Oct. 11, 1955 N. R. HASTINGS 2,720,637

TRAFFIC SIGNAL WITH TIME LAPSE INDICATION

Filed Nov. 3, 1954 3 Sheets-Sheet 1

Fig. 1

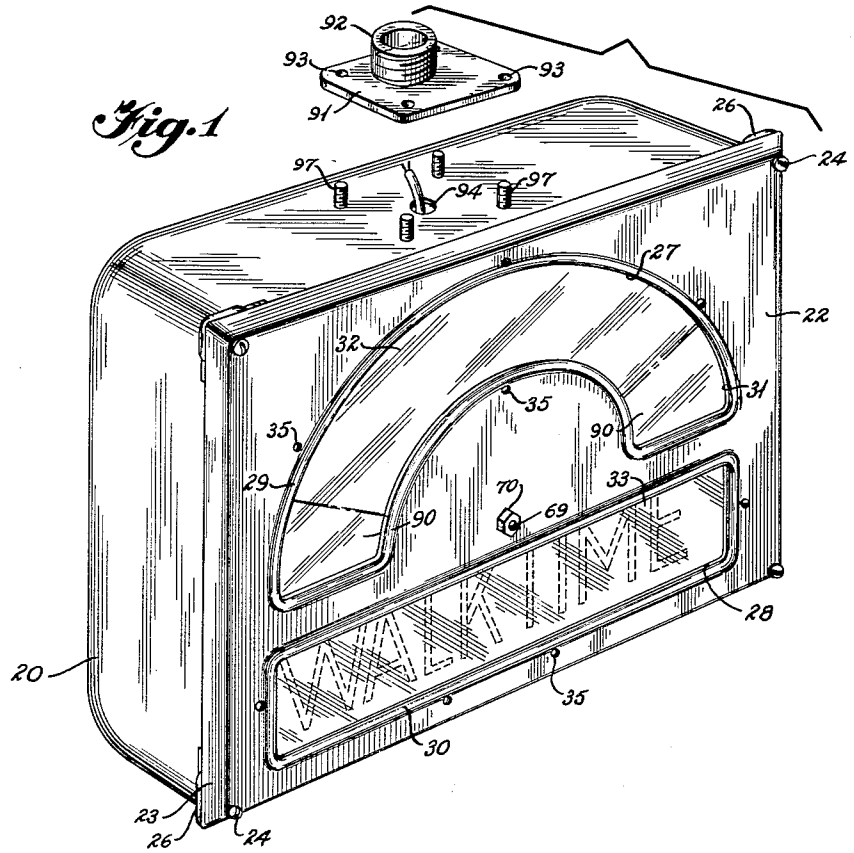
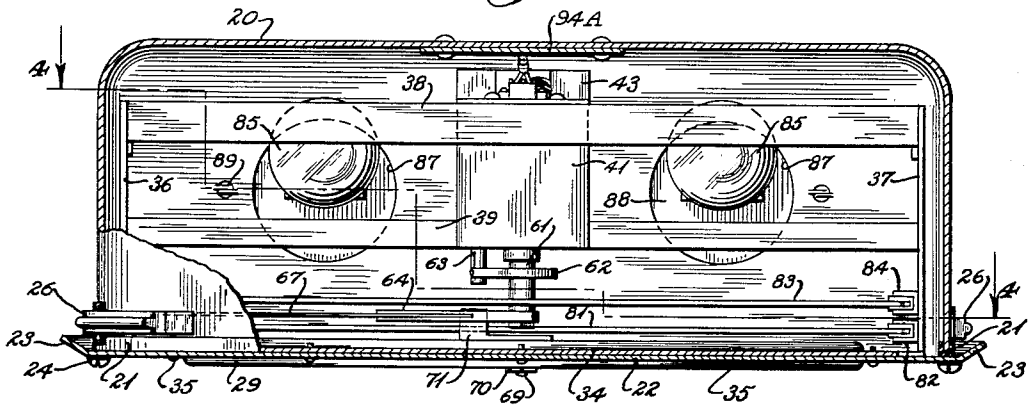


Fig. 2



INVENTOR

Norman R. Hastings

BY

A. Yates Dowell

ATTORNEY

Oct. 11, 1955 N. R. HASTINGS 2,720,637

TRAFFIC SIGNAL WITH TIME LAPSE INDICATION

Filed Nov. 3, 1954 3 Sheets-Sheet 2

Fig. 3

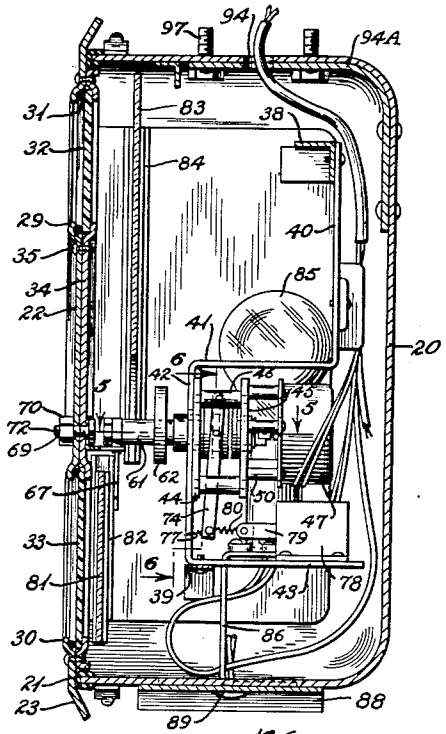


Fig. 6

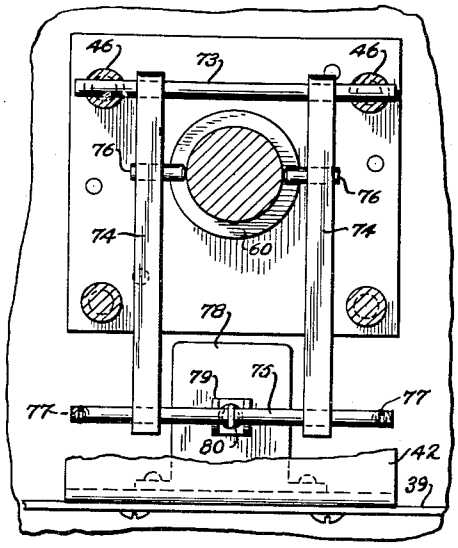


Fig. 7

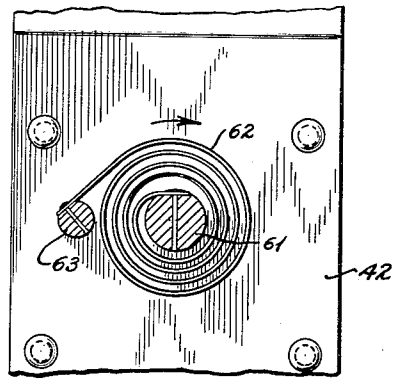


Fig. 5

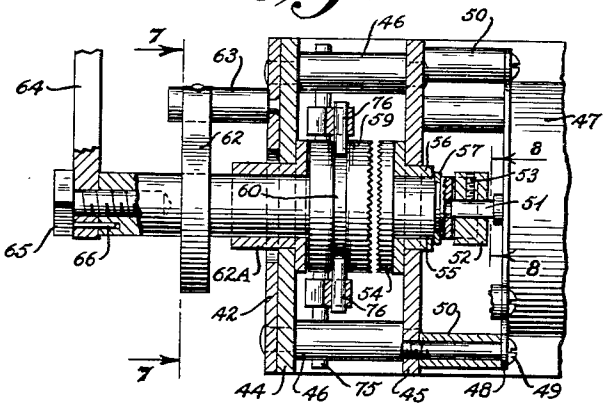


Fig. 9

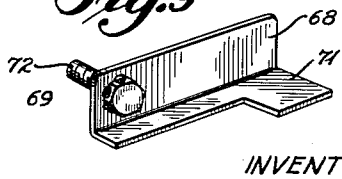
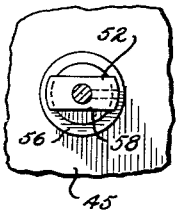


Fig. 8



INVENTOR
Norman R. Hastings

BY

ATTORNEY

Oct. 11, 1955 N. R. HASTINGS 2,720,637

TRAFFIC SIGNAL WITH TIME LAPSE INDICATION

Filed Nov. 3, 1954 3 Sheets-Sheet 3

Fig. 4

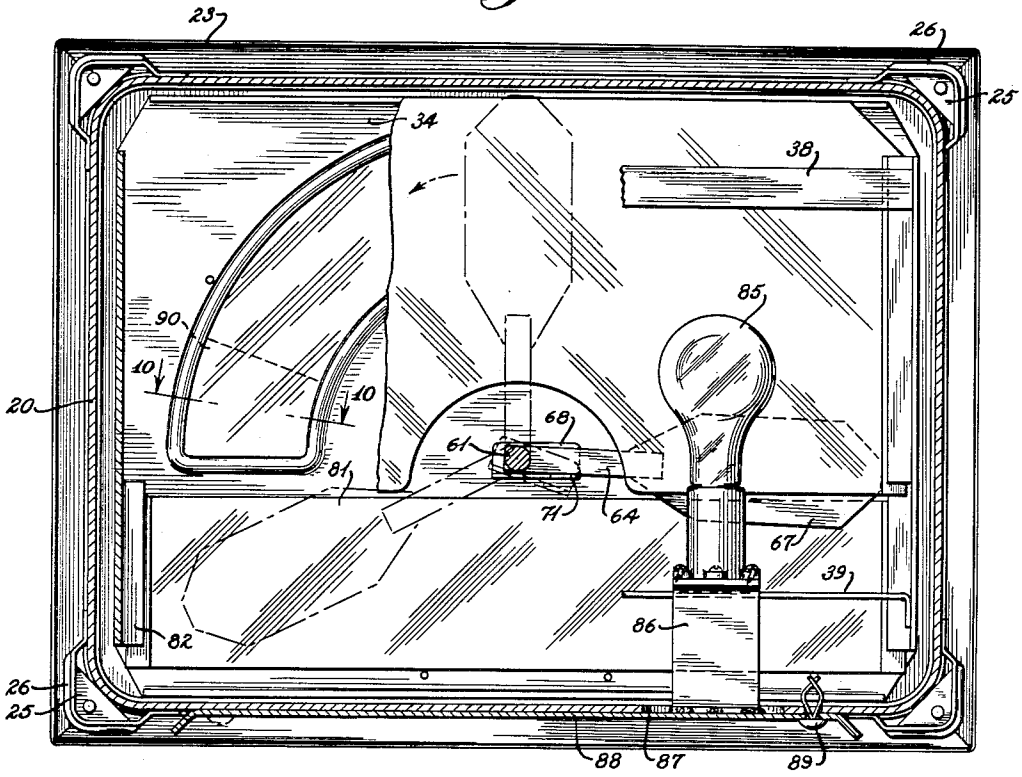


Fig. 10

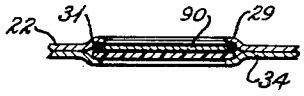


Fig. 11

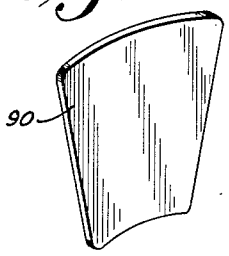


Fig. 12

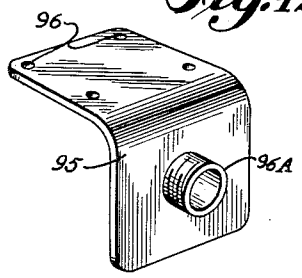
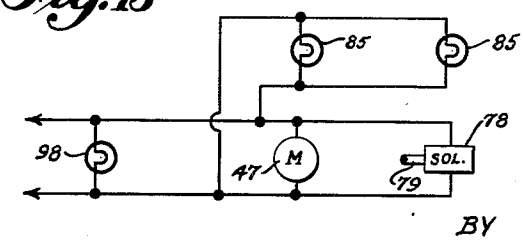


Fig. 13



INVENTOR
Norman R. Hastings

BY

Agates Dowell
ATTORNEY

United States Patent Office 2,720,637
Patented Oct. 11, 1955

2,720,637

TRAFFIC SIGNAL WITH TIME LAPSE INDICATION

Norman R. Hastings, Huron, S. Dak.

Application November 3, 1954, Serial No. 466,581
8 Claims. (Cl. 340—43)

The present invention relates to traffic signals and more particularly to a signal for indicating the time remaining before the signal will change.

This application is directed to a traffic signal of the general type disclosed in my prior application, Serial No. 411,081, filed February 8, 1954. Traffic directing signals consisting of red and green lights, indicating, respectively, whether one may proceed or must stop have come into general use. These are frequently supplemented by a yellow caution light which may be on for a few seconds intermediate the red and green lights, or sometimes for a few seconds at the end of the on period for the green light. Although such caution light where used indicates that the "Go" signal is about to change, its duration is usually not sufficiently long to be of assistance to the pedestrian desiring to cross nor to vehicular traffic which has not reached the intersection. As a result, pedestrians frequently begin to cross a street on the green signal, but do not have sufficient time to reach the opposite side before such signal has changed.

Despite the fact that local laws usually state that the pedestrian in such circumstances has the right of way, this is small comfort to a pedestrian who finds himself in the middle of a stream of traffic which has started up before he could safely reach the opposite side. Vehicles approaching an intersection frequently do not receive adequate warning that the signal is about to change, resulting in dangerous conditions arising.

Accordingly, it is an object of the present invention to provide a plainly visible signal for use in association with conventional traffic control signals and which will constantly provide an indication of the time remaining for the "Go" signal, thus providing both pedestrians and vehicular traffic with information by means of which they may judge whether it is safe to cross or to enter an intersection.

A further object of the invention is to provide a signal for use in conjunction with conventional traffic control signals and which is visible for a substantial distance in order that operators of vehicles may judge a substantial distance before reaching the intersection whether the "Go" signal will change before the vehicle can clear such intersection.

A further object of the invention is to provide an efficient, positive working, and inexpensive signaling means to overcome the difficulties with prior art structures.

Other and further objects will become apparent upon reference to the drawings wherein:

Fig. 1 is a perspective of the external cabinet and window structure in which the mechanism is mounted and showing one form of mounting plate in detached position;

Fig. 2, a broken horizontal section taken just beneath the top of the cabinet and showing parts in plan;

Fig. 3, an irregular vertical transverse section taken approximately through the center of the cabinet showing some of the parts in elevation;

Fig. 4, a longitudinal section taken generally on line 4—4 of Fig. 2 showing the indicating hand in starting position with dotted line intermediate and extreme positions;

Fig. 5, an enlarged sectional view taken on line 5—5 of Fig. 3 showing the clutch mechanism and the mounting for the indicating hand;

Fig. 6, an enlarged sectional view taken approximately on line 6—6 of Fig. 3 of the clutch operating linkage;

Fig. 7, a section taken substantially on line 7—7 of Fig. 5 showing the coil spring for returning the indicator hand to starting position;

Fig. 8, a section taken on line 8—8 of Fig. 5 showing the driving connection between the motor and the driving element of the clutch;

Fig. 9, a perspective of the adjustable stop for limiting the starting position of the indicator hand;

Fig. 10, a section taken substantially on line 10—10 of Fig. 4 showing the masking plate in operative position;

Fig. 11, a perspective showing one size of masking plate;

Fig. 12, another form of mounting plate for the cabinet; and

Fig. 13, a wiring diagram of the electrical circuits for the time signal.

Briefly, this invention comprises a signaling device including a cabinet having a removable cover on one side with an arcuate-shaped window through which an arcuately movable signaling hand may be observed and another window through which information regarding the signal may be observed. Within the cabinet mechanism is provided including a motor and a clutch mounted on a suitable bracket with the driven portion of the clutch fixed to and operating an arcuately movable signaling hand at a predetermined rate in one direction and a spring causes return of the hand to starting position. Simultaneous with the operation of the motor, the clutch is engaged and lights within the cabinet are energized to expose the silhouette of the hand and also expose instruction. The mechanism and lights within the cabinet are energized simultaneously with the conventional Go traffic signal thereby indicating the time during which such Go will be exposed. The starting position of the arcuately movable hand is adjusted from the outside of the cabinet, and masking plates are provided for limiting the time of observation of such hand whereby the signaling structure may be accurately adjusted for operation within relatively wide time intervals.

Referring more specifically to the drawings, the traffic signal structure includes a cabinet **20** of generally rectangular shape having an open front, the peripheral edges of said open front being provided with a U-shaped gasket **21**, and closing the open front is a front cover **22** which has an angularly bent, rearwardly projecting marginal edge **23**. The cover **22** is held in sealing engagement with the gasket **21** by means of machine screws **24** extending into threaded openings in triangular plates **25**. The triangular plates **25** are loosely held against curved corners of the cabinet **20** by means of V-shaped brackets **26** having inner grooves formed by suitably shaping the material of such brackets, such brackets being held in position by welding or the like to the cabinet **20**.

An arcuate-shaped window opening **27** is provided in the upper portion of the cover **22**, and an elongated rectangular window opening **28** is provided in the lower portion of the cover **22**, the margins of such openings being provided with an outwardly extending offset **29** and **30**, respectively, receiving the O-ring gaskets **31** of rubber-like material against which glass or plastic transparent window panes **32** and **33** are mounted. The window panes are held in fixed position by means of a front plate **34** of a supporting chassis, such front plate **34** being provided with window openings in registry with the window openings of the cover **22** and having offset portions for retaining the window panes in position, said front cover **22** and front chassis plate **34** being held together by screws **35** or the like. Secured to the side edges of the front plate **34** of the chassis are rearwardly extending wings **36** and **37**. A horizontally extending angle bar **38** is fixed at its ends to the upper rear corners of the chassis wings **36** and **37**, and a horizontally extending strap **39** is secured at its ends to the lower portions of the wings. Mounted on angle bar **38** and strap **39** is a bracket having a first vertical leg **40** fixed at its upper end to the angle bar **38**, the lower end of said vertical leg **40** being ter-

minated in a first horizontal leg 41 and thence a second vertical leg 42, and a second horizontal leg 43, said horizontal leg 43 being secured to the horizontal strap 39 by a suitable screw or other fastening.

Mounted upon said second vertical leg 42 of the bracket is a clutch housing including a front plate 44 and a rear plate 45 held in spaced relation by shouldered studs 46 having deformable extensions which are riveted to the vertical leg 42 of the bracket, the front plate and the rear plate of the clutch housing thereby maintaining the clutch housing in assembled relation and in fixed position on the supporting bracket. A motor 47 having an outwardly extending flange 48 is secured to the clutch housing plate 45 by means of screws 49 passing through the flange 48, through spacing sleeves 50 threaded into tapped holes in the rear clutch housing plate 45 thereby maintaining the motor in fixed position.

The motor 47 is provided with a shaft 51 on which a rectangular lug 52 is fixed by means of a set screw 53. Cooperating with the rectangular lug 52 is a driving clutch element 54 having a shaft portion 55 rotatably mounted in a bushing 56 pressed into an opening in the rear clutch housing plate 45, such shaft being held in position by means of a split ring 57 extending in a groove in the shaft portion 55 thereby retaining the clutch element 54 against axial movement. The clutch shaft portion 55 is provided with a diametrical slot 58 which receives the lug 52 thereby providing driving connection with the motor shaft 51 for positively driving the clutch element 54 from the motor.

A driven clutch element 59 is provided with an annular groove 60 for cooperation with the clutch operating mechanism, such clutch element 59 being integral with a shaft 61 which is rotatably mounted in a bushing 62A pressed into or otherwise fixed to the front clutch housing plate 44. It will be apparent that the facing portions of the clutch elements 54 and 59 are provided with interengaging wedge shaped teeth and V-shaped notches for obtaining driving relation. It will be observed that the teeth of the clutch elements 54 and 59 are formed by relatively shallow V-shaped notches, which arrangement permits slipping in the event that the driven element is positively stopped such as might occur when the green light is actuated for a long period of time.

The shaft portion 61 of the driven clutch element has the inner end of a clock-type spring 62 fixed to a flattened portion thereof by a rivet or the like, the outer end of such coil spring being secured by a rivet or the like to a stud 63 projecting forwardly from the second vertical leg 42 of the bracket. An indicator supporting arm 64 (Fig. 5) is secured to the forward end of the shaft portion 61 by a cap screw 65 passed through an aperture in arm 64 and threaded into the front end of shaft portion 61 and is prevented from relative rotation by a pin or the like 66 extending into aligned openings in the shaft portion and the indicator supporting arm. The spring 62 is arranged to normally urge the indicator supporting arm 64 and the hand 67 fixed thereon to the full line position shown in Figures 2, 3, and 4. The indicator supporting arm 64 is limited in its spring biased movement by a stop 68 (Fig. 9) of angular configuration in which one web is arranged in a vertical plane parallel to the front and is provided with a threaded stud 69 passing through an opening in the front cover 22 and front chassis plate 33 and secured thereto by means of a nut 70 on stud 69. The horizontally extending web 71 of the stop 68 is of L-shaped configuration as shown in Figures 2 and 9, and the rearwardly extending portion thereof engages the indicator supporting arm 64 to limit the movement caused by the coil spring 62. The stud 69 is provided with a slot 72 so that the stop 68 may be adjusted from the front of the cabinet without requiring access to the interior thereof.

The driven clutch element 59 is controlled in its axial movement by a linkage including a horizontally extending pivot pin 73 supported in apertures in shouldered studs 46 and carrying depending arms 74, 74, the bottom ends of which arms support an operating rod 75 passing through openings in the lower ends of the arms 74. Dowels 76, 76 fixed by pressing into apertures in arms 74 project into the groove 60 of the driven clutch element whereby forward or backward movement of the control rod 75 causes disengagement or engagement of driven clutch element 59 and driving clutch element 54. The control rod 75 is normally urged forwardly by means of clutch release springs 77 which react between the second vertical leg 42 of the supporting bracket and the outer ends of control rod 75 to the clutch release position shown in Figures 3 and 5.

The clutch is caused to engage by the reaction of a solenoid 78 mounted on the second horizontal leg 43 of the supporting bracket which solenoid draws an armature 79 connected by means of a spring 80 to the center of the clutch control rod 75. It will be apparent that when the solenoid 78 is energized, the driven clutch element 59 is moved axially rearwardly resulting in a limited rearward movement of the indicator supporting arm 64 and the indicating hand 67.

Mounted behind the window 33 is a translucent screen 81 which may be made of opalescent glass with the words "Walk-Time" thereon, such translucent screen being mounted forwardly of the path of movement of the hand 67 by means of channel elements 82, 82 which receive the ends of the translucent screen with a U-shaped resilient gasket thereby retaining the translucent screen in fixed position. A second translucent screen 83 is mounted rearwardly of the indicating hand 67 a sufficient distance to permit the rearward movement of the hand 67 resulting from the axial movement of the shaft portion 61, and such translucent screen 83 being supported in channels 84 by means of U-shaped gaskets.

For producing illumination within the cabinet to display the words "Walk-Time" and to produce a silhouette of the hand 67 through the arcuate window 32, a pair of incandescent lamps 85 are mounted upon C-shaped brackets 86, 86 which brackets and lamps may pass through openings 87, 87 in the bottom wall of the cabinet. The C-shaped brackets 86 are fixedly secured by welding or the like to a removable supporting plate 88 which is held in abutting relation to the outer surface of the bottom of the cabinet by means of spring fasteners 89 passing through registering apertures in the supporting plate 88 and bottom wall of the cabinet as shown in Figs. 3 and 4. By this means the lamps may be replaced without requiring removal of the front cover, thereby simplifying the replacement of lamp and maintenance of equipment.

It is ordinarily desirable to have the arcuate window opening 27 of approximately the correct size corresponding to the time interval during which the indicating hand 67 passes in its motor controlled movement against the tension of the spring 62. Consequently, in some installations where the time interval is relatively short, the window opening 27 is unnecessarily long. To compensate for such conditions without requiring separate front cover one or more masking plates 90 (Figs. 1, 4, 11) may be installed at either the start or finish end of the window, or at both ends. Such a masking plate 90 may be held in position by means of the O-ring gasket 31 by forcing the masking plate 90 into position where it is retained by the overhanging offset portion 29.

Where the cabinet is installed in a depending position a flange supporting plate 91 having a threaded tubular nipple 92 and a plurality of stud receiving openings 93 has been found to be satisfactory with the passage in the nipple being in alignment with a control wire receiving opening 94 permitting weather-tight covering of the electrical cable. Studs 97 passing through a reinforcing bracket 94A and secured thereto pass through the cabinet top and are receivable in openings 93 of the flange.

In some installations it is desirable to support the cabi-

net from the rear wall, and this may be done by means of the angular bracket **95** (Fig. 12) having stud receiving openings **96** for receiving the studs **97** projecting upwardly from the cabinet, and a threaded nipple **96A** may serve as the support as well as the conduit for the electrical control wires. A suitable opening is provided for the electrical cables.

Upon reference to Fig. 13 the operation of the signal is believed to be clear. A lamp **98** corresponding to the conventional green traffic signal light, the motor **47**, clutch operating relay **78**, and lamps **85**, **85** are connected in parallel so that all are energized at the same time that the corresponding green traffic signal light is energized. Therefore, the signaling system of the present invention is operated in the sequence of simultaneously starting the motor **47**, engaging the driven clutch element **59** with the driving clutch element **54**, thereby causing the indicating hand **67** to move in its path while lamps **85**, **85** which have been simultaneously energized produce illumination of sufficient intensity to cause a silhouette to be observed as the hand **67** passes in front of the translucent screen **83**, thereby indicating to the pedestrians as well as motorists the time that has elapsed since the green signal was first observed and the time remaining before the red signal will be displayed. As a result many of the presently considered unavoidable "accidents" can be averted by the use of the present invention, the advantages of which should be apparent.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof; and, therefore, the invention is not limited by that which is illustrated in the drawings and described in the specification, but only as indicated in the accompanying claims.

What is claimed is:

1. A cabinet structure for weather-tight protection of an indicator system comprising a wall structure having a removable side, means to attach the removable side to said wall structure with a weather-tight seal, an arcuate window in said cabinet for exposing an indicator hand movable along said window, means within the cabinet for supporting said indicator hand, operating mechanism supported in said cabinet for causing said hand to pass along said window, a stop movably mounted in said cabinet and having an outwardly projecting operating portion for adjustment of said stop without requiring opening the cabinet, said stop being provided with an abutment surface for engaging said indicator hand, and means for attachment to the exterior of the cabinet for reducing the effective size of said window whereby a single cabinet structure may be used for different amplitudes of movement of said indicating hand.

2. A signal structure comprising a cabinet having a window opening, a chassis mounted within the cabinet, a motor and clutch mechanism mounted on said chassis, said clutch mechanism having a driving and a driven portion, means connecting said motor with said driving portion, a pointer mounted on said driven portion, a stop for said pointer mounted on said chassis, wedge-shaped teeth on said driving and driven portions of the clutch for causing movement of said portions when interengaged but permitting slippage under heavy load when the pointer reaches a final stop position and with the motor still running, a solenoid for causing interengagement of said clutch portions, and spring means for returning said pointer to its initial position to engage the stop upon the deenergization of the solenoid.

3. A signal as defined in claim 2 wherein the stop includes a stud projecting through the cabinet, and means for adjusting said stop from the outside of said cabinet to limit the extent of movement of the pointer.

4. A signal as defined in claim 3, and means to mask a portion of the window opening at either or both ends thereof to cut down the time interval of visibility of the pointer through the window opening.

5. A signal structure comprising a cabinet open on one side, a cover to close the open side, said cover having at least one window opening, a chassis mounted on the interior face of said cover and having wings projecting rearwardly therefrom, a motor and clutch mechanism mounted on said wings, said clutch mechanism having a driving and a driven member, means to connect said driving member to the motor, a pointer mounted on the driven member, a stop for said pointer mounted on said cover and chassis, said members being provided with wedge-shaped teeth for causing interengaging movement of said members for operating said pointer but permitting slippage under heavy load when the pointer reaches its final stop position and with the motor still running, a solenoid for causing interengagement of said clutch member, means for energizing said motor and solenoid simultaneously, a translucent screen mounted on the wings of said chassis, and illuminating means located rearwardly of said screen.

6. A signal structure comprising a cabinet open on one side, a cover closing said side, said cover having an arcuate window opening therein, a translucent screen mounted rearwardly of said window opening, a pointer pivotally mounted within the cabinet adjacent to said translucent screen, stop means adjacent to the ends of the arcuate window for limiting the travel of the pointer, a motor and clutch elements for pivotally moving said pointer, means permitting slippage between the clutch elements when the pointer reaches one of said stop means, lighting means located rearwardly of said screen and pointer to cause a silhouette of said pointer on the screen as said pointer is moving in an arcuate path across the arcuate window opening, and means for simultaneously energizing said motor, lighting means, and solenoid.

7. A signal structure as set forth in claim 6, wherein the motor and clutch elements move the pointer in one direction, a spring for returning the pointer in the opposite direction to a starting position, one of said stop means being mounted on said cover to fix the starting position of the pointer, said stop means including a stud projecting through the cover, and means for adjusting said stop from the outside of the cabinet to change the initial or starting position of the pointer thereby limiting the extent of movement of the pointer in one direction.

8. A signal structure comprising a motor, a pointer, means for driving said pointer by said motor from a starting to a finishing position, said driving means permitting slippage when said pointer reaches a finishing position with the motor still running, stop means for limiting the extent of movement of said pointer by said motor in one direction, means for moving said pointer in the opposite direction back to the starting position, means for setting the starting position of said pointer, said setting means being adjustable to vary the starting position of the pointer, means associated with the pointer for visually indicating the path of movement of the pointer, and means for optionally reducing the visual length of said path of movement.

References Cited in the file of this patent

UNITED STATES PATENTS

1,467,847	Fulton	Sept. 11, 1923
1,756,907	Payne	Apr. 29, 1930
1,989,984	Hope	Feb. 5, 1935
2,254,676	Ebert	Sept. 2, 1941
2,258,764	Hughes et al.	Oct. 14, 1941
2,317,538	Lamar	Apr. 27, 1943
2,480,290	Fein	Aug. 30, 1949
2,534,992	Reid	Dec. 19, 1950
2,577,173	Woest	Dec. 4, 1951
2,612,548	Swanson	Sept. 30, 1952
2,666,509	Jaggi	Jan. 19, 1954

FOREIGN PATENTS

835,347	France	Sept. 19, 1938