon a shaft 63 rotatably mounted in bearings 64 secured to the support 51. The shaft 63 is positioned substantially in line with the pin 59, so that the slots 65 of the gear 62 may be properly aligned with the projecting end of the pin 59. A guide 66 may be provided rearwardly of the gear 62 to retain the pin 59 in engagement with the slots 65.

The shaft 63 has a crank 67 pivotally connected to the rod 57. as at 68.

From the foregoing description. it will be apparent that as the gear 37 is rotated, the pin 59 will be moved into one of the slots 65. Continued rotation of the gear will cause the pin 59 to rotate the gear 62 with consequent rotation of the shaft 63, causing an upward movement of the rod 57. This movement of the rod rocks the lever 52 so as to move the housing 30 down within the housing 31. As soon as the pin has become disengaged from the slot 65, the spring 55 will help to balance the difference in the weight of each end of the lever 52 and also acts to again raise the housing 30 and reciprocate the rod 57 downwardly so as to dispose one of the slots 65 of the gear 62 in position to receive the pin 59 upon the next rotation of the gear 37.

Any suitable electric motor may be employed, the speed thereof being controlled through a rheostat 69.

In the operation of my device the signal 10 is suspended approximately in the middle of intersecting streets or highways, so as to present a display window 17 in line with oncoming traffic. We will assume, for clearness in describing the operation, that one street upon which traffic is to be controlled ex-

tends east and west while the other street extends north and south.

The motor 33 having been put in motion, through a suitable control switch, not shown, the lamp 29 will be simultaneously illuminated. With parts thus operating, we will say that traffic on the street extending north and south has been stopped, due to the display of the red signal 32 showing through appropriate windows 17. During rotation of the motor 33, the stud shaft 35 is rotated, transmitting motion to the gear 37 through the pinion gear 38. Since the bevel gear 41 is in mesh with the gear 37 motion will be transmitted to the indicators 42 by reason of the shafts 43 and gears 45 in mesh with the gear 41.

The indicators 42 rotate clockwise behind the ground glass 18 and make one complete revolution to each change of the signal. The light transmitted through either the green or red lenses 31—32 will project a silhouette or shadow of the indicator upon the glass 18 throughout its rotation. Thus, pedestrian as well as vehicular traffic may observe the indicator, and be apprised of the approximate lapse of time before the next change of movement in traffic. In other words, if any indicator 42 is at its lowermost central position, the indicator would have to make a complete revolution of the dial glass 18, before a change would be made in the signal.

During rotation of the indicators 42, the gear 37 is also rotated, as before explained, the pin 59 being carried around by the gear until it engages in one of the slots 65 of the gear 62. When the pin engages the gear 62 rotary motion will be imparted to the gear and shaft 63, and produce an upward thrust upon the rod 57 by virtue of the crank 67. Upward movement of the rod 57 will lower the housing 30. It will be obvious that when this housing is lowered, a change in the travel of traffic is effected.

By proportioning the gearing, the movement of the housing 30 and the indicators 42 may be synchronized with the timing of the illumination of respective signal windows.

While I have shown and described a specific embodiment of the invention, I do not limit myself to the exact details of construction and arrangement set forth but may employ such changes and modifications of the parts and resort to such equivalents as fairly fall within the scope of the appended claims.

I claim:—

1. A traffic signal comprising a housing having a plurality of signal windows, a stationary lamp housing having openings in alinement with said signal windows, a shutter reciprocable over said lamp housing and having pairs of vertically arranged lenses adapted for movement before the openings of said lamp housing, one of said lenses representing a "go" signal and the other of which designates a "stop" signal, an indicator rotatably mounted to traverse respective windows, means to rotate said indicators, and means to reciprocate said shutter upon each complete rotation of said indicators.

2. A traffic signal comprising a main housing having a plurality of signal windows, a compartment for each window, a lamp housing apertured to permit light rays to pass into respective compartments for projection through respective signal windows, illuminating means in said lamp housing, a vertically reciprocable shutter mounted over said lamp housing, vertically arranged signal lenses carried by said shutter for movement before said apertures, a motor carried by said main housing having a rotatable bevel gear, a gear train driven by said motor and rotating said bevel gear, drive shafts carried by said housing, each shaft extending radially and disposed approximately centrally of each respective signal window, a bevel gear upon one end of each shaft and in mesh with said first named bevel gear, an indicator mounted upon the opposite end of each respective drive shaft for traversing respective signal windows and means for reciprocating said shutter upon each complete rotation of said indicators.

3. A traffic signal comprising a main housing having a plurality of signal windows, a compartment for each window, a lamp housing apertured to permit light rays to pass into respective compartments for projection through respective signal windows, illuminating means in said lamp housing, a vertically reciprocable shutter mounted over said lamp housing, vertically arranged signal lenses carried by said shutter for movement before said apertures, a motor carried by said main housing having a rotatable bevel gear, a gear train driven by said motor and rotating said bevel gear, drive shafts carried by said housing, each shaft extending radially and disposed approximately centrally of each respective signal window, a bevel gear upon one end of each shaft and in mesh with said first named bevel gear, an indicator mounted upon the opposite end of each respective drive shaft for traversing respective signal windows, a lever carried by said main housing and connected to said shutter, and means operable by said gear train for reciprocating said lever and associated shutter upon each complete rotation of said indicators whereby to change the position of said signal lenses.

4. A traffic signal comprising a main housing having a plurality of signal windows, a compartment for each window, a lamp housing apertured to permit light rays to pass into respective compartments for projection through respective signal windows, illuminating means in said lamp housing, an indicator for each signal window, a vertically re-

ciprocable shutter, vertically arranged signal lenses thereon adapted to register with said apertures, a motor mounted in said main housing, a gear revolubly mounted upon said motor, a gear train driven by said motor and driving said gear, a crank shaft extended transversely, with respect to said gear and having a slotted gear thereon, a spring pressed lever associated with said shutter, a connecting rod between said crank shaft and lever, a pin carried by said first named gear for engagement with said slotted gear to reciprocate said shutter, and means associated with said motor for rotating said indicator means upon completion of the reciprocation of said shutter.

5. A traffic signal comprising a main housing having a plurality of signal windows, a compartment for each window, a lamp housing apertured to permit light rays to pass into respective compartments for projection through respective signal windows, illuminating means in said lamp housing, a vertically reciprocable shutter disposed over said lamp housing and movable between said compartments and said lamp housing, vertically arranged signal lenses on said shutter for registry with the apertures of said lamp housing, a motor in said main housing, a revoluble gear carried thereby, a gear train driven by said motor and rotating said gear, a crank shaft extended transversely with respect to said gear, a spring-pressed lever carried by said main housing, one end thereof being connected to said shutter, a connecting rod between said crank shaft and the opposite end of said lever, a slotted gear fixed to said crank shaft, and a pin carried by said revoluble gear for engagement with a slot of said slotted gear during rotation of said gear to reciprocate said shutter.

6. A traffic signal comprising a housing having a plurality of signal windows, a stationary lamp housing having openings in alinement with said signal windows, a vertically reciprocable shutter disposed over said lamp housing and having pairs of vertically arranged upper and lower lenses, said upper lens being disposed before the openings of said lamp housing in one position of said shutter and said lower lens being disposed before the openings of said lamp housing in the other position of said shutter, an indicator rotatably mounted to traverse respective signal windows, means for rotating said indicators, and means to reciprocate said shutter upon each complete rotation of said indicators.

THEODORE A. BOOR.