Oct. 12, 1937. P. M. FERGUSON 2,095,928

TRAFFIC SIGNALING DEVICE

Filed March 19, 1930

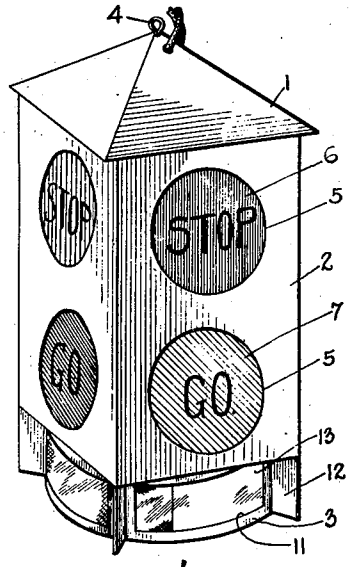


Fig. 1.

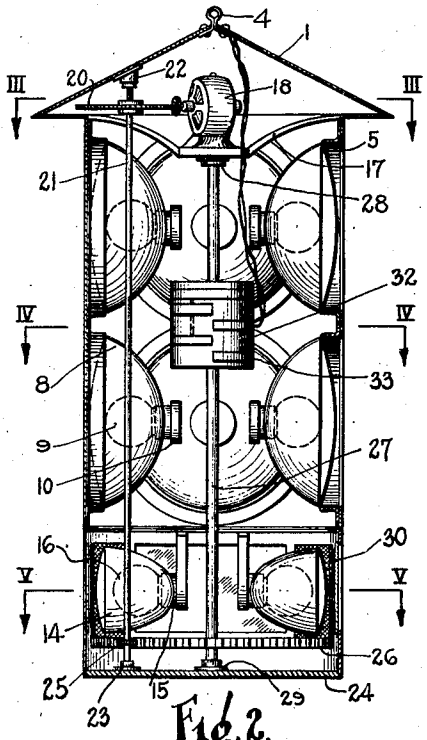


Fig. 2.

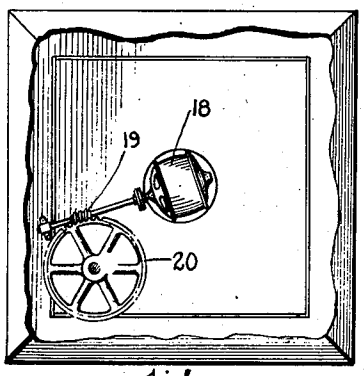


Fig. 3.

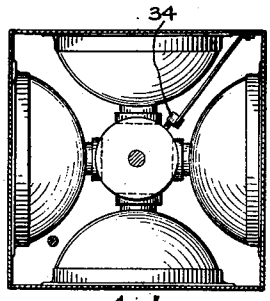


Fig. 4.

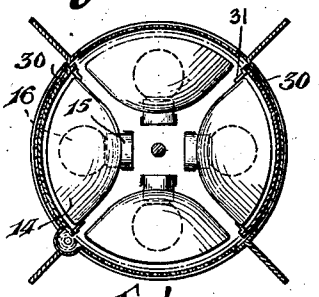


Fig. 5.

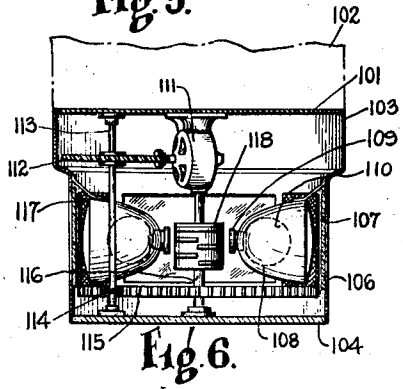


Fig. 6.

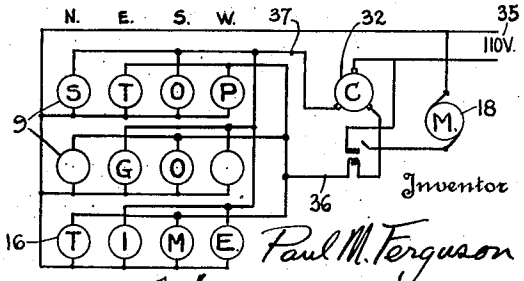


Fig. 7.

Inventor

Paul M. Ferguson

By Harvey R. Haugood

Attorney

Patented Oct. 12, 1937 2,095,928

UNITED STATES PATENT OFFICE

2,095,928

TRAFFIC SIGNALING DEVICE

Paul M. Ferguson, Cleveland, Ohio, assignor of one-third to Fred C. Boltz and one-third to Albert A. Rossman, both of Cleveland, Ohio

Application March 19, 1930, Serial No. 436,959

8 Claims. (Cl. 177—327)

This invention relates to a signal device which is particularly adapted for the regulation of vehicular and pedestrian traffic at street intersections.

An object of the invention is to provide an improved signaling device which will automatically indicate both the direction in which traffic is to move, and the approximate time in which the direction for the motion of the traffic will be changed.

Another object is to provide an improved signaling device which will be self-contained and simple in construction.

Another object is to provide an improved signaling device in which different periods of time may be provided for traffic in different directions, and which will, at the same time, provide like signals for indicating when the signal is to change.

Another object is to provide an improved signaling device which may be used in conjunction with existing traffic controlling systems.

Other objects will hereinafter appear.

The invention will be better understood from the description of two practical embodiments thereof, illustrated in the accompanying drawing, in which;

Figure 1 is a perspective view of a complete signaling device;

Figure 2 is a central longitudinal sectional view thereof;

Figures 3, 4 and 5 are transverse sections, taken on the lines III—III, IV—IV and V—V, respectively, of Figure 2;

Figure 6 is a fragmentary view, in central longitudinal section, of a modification of the signal of the preceding figures, arranged to be mounted upon signals such as are now in use; and

Figure 7 is a wiring diagram of the signal illustrated in Figures 1 to 5.

It is customary, in present traffic control systems, to place at congested street intersections a signal having two series of lights, one series being visible from each of the intersecting streets. These lights may consist merely of one green for indicating that traffic may go, and one red for indicating stop, facing each direction, which may be alternately illuminated, the two diametrically opposite being of the same color, while the two at right angles to these are of the other color.

Signals of this kind, of course, must change suddenly from green to red, and traffic is supposed to stop instantaneously upon this change. This, of course, is not always possible, as vehicles just entering the intersection possess considerable momentum and the difficulty of stopping suddenly is increased by slippiness of the streets. In order to give the approaching vehicles a warning that the signal is about to change and so to allow their drivers to prepare to stop, a third light of an amber color has frequently been provided which is illuminated during a time while the change is made between the red and green lights, and this amber light furnishes an intervening period when vehicles already within the crossing, or too close to it to stop before being within it, may proceed through the same.

This system was not satisfactory, because of the habit which many drivers had acquired of proceeding as long as the amber light was visible at all, so that the signal which they used for stopping was the change from amber to red, and this necessitated as sudden stops as did the change from green to red. Also drivers who were awaiting a signal to go were inclined to start their vehicles when the amber light appeared. In fact, this signaling system was so unsatisfactory in the above regard that in many places the amber lights have been replaced with red lights, so that there is a period during the change of the signal when it illuminates red on all sides.

In the illustrated embodiments of the present invention are provided signals having in each direction a red light and a green light to indicate, respectively, "stop" or "go" to the traffic, as has been customary heretofore, and, in addition, a third light operating in conjunction with the "go" signal which will indicate a period of time before the "go" signal is to be discontinued, so that approaching drivers will have no reason for not being prepared to stop immediately upon the appearance of the "stop" signal.

This is done by providing a lighted window closely adjacent the "go" signal, the area of which decreases as the time for change in signal approaches, becoming zero upon the instant of the change.

In Figures 1 to 5 a signal is shown carried in a housing which consists of a pyramidal top 1, a rectangular upper portion 2 suspended immediately therebelow, and a cylindrical lower portion 3 beneath the rectangular portion. This casing is arranged to be suspended by an eye 4 above the intersection of two streets.

Through each side of the rectangular portion of the casing are two apertures 5, the upper of which is provided with a red lens 6 for indicating "stop", and the lower of which is provided with a green lens 7 for indicating "go". Within the casing behind each lens is a reflector 8 in which is positioned an incandescent bulb 9 for illumi-

nating the lens. The bulb is mounted in a socket 10 of any desired type and is operated by circuits which will be hereinafter described.

The cylindrical portion of the casing has four elongated rectangular openings 11, one beneath each pair of lenses, and may be provided with wings 12 so that, from any given line of traffic, only one of the openings is visible. These openings are each covered by a glass 13 which may be of any desired color as green to match the "go" signal with which it is intended to cooperate, or amber.

Within each of the elongated windows thus formed is positioned a reflector 14 provided with a socket 15 which carries a bulb 16 so that opposite windows may be illuminated, and those between may be darkened as desired, by control of the circuits above referred to.

A shutter mechanism is provided within the casing for decreasing the illuminated area of the rectangular windows as the time for change in signal approaches, so that traffic may readily estimate the time at which this change will occur and be governed accordingly.

Within the top of the casing and secured thereto is a shelf 17 on the upper surface of which is supported an electric motor 18 carrying in its shaft a worm 19 which rotates a worm wheel 20 carried by a vertical shaft 21 supported in bearings 22 and 23 attached to, respectively, the top 1 and the bottom 24 of the casing. A pinion 25 is keyed to the shaft adjacent its lower end and meshes with a gear 26 carried by a vertical shaft 27 arranged centrally the casing and supported in bearings 28 and 29 carried, respectively, by the lower side of the shelf 17 and the upper side of the bottom 24. Upon the upper surface of gear 26 are provided two shutters 30 which are cylindrical in shape concentric the shaft 27 and extend for substantially 90°. These shutters pass between reflectors 14 and windows 13, the space between the reflectors and windows being merely sufficient for the passing of the shutters, and, if desired, flexible strips 31 may be provided to prevent the leakage of any light through the slit between the shutter and reflector, so that no light can reach the window which it is desired to have darkened. These strips, of course, can be of rubber, felt or any other desired material.

Carried by the shaft 27 is a commutator drum 32 on which are positioned segmental contact rings 33 which are brought, by rotation of the shaft, into contact with brushes 34 to control the circuits for illuminating the lights.

These circuits are illustrated in Figure 7 which shows the manner in which the motor 18, commutator 32 and lights 9 and 16 are connected. Electricity is supplied by power lines 35 and operates motor 18 to rotate, through the gearing illustrated, the shaft 27 which carries with it the commutator 32. As the commutator rotates it alternately connects circuits 36 and 37 with the power lines 35 and, as will be readily seen from this figure, when circuit 37 is connected to the source of power the first and third bulbs behind the "stop" lenses will be illuminated, these being, for instance the north and south red light bulbs; while the second and fourth "stop" bulbs, or those facing east and west, will be extinguished. At the same time, the second and fourth or east and west green light bulbs will be illuminated, and the first and third, or north and south green light bulbs will be extinguished; and the second and fourth or east and west timing window illuminating the bulbs will be illuminated, while the first and third, or north and south, will be darkened. During this time the shutters 30 will be traveling across the east and west windows 13, decreasing their illuminated area until they are completely covered, at which instant the commutator has reached a position to break the circuit 37 and close circuit 36, and the shutters are in position to travel across the north and south windows. Upon closing of circuit 36, the lights which were previously illuminated are all darkened and the others illuminated, so that the direction of traffic is changed, the shutters now traveling across the north and south windows below the illuminated north and south "go" lenses.

In Figure 6 a modification of the invention is illustrated which is adapted to be entirely mounted beneath the red and green lights in a separate casing which may be attached to the bottom of the casings already installed. The casing is shown as consisting of a top 101 secured to the bottom of the present casing 102, depending side walls 103, and a bottom 104. The sides are provided with elongated windows 106 having panes 107 and within these windows are reflectors 108 carrying the sockets 109 and provided with bulbs 110. A motor 111 is suspended from top 101 and drives through a worm and wheel 112, a vertical shaft 113 provided at its lower end with a pinion 114 meshing with a gear 115 carried by a central vertical shaft 116. This shaft is provided with shutters 117 similar to those above described, and with a commutator 118 also similar to that above described, which controls the circuits of the lamps within the housing, and also those in the casing to which it is attached.

In Figure 7 two commutator segments are shown, these being interposed in one side only of the circuit to the various lamps. In this form the lamps 16 are shown connected in parallel with the circuits of lamps 9. If it is desired, at times, to operate lamps 9 without lamps 16 or vice versa, duplicate commutator sectors may be used and the ends of the circuits from lamp 16 may be provided with their own individual brushes. In Figures 2 to 6 the commutators with duplicate sets of sectors which may be used in this manner are illustrated. Also, the duplicate sectors might be connected into the opposite sides of the circuit if it be desired that the lamp circuits be broken on both sides simultaneously.

While the signal has been illustrated as a complete self-contained unit, it is obvious that it may be used either alone or with a motor controlled from a central boulevard or cascade wave system in synchronism with other signals along the same road, and it will be also obvious that the illuminated time-indicating windows may be positioned in any place desired, either above or below the "go" signal or either between or above or below the "go" and "stop" lenses; or that the illuminated window itself may constitute the "go" signal.

While I have described the illustrated embodiment of my invention in some particularity, obviously many other embodiments will readily occur to those skilled in this art, and I therefore do not limit myself to the precise details shown and described herein, but claim as my invention all embodiments, variations and modifications coming within the scope of the appended claims.

I claim:

1. A traffic signal having "stop" and "go" indications in four directions, means for the routine display of said indications, a cylindrical housing having its axis vertical, substantially

quadrantal elongated windows in the exterior of said housing, a separate compartment to the rear of each of said windows of substantially the same extent and spaced therefrom, illuminating means in each compartment, means to illuminate the illuminating means, two diametrically opposite parti-cylindrical opaque shutters each of substantially the same extent as a window and disposed in the space between the windows and the compartments, means for continuously and uniformly rotating the shutters, and means for timing the rotation of the shutter and the illumination of the illuminating means whereby illumination of a window is obtained at the instant of a change of indication and whereby the shutter begins to obliterate the illumination of the window at the beginning of an indication and completes the obliteration substantially at the end of the last-named indication.

2. A traffic signal comprising a casing having a plurality of windows in the lateral sides thereof facing in different directions, a plurality of sources of light one for each window, means to direct a light from each source to its corresponding window only, a light shutter, means to support said shutter within the casing for rotation to successively intercept the light passing from each source to its respective window, timing means controlling the said sources and positively connected to said shutter to illuminate only the source the light from which the shutter is intercepting, additional signaling means comprising signal lights facing in the same directions as the windows, the illumination of said signal lights being controlled by said timing means.

3. A traffic signal comprising a casing having a plurality of windows in the lateral sides thereof facing in different directions, a plurality of sources of light, one source of light for each window, means to direct the light from each source to its corresponding window only, a plurality of rotary shutters within the casing arranged to pass between said windows and sources, each shutter being sufficient in extent to cover one of said windows, means for moving said shutters to pass said windows successively, timing means connected to said shutters and arranged to control the sources of light of the windows over which the shutters are passing only, and additional signaling means facing in the same directions as the windows and controlled by said timing means.

4. A traffic signal comprising a casing having a plurality of windows in the lateral sides thereof facing in different directions, a plurality of sources of light, one source of light for each window, means to direct the light from each source to its corresponding window only, a plurality of rotary shutters within the casing arranged to pass between said windows and sources, each shutter being sufficient in extent to cover one of said windows, means for moving said shutters to pass said windows successively, timing means connected to said shutters and arranged to cause illumination of the windows over which the shutters are passing only, and additional signaling means facing in the same direction as the windows and controlled by said timing means to change at the instant the shutters completely cover the windows over which they are passing.

5. A traffic signal comprising a casing, windows through the sides thereof in substantially horizontal alinement, a central vertical shaft journalled within the casing, a plurality of sources of light, one source of light for each window, means to direct the light from each source to its corresponding window only, the sources being positioned between the windows and the shaft, two oppositely disposed curved shutters carried by and concentric with the shaft and arranged to intercept the light from said sources, and timing means carried by the shaft controlling the sources, so that only the windows over which the shutters are passing are illuminated.

6. A traffic signal comprising a casing, windows through the sides thereof in substantially horizontal alinement, a central vertical shaft journalled within the casing, a plurality of sources of light between the windows and shaft, one source of light for each window, means to direct the light from each source to its corresponding window only, two oppositely disposed curved shutters carried by and concentric with the shaft and arranged to intercept light passing from the illuminating means to the windows, the shutters being as great in extent as the width of the windows, openings through the casing, a plurality of sources of light one for each opening, timing means carried by the shaft and controlling the sources for both the windows and openings, whereby the windows which are being covered by the shutters only are illuminated.

7. A traffic signal comprising a vertically elongated casing the upper portion of which is rectangular in cross-section and the lower portion of which is cylindrical in cross-section, two openings in each side of the upper portion of the casing, one beneath the other, separate reflectors behind the openings, an incandescent bulb carried within each reflector so that its light when illuminated is directed to the corresponding window only, a colored lens covering each opening, four windows in horizontal alinement through the cylindrical portion of the casing, one beneath each pair of openings, a plurality of reflectors one behind each window, an incandescent bulb within each second mentioned reflector, electrical circuits including all said bulbs through which the bulbs may be illuminated, a vertical shaft disposed centrally of the casing, a motor carried within the casing and geared to said shaft, two diametrically disposed curved shutters carried by and concentric with the shaft and arranged to pass between the windows and their reflectors, and a commutator carried by the shaft controlling the circuits by which the bulbs are illuminated, so that only the windows which are being covered by the shutters are illuminated, one of said openings above each window being illuminated when the window is illuminated and the other illuminated when the window is darkened.

8. A traffic signal comprising a casing provided with a plurality of windows in substantially horizontal alinement and facing in different directions, a plurality of sources of light, each window being in front of one of said sources, light obstructing elements confining the light from each source to its respective window, timing means selectively in repeating cycles controlling the illumination of said sources of light, a curved shutter supported to rotate about a vertical axis and arranged to intercept light passing from said sources to said windows, driving means rotating said shutter about said axis, and synchronized positive driving connections between said shutter and said timing means.

PAUL M. FERGUSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,095,928. October 12, 1937.

PAUL M. FERGUSON.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the drawing, strike out Figure 7, and insert instead the following:

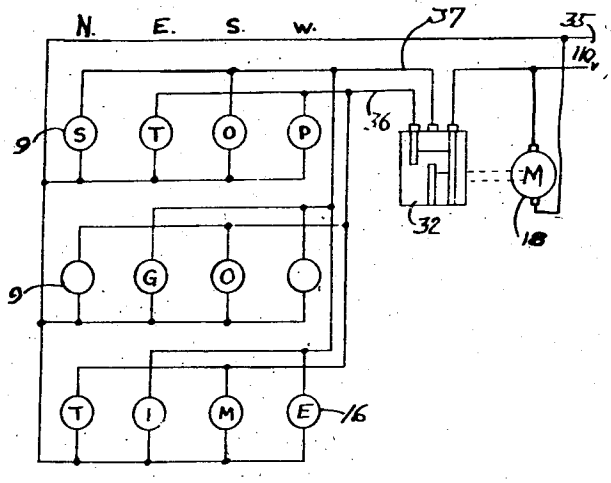


Fig. 7

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of April, A. D. 1938.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)