

Jan. 29, 1963

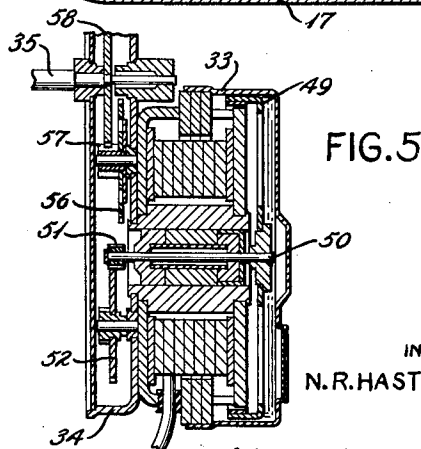
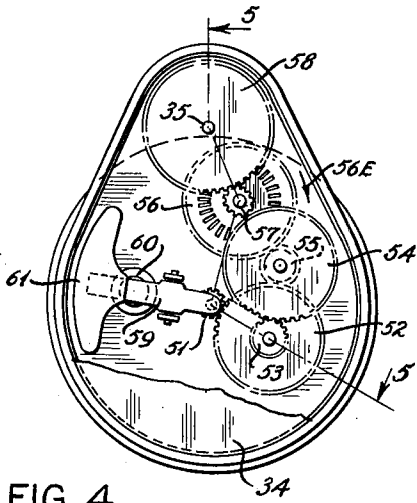
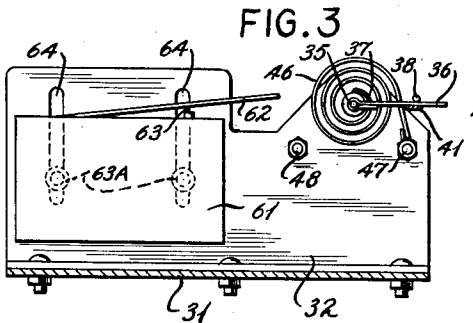
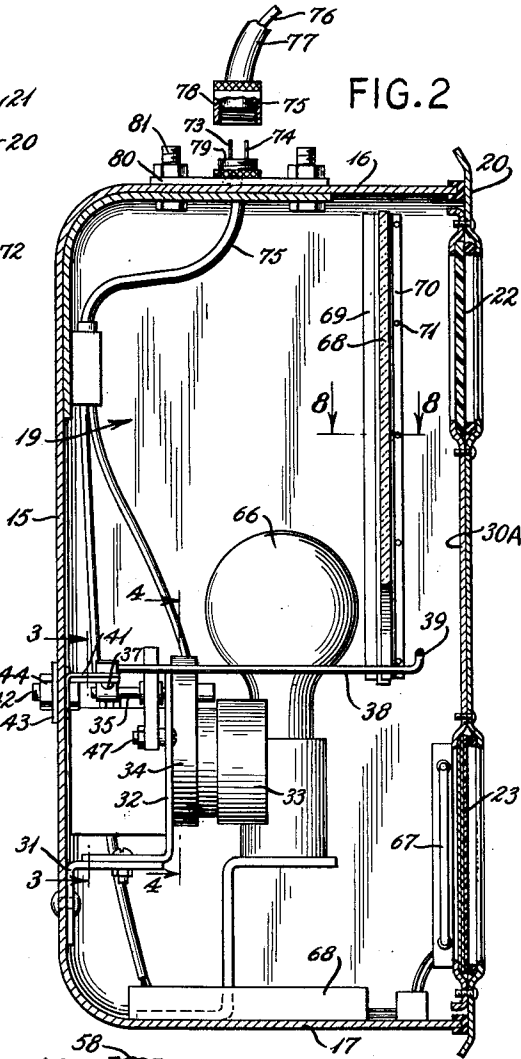
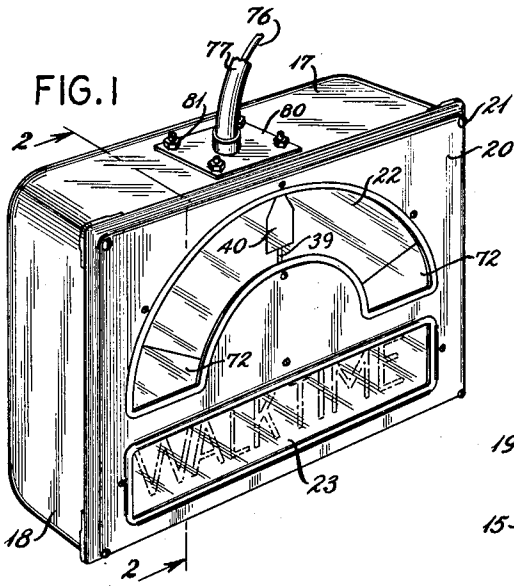
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3,076,178

PEDESTRIAN TRAFFIC SIGNAL

Filed Sept. 25, 1958

4 Sheets-Sheet 1



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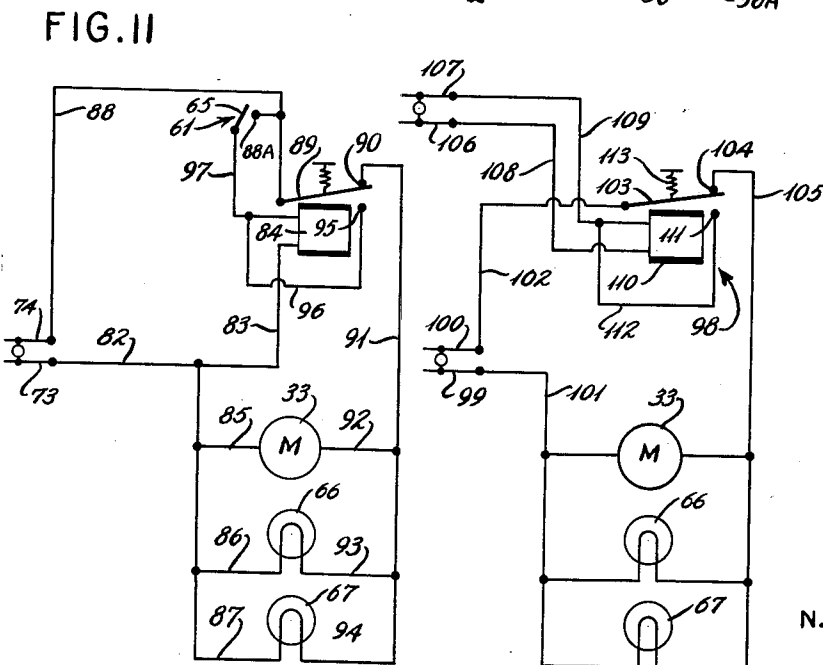
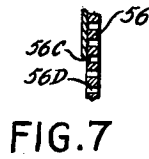
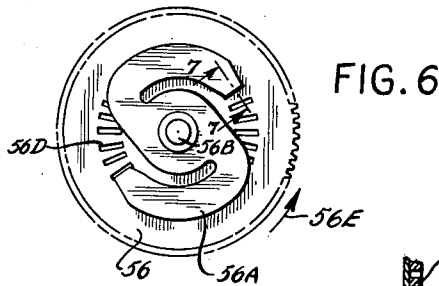
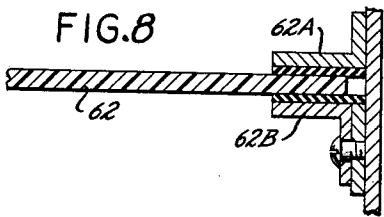
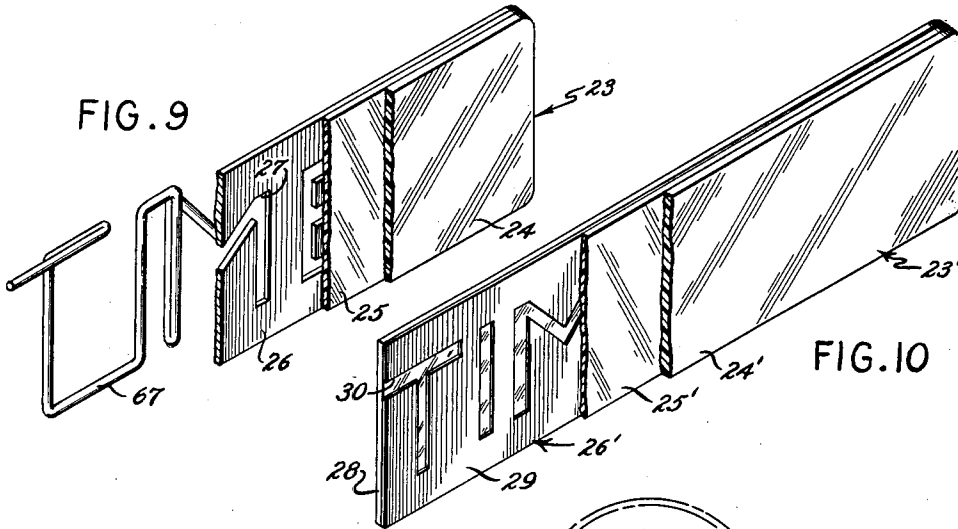
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PEDESTRIAN TRAFFIC SIGNAL

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4 Sheets-Sheet 2



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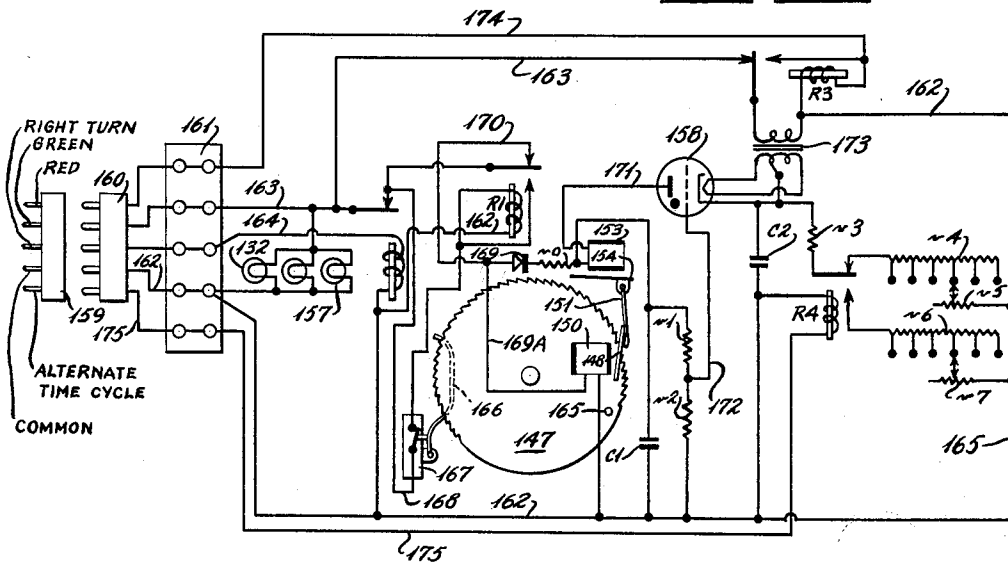
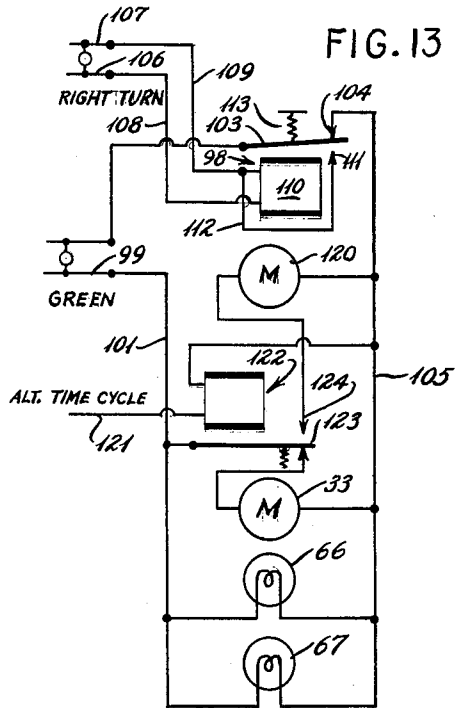
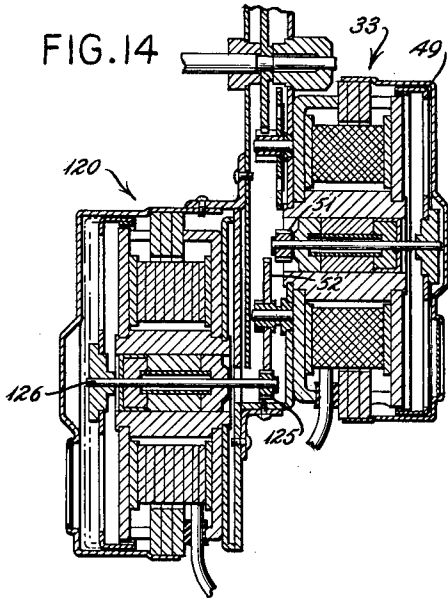
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PEDESTRIAN TRAFFIC SIGNAL

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4 Sheets-Sheet 3



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3,076,178

PEDESTRIAN TRAFFIC SIGNAL

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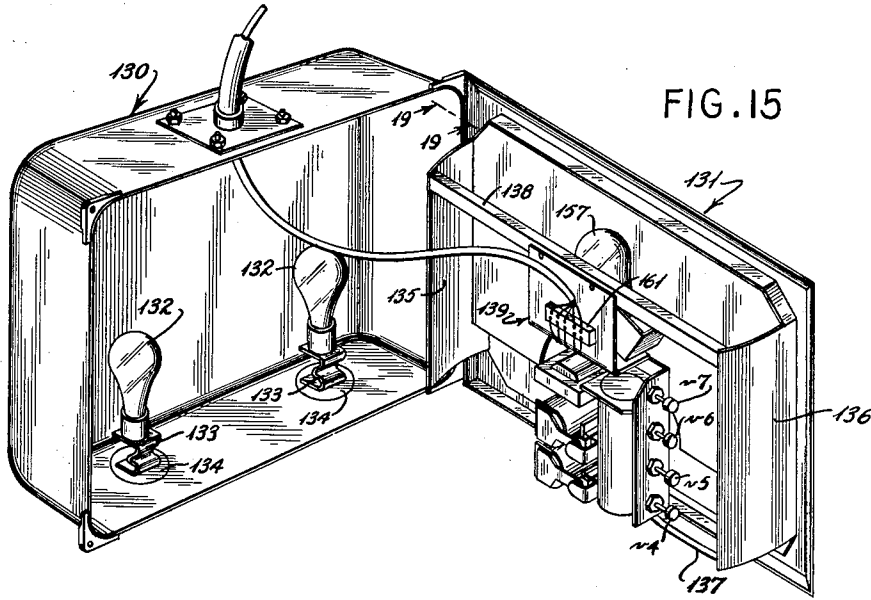


FIG. 15

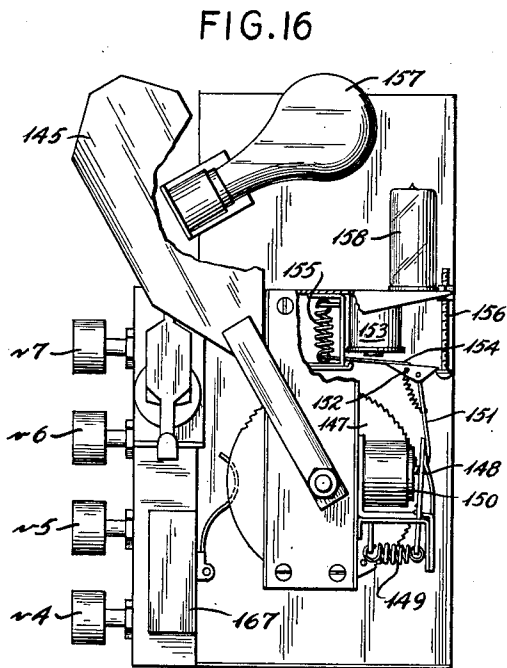


FIG. 16

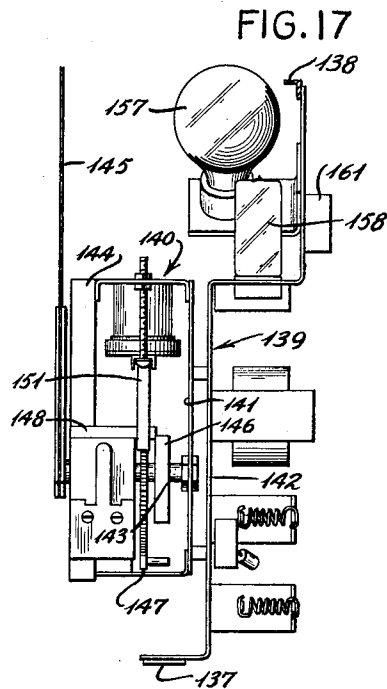


FIG. 17

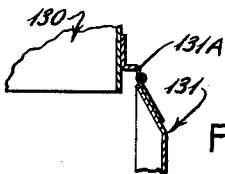


FIG. 19

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3,076,178

PEDESTRIAN TRAFFIC SIGNAL

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13 Claims. (Cl. 340—43)

The present invention relates to signals and more particularly to a traffic control signal for direction of pedestrian traffic, which signal indicates the time interval before a traffic change is to occur.

Heretofore traffic signals have been used including signals to indicate the proper time for a pedestrian to proceed. Such signals are disclosed in my prior Patents 2,724,100 and 2,720,637 and the present invention is a further development over those patents. In the prior art, the words "Walk Time" have been observable from the illumination due to daylight resulting in confusion to the pedestrian. However, this can be avoided by the use of sun shades. Also, the mechanism for operating the pointer to indicate the remaining time has been complicated, requiring many parts including a separate solenoid operated clutch.

Further, the prior pedestrian signal systems have been operated for the duration of the green signal for vehicular traffic and therefore confusion occurred particularly where vehicular traffic was making a right turn preventing pedestrian crossing. The replacement and installation of the complete traffic signal has been difficult because of the permanent nature of the wiring connections. The time interval for the movement of pedestrian traffic has not been easily variable to provide for special changes involving circumstances, prior to the use of masking plates.

An object of the present invention is to provide a traffic signal which overcomes the problems of the prior art.

Another object is to provide a window structure for masking a silhouette sign which window structure prevents visibility of the silhouette sign, except upon illumination of the sign from its unexposed face.

A further object is to provide a time indicator which is adjustable over an appreciable range.

Another object is to provide a signal system which is energized for a substantial length of time with the signal showing for only a portion of such time.

A further object is to provide an electronically controlled indicator which may be adjustable over a wide range and may be applied to existing equipment with a minimum of labor and expense.

Another object is to provide a readily serviceable signal in which the parts are readily accessible for servicing, inspection and repair.

A further object is to provide an electronically controlled timing arrangement in which the mechanical parts are kept to a minimum while maintaining a high degree of accuracy.

A still further object is to provide a combination of a timing pointer with a combination motor and motor actuated clutch with means to stop the motor and release the clutch after a predetermined interval.

A further object is to provide a signal system connectible to the conventional "Go" signal and to the "Right Turn" signal for allowing pedestrian traffic to pass only during the time when the "Right Turn" signal is not energized.

Other and further objects will be apparent as the description proceeds and upon reference to the accompanying drawings wherein:

FIG. 1 is a perspective of the signal including the casing with a movable time indicating pointer and a translucent window for normally obscuring a silhouette sign except when illuminated from within the casing;

FIG. 2, a vertical section taken substantially on line 2—2 through the casing of FIG. 1;

FIG. 3, a transverse section taken on line 3—3 of FIG. 2;

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FIG. 4, a section taken on line 4—4 of the gear train, and clutch operating mechanism for the pointer;

FIG. 5, a section through the motor, gear train, clutch and ratchet taken on broken line 5—5 of FIG. 4;

FIG. 6, detail of one of the gears showing the ratchet in the gear train;

FIG. 7, a detail section taken on line 7—7 of FIG. 6 showing one ratchet pawl;

FIG. 8, a fragmentary section taken on line 8—8 of FIG. 2 showing the mounting of the opal glass behind the time indicating pointer;

FIG. 9, a fragmentary perspective showing the "Walk Time" window with the source of light, the silhouette sign, the translucent silhouette masking sheet and transparent covering sheet therein;

FIG. 10, a fragmentary perspective showing another form of window for the "Walk Time" sign;

FIG. 11, a wiring diagram for use with the signal system and showing one means of varying the time interval;

FIG. 12, another wiring diagram suitable for use where special indications are used for "Right Turn" or "Left Turn";

FIG. 13, a modification of the wiring diagram of FIG. 12, an additional motor for producing a variation in time of movement of the indicating hand when an alternate time cycle control line is energized;

FIG. 14, a fragmentary view of the two synchronous motors and one manner of connecting them for obtaining the desired selected operation and corresponding to the showing in FIG. 5;

FIG. 15, a perspective of a modification of the signal housing showing the front open and the operating mechanism secured thereto;

FIG. 16, an enlarged front elevational view of the motor and operating mechanism of FIG. 15;

FIG. 17, a side elevation thereof;

FIG. 18, a wiring diagram of the modification shown in FIGS. 15 to 17 inclusive; and

FIG. 19, a fragmentary section taken on plane 18—18 of the hinge mounting of the door.

Briefly, the signal system of the present invention comprises a casing which has a window through which the words "Walk Time" may be read and also a window which exposes a movable pointer, the pointer moving at a predetermined selected rate by means of the selection of a suitable driving mechanism including motor, clutch and gear mechanism. The duration of operation of the motor is controllable by an adjustable limit switch in the path of the pointer. A suitable source of illumination is provided within the casing to expose the words "Walk Time" and the pointer under all conditions in which the signal system is used, the words "Walk Time" being unobservable when the illumination is extinguished.

In a modified form of the invention, a signal system is designed for use with traffic control systems in which the period of movement of traffic in one direction may be changed from one time of the day to another and the indication of the "Walk Time" may be correspondingly controlled by adjustment within the housing of the control or signal unit itself, such controls including a plurality of knobs and dials which control an electronic circuit making use of a thyatron tube and a pointer driving mechanism including ratchets which are operated in accordance with the timing cycle and which are released to return the pointer to its initial position.

Upon more detailed reference to the drawings, the signal unit of the present invention includes a casing or box of rectangular shape including a back wall 15 integrally connected to top wall 16 and bottom wall 17 and side walls 18 and 19, the front of said box being closed by a cover 20 having angularly flanged edge portions and

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being secured by screws 21 to the box. The cover 20 has a pointer displaying arcuate window 22 and a "Walk Time" displaying rectangular window 23, the window 22 being of conventional transparent material. The window 23 (FIG. 9) is made of laminations including a front transparent sheet 24, a sheet 25 of translucent material such as a plastic or the like, and a silhouette providing a panel 26 which may be made of metal with letter portions thereof cut out as at 27 so that light may pass only through the cut outs 27 from the interior of the casing to make the silhouette observable on the translucent material 25 whereby an observer can see the silhouette outline only when illumination is provided on the inside of the casing, the translucent material serving to effectively mask the information on the panel 26 at all other times.

In FIG. 10 a modified window 23' includes a transparent panel 24' of $\frac{1}{16}$ " plastic, a translucent panel 25' of .015 inch thick modified styrene pigmented so that it is semi-transparent and a silhouette panel 26' of $\frac{1}{16}$ " plastic which is a conventional transparent sheet 28 on which an opaque coating 29 is provided to leave uncovered transparent portions defining letters 30.

The front transparent panel 24' may be made with a pyramid or ripple surface for increasing its attractiveness and for causing the letters to be brighter when illuminated and for more effectively hiding the letters when the lights are off.

It is also proposed to mount the illuminine tube 67 in a grooved transparent panel which may be placed in back of the window unit 23 or 23' with the grooves being deep enough to hold the illuminine tube so that the panel including the illuminine tube may be fixed flush with the back surface of the rear panel 26 or 28.

The windows 22 and 23 are held in position by means of a plate 30 having registering openings for the windows 22 and 23 with the registering plate 30A being held in position by screws or the like, the front cover 20 being suitably sealed with the window and with the edge of the box by rubber gaskets or the like thus preventing the passage of moisture into the casing.

Mounted on the interior of back wall 15 is an angle bracket 31 on which a second angle bracket 32 is mounted which second angle bracket carries a driving mechanism for the pointer including a motor 33 gearing 34 operating a driven shaft 35 which driven shaft carries an arm 36 secured thereto by a bolt 37. The arm 36 carries a forwardly extending rod 38 which has a continuation 39 at right angles thereto on which continuation the pointer blade 40 is fixedly secured whereby rotation of shaft 35 causes the pointer blade 40 to move across the window 22. To maintain the pointer at the left of its travel as viewed in FIG. 1, an L-shaped stop 41 has its stem fixed to a bolt 42 extending through the back wall 15 carrying a dial 43 keyed thereon with the dial having serrations at the edge thereof. Suitable indicia on the dial indicates the angular positions of the shaft 42 and of the stop 41. The shaft 42 is held in adjusted position by a nut 44 which draws the bolt 42 tightly in position so that a lock washer 45 between the wall 15 and the stop locks the parts in adjusted position.

The arm 36 and the shaft 35 are urged to the stopped or initial position by a spiral spring 46 having its inner end fixed to a collar fixed on the shaft 35 and having its outer end connected by a bolt 47 to the upstanding portion of the bracket 32. Also fixed to the bracket 32 is the driving mechanism held thereon by the bolt 47 and bolt 48 passing through flange portions on the gear housing 34.

Secured to the gear box 34 is the starter of a synchronous motor 33 having an armature 49 fixed to a shaft 50 rotatable and slidable in bearings in the stator and carrying a pinion gear 51 on its end opposite the armature. The pinion gear meshes with a gear 52 rotatably mounted in the gear housing and carrying a second pinion 53 meshing with a gear 54 rotatably mounted in the gear housing

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and carrying a pinion 55 which meshes with a ratchet carrying gear 56, the ratchet 56A of which ratchet gear drives a pinion 57 meshing with a gear 58 fixed to the pointer carrying shaft 35.

The ratchet 56A is of S-shape and is fixed to a shaft 56B carrying the pinion 57. The ends of the ratchet are bent downwardly to provide detents 56C which are received in openings 56D in the ratchet gear 56 whereby the driving force of the ratchet gear 56 in the direction of the arrow 56E will cause rotation of the pinion gear 57 and gear 58 with the resulting rotation of shaft 35 and movement of the pointer from the left to the right as observed from the front as in FIG. 1.

The rotor carrying shaft 50 is normally urged to the right as viewed in FIG. 5 so that rotor 49 is normally in the dotted line position when the motor 33 is inoperative, such shaft 50 being urged to the inoperative position by a lever 59 rockably mounted on a stationary portion of the gear case 34 and being urged by expansion spring 60 so that the end of the lever 59 contacting shaft 50 holds such shaft in a position such that pinion gear 51 is out of an engagement with gear 52. A counter weight 51 serves to counter balance the weight of the rotor 49, shaft 50 and pinion 51 so that the structure is operable in all positions as shown in U.S. Patent 2,334,040. It will thus be seen that when the motor 33 is energized the rotor 49 is rotated and also moved to the full line position causing simultaneous engagement of pinion 51 with gear 52 thereby causing rotation of gearing 34 and shaft 35 at a determined rate in accordance with the speed of the rotor 49 and the arrangement of gearing 34.

Mounted on bracket 32 is a micro-switch 61 having an operating blade 62 arranged in the path of arm 36 on the rod 38 or its extension 39 and such switch is vertically adjustable by means of screws 63A passing through slots 64 and into the micro-switch housing 61 whereby the blade 62 may be operated at varying positions of the arm 36 or the pointer supporting rods 38, 39. The blade 62 contacting a button 63 which actuates a switch blade or the like 65 in a well-known manner.

The interior of the casing is preferably of bright enamel and is illuminated by incandescent bulbs 66 or the like while the "Walk Time" may be separately illuminated by one or more neon type illuminine or the like tubular fluorescent elements 67. The fluorescent lighting is preferably of the rapid cold starting type and the usual type of ballast 68 is provided in a well-known manner. The neon type tubular lamps 67 may be shaped in the form of the letters behind which it is mounted to increase the effectiveness of the light therefrom.

In back of the pointer is an opalescent type glass 68 which is secured in place by any suitable means such as angle elements 69 and 70, angle element 70 being removably held in position by screw fasteners 71 or the like. The pointer passes between such opalescent glass 68 and the transparent window 22, the pointer normally being arranged to be out of view by being masked behind the plate 30A. If desired masking plates 72 may be provided for adjusting the effective size of the window 22 for additionally controlling the length of time the pointer is visible.

Referring more particularly to the wiring diagram shown in FIG. 11, a pair of male plug contacts 73 and 74 are adapted to extend from a plug on a cable 75 and such plug with its contacts is adapted to be received in a cooperating female socket 75 secured to the end of a cable 76 passing through a mounting tube 77 which has an internally threaded coupling 78 adapted to receive a threaded nipple 79 on an apertured mounting plate 80 which has bolts 81 extending therethrough for securement by means of cooperating nuts to the top wall 16 of the casing thereby providing mounting for the casing similar to that shown in my prior Patent 2,720,637.

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When the conventional "Go" signal or green light is energized, electric energy is furnished to plug contacts 73 and 74 and from the one plug contact 73 to a lead 82 connected to one lead 83 of a relay coil 84 connected to one lead 85 of the motor 33, connected to one lead 86 of the lamp 66, and connected to one lead 87 of the neon light 67. The other contact 74 of the plug is connected by lead 88 to one contact 88A of switch 61 connected to the armature 89 of the relay 84 and through the normally closed contact 90 of relay 84 to a lead 91 connected to the other lead 92 of the motor, connected to the other lead 93 to the lamp 66 and connected to the other lead 94 to the neon light 67. The second contact 95 of the relay is connected by a lead 96 to the other lead 97 of the coil of relay 84 and thereby to switch blade 65 of pointer operated switch 61.

From the above description it is believed evident that when the green light is illuminated, electrical energy is supplied to prongs 73 and 74 thereby causing the motor 33 to begin rotation and causing the shaft 59 and pinion 51 thereon to rotate and move axially so pinion 51 engages with gear 52 thereby causing rotation of the pointer shaft 35 moving the pointer across the window 22 at a selected speed based on the speed of motor 33 and the arrangement of gearing in gear casing 34, the pointer continuing until the green light is de-energized thereby permitting spring 60 to oscillate lever 59 releasing pinion gear 51 from gear 52 and allowing the pointer to return to its starting position under the influence of spiral spring 46. However, if the green light is on for a sufficient time so that arm 36 or pointer carrying rod 38—39 engages the switch operating spring blade 62 which engages button 63 causing switch blade 65 to make a contact with contact 88A, the coil in relay 84 is energized through lead 97, switch blade 65, contact 88A, and lead 88 to plug prong 74, the circuit to relay coil 84 from lead 83 from coil of relay 84 being completed thereon through lead 82 to the prong 73 whereby the armature 89 is moved against the force of its spring by the energization of the coil 84 to complete a holding circuit from lead 88 through armature 89 and contact 95 and lead 96 to the other lead of coil 84 whereby the de-energization of the motor 33 and lamps 66 and 67 is maintained after the pointer returns to its initial position, the relay 84 remaining energized until the green light is extinguished thereby deenergizing contacts 73 and 74. The holding circuit is then de-energized. The signal is then ready for the next actuation when the green light is re-energized.

It will be apparent that the time of movement of the pointer 40 is controlled by the speed of the motor 33 and the arrangement of gearing 34 and also by the position of the switch 61 which switch 61 can be moved along the path of movement of the pointer or its operating arm 36 or pointer carrying rods 38—39 to vary the time interval during which the words "Walk Time" are observed and also the movement of the pointer is observable only during this time.

It will be evident that the motor may be interchanged with other motors of different speed or the gearing may be varied to obtain the desired result, such motors being available in commercial quantities with speeds of rotation from .8 to 2 r.p.m.

From a constant alternating current with a fixed cycle, it is possible to obtain different speeds by the use of a phase changer which may be provided in the drive for the synchronous motor and such phase changer may be of a conventional type and may be adjustable in accordance with well known electrical practice whereby the period of movement and the speed of operation of the walk time indicating hand may be varied within desired limits and such phase changer may be controlled by the master control of the traffic signals by means of an alternate time cycle control line which is energized to

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change the period of operation for different times of the day.

Referring to FIG. 12, the wiring diagram is designed for parallel connection to the green light and also right turn signal. This arrangement is designed to permit pedestrian traffic only for the through green light and to prevent operation during the right turn. The motor 33 and lamps 66 and 67 are similar or identical with those previously described, but the relay 98 is operated only by the right turn signal.

Assuming the right turn to occur after the through green light, the green light energizes prong contacts 99 and 100. Contact 99 is connected through lead 101 to the motor 33 and lamps 66 and 67. Contact 100 is connected by lead 102 to armature 103 of relay 98 and thence to contact 104 and lead 105 to the other terminals of motor 33 and lamps 66 and 67 whereby the words "Walk Time" are illuminated and the pointer is illuminated and begins moving and continues its motion until the green light is de-energized.

However, as soon as the right turn signal is illuminated, plug contacts 106, 107 are energized and through leads 108 and 109 respectively, the coil 110 of relay 98 is energized thereby drawing armature 103 to a position closing such armature with contact 111 connected by a lead 112 to lead 109 thereby providing a holding circuit to maintain the energized coil thereby maintaining the armature in contact with contact 111 as long as the right turn signal is energized. This movement of the armature 103 breaks the circuit from prong 100 to lead 105 to the other terminals of the motor and lamps thereby stopping the pointer and extinguishing the lamps, the pointer returning to its initial position by the bias of spiral spring 46. Thereafter, when the right turn signal is de-energized, coil 110 is de-energized and the spring 113 of relay 98 returns the armature to its full line position ready for the next energization of the green signal.

Upon reference to FIGURES 13 and 14, an auxiliary motor 120 is operated in lieu of the motor 33 when an alternate time cycle control line 121 is energized from the master controller, such alternate time cycle control line being connected to the coil of a relay 122 the other lead of the relay coil being connected to the lead 105. The armature 123 of the relay 122 is normally urged by a spring to complete a circuit from leads 99 and 101 through motor 33 to the lead 105 but when the alternate time cycle control line 121 is energized the armature engages the contact element on lead 124 to energize motor 120, the other lead from the motor 120 being permanently connected to the lead 105.

On reference to FIGURE 14, the motor 120 is substantially identical with the motor 33 and carries a pinion 125 on its shaft 126 which shaft is moved axially upon energization of the motor 120 to thereby cause pinion gear 125 to operatively engage gear 52 as shown in full lines in a manner similar to drive of the motor 33 to drive the gear 52. It will be evident that the pinion gear 125 mounted on armature shaft 126 is shown in engagement indicating that relay 122 is energized so that the drive at that time is controlled by motor 120, the motor 33 being unenergized and the gear 51 out of engagement with gear 52. The right turn control is similar to that shown in FIGURE 12 with the parts similarly identified.

Upon reference to the modification of the invention shown in FIGURES 15 to 19 inclusive, a signal box 130 is provided with the usual support for depending detachment to a traffic signal pole. Projecting from the upper wall of the box 130 is a plug 160 having a plurality of prongs, five prongs being shown and such plug 160 is adapted to be received in a receptacle 159 having a plurality of prong receiving apertures.

With the above arrangement it is believed to be obvious that applicant has made an improvement by means of which the accuracy of the timing can be controlled and adapting the structure for limited periods of energiza-

tion based upon either the movement of the pointer or the operation of a right turn signal.

In applicant's prior Patent 2,720,637 a clutch operating solenoid and a motor were operated together and applicant proposes to apply the present control to such patented structure. Also, in said patent the clutch operating solenoid 78 is slidably and adjustably mounted so the solenoid 78 of the patent may be moved in channel shaped guides or the like by means of an adjusting screw through or accessible from the rear of the casing 20 of said patented structure to provide for adjustment of the solenoid toward and away from the clutch operating depending arms 74, 74 with resulting simplification in the manufacture, operation, maintenance and adjustment of the structure for controlling the bias of the springs 77 and 80 therein.

Referring more particularly to the form of the invention shown in FIGS. 15 to 19 inclusive the pedestrian traffic signal comprises a housing 130 having an open side closed by a door 131 mounted on hinges 131A for swinging movement from a closed position similar to that shown in FIG. 1 to an open position shown in FIG. 15 providing for access to the operating mechanism thereof. It will be noted that the door 131 may be secured by bolts in closed position in a manner similar to that shown in FIG. 1. A pair of lights 132 are mounted on W-shaped brackets 133 mounted on plates 134 normally secured to the bottom of the housing providing for access and removal and replacement of the bulbs 132.

Extending rearwardly from the door 131 are converging wings 135, 136 between which a bottom bar 137 and a top bar 138 extend, and mounted on such bottom and top bars is a Z-shaped chassis 139. An auxiliary V-shaped chassis 140 is suitably secured by bolts and spacing means by its bight portion forming a vertical panel 141 to vertical panel 142 of the Z-shaped chassis. An indicator hand carrying shaft 143 is rotatably mounted in a bearing supported on vertical panel 141 and a bearing supported on channel-shaped front panel 144 of the auxiliary chassis, the shaft 143 carrying an indicator hand 145 which is fixedly secured to the shaft, the shaft being biased for rotation in a counterclockwise direction as seen in FIG. 16 by a spiral clock type spring 146 which is substantially the same as spiral spring 46, said spiral spring being connected at its outer end to a fixed projection on the auxiliary frame and having its center fixed to the shaft 143. A ratchet wheel 147 is fixedly mounted on shaft 143 and such ratchet wheel cooperates with a first pawl 148 which is swingable toward and away from the ratchet, being urged away from the ratchet by a first spring 149 and being drawn toward the ratchet by means of a first solenoid 150. A second pawl 151 overlies a laterally projecting portion of the first pawl adjacent the ratchet for engaging the ratchet teeth of said ratchet wheel while a second spring 152 urges the second pawl toward said ratchet teeth but the second spring 152 is of less effective strength than the first spring 149 whereby when the first solenoid is de-energized the first pawl 148 will be moved away from the ratchet by its spring 149 which also moves the pawl 151 out of engagement with the ratchet wheel.

A second solenoid 153 cooperates with a pivoted arm 154 which is urged away from the solenoid 153 by a spring 155, such arm 154 pivotally carrying the pawl 151 whereby energization of solenoid 153 and subsequent de-energization thereof will reciprocate pawl 151 and when solenoid 150 is energized the pawl 151 will cause rotation in step by step manner of the ratchet wheel 147, the lateral projection of pawl 148 preventing retrograde movement. An adjustment bolt 156 supported from a horizontal shelf of the Z-shaped frame 149 is adjusted in effective length from said shelf so that its head limits the extent of spring biased movement of arm 154 while permitting the solenoid 153 to move the arm 154 toward the solenoid.

The time interval for movement of the hand 145 across the window 22 can be controlled by controlling the time interval between reciprocations of pawl 151 and such time control is accomplished by the use of a thyatron tube 158 which is provided with suitable controlling resistors to provide for variation in the period of discharge.

Upon reference particularly to FIG. 18, a socket 159 is shown provided with five leads corresponding to the red light, the green light, the right turn light, the common lead, and an alternate time cycle control lead, while a plug 160 cooperates therewith to provide for simple connection of the signal control unit to the existing leads in a traffic control system, such socket and plug corresponding to a socket and plug of the type shown in FIG. 2 and being designed so that the plug and socket can only be assembled in one position. Corresponding leads in a cable extend from the socket to an insulated terminal connection plug 161 mounted on the top vertical panel of the Z-shaped chassis.

A first solenoid 150 controls the first pawl 148 while the second solenoid 153 controls and operates the tangentially arranged second pawl 151 with the first pawl serving to maintain both pawls out of engagement with the ratchet wheel 147 when the first solenoid is de-energized to permit the spring biased return of the hand 145 to its initial position. The first solenoid 150 is energized in response to the energization of the green light in a traffic signal system and the control system of the present invention includes a first relay R1 having a normally open contact and a normally closed contact, a second relay R2 having a normally closed contact, a third relay R3 having a normally closed and a normally open contact, and a fourth relay having a normally open and a normally closed contact, one lead of the coil of each relay being connected to the common lead 162, the armatures and normally closed contacts of relay R1 and relay R2 being in series with the green lead 163. A right turn signal lead 164 is connected to the other terminal of the coil of relay R2 whereby when the right turn lead is energized said relay R2 will break the circuit from said green lead to the armature of the first relay R1. The ratchet wheel 147 carrying the indicator hand 145 is urged in a counter-clockwise direction by the spiral spring 146 to a position out of observation through the window 22. A pin 165 is fixed to the ratchet wheel and is operative upon clockwise movement of the ratchet wheel to engage a cam lever 166 which operates a normally open micro switch 167, one terminal of the micro switch being connected to a lead 168 connected to the armature of said first relay and thereby to the normally closed contact of said first relay R1 and to the normally closed contact of said second relay R2 and to the other lead of the first relay coil to energize the coil of said first relay whereby when the indicator hand and the ratchet wheel are moved a predetermined distance from their initial position so that pin operated micro switch 167 is closed the circuit through the armatures of said first and second solenoids 150 and 153, respectively is opened. The holding circuit for relay R1 is rendered inoperative when the green light lead 163 is de-energized, thereby de-energizing the relay R1 and permitting the armature to return to initial position. A rectifier 169 in a circuit including lead 169A between the solenoids 150 and 153 is connected to a lead 170 from the normally closed contact of the first relay R1 while a first capacitor C1 is provided in a circuit between common lead 162 and the rectifier lead of the second solenoid, the other lead 171 of the second solenoid being connected to the plate of a thyatron tube 158. A resistance r_0 is provided in series with rectifier 169. First and second resistances r_1 , r_2 are provided in series across said first capacitor C1. The armatures and the normally closed contacts of said first and second relays are in series with the green lead 163 while a lead 172 from the common connections of said first and second

resistances r_1 and r_2 is connected to the grid of said thyatron 158. A second capacitor C2 is provided between the cathode of the thyatron and the common lead 162.

A transformer 173 is provided for heating the filament of said thyatron, one lead of the primary of said transformer being connected to said common lead 162, the other lead of the primary of said transformer being connected to the armature of a third relay R3, which armature normally engages a closed contact of green lead 163 thereby energizing the transformer when the green lead is energized. The coil of the third relay R3 is energized by the red light lead 174 when the green light lead is de-energized and the red light lead is energized. The purpose for the relay R3 is to assure a continuous supply of filament current to the thyatron tube 158. In installations where a continuous supply of current is provided the relay R3 may be omitted and the transformer energized by such continuous supply.

A fourth relay R4 has its coil energized by the alternate time control cycle lead 175, the armature of said relay being connected through a resistance r_3 to the cathode of the thyatron tube. The normally closed contact of said armature of relay R4 is connected to an adjustable resistor r_4 having a usual wafer switch with resistance between the contacts thereof, and another variable resistor r_5 in series therewith whereby the rate or cycle of discharge of the thyatron 158 and the resulting energization of the solenoid 153 can be accurately controlled whereby the time interval for operation of the movement of the hand from its initial position to its extreme position can be selected for varying time intervals in a traffic system.

When the alternate time control lead 175 is energized the coil of relay R4 draws the armature into contact with the normally open contact thereof which is connected to adjustable resistances r_6 and r_7 similar to resistances r_4 and r_5 and such resistances r_6 and r_7 provide means for obtaining a different rate or cycle of discharge of the thyatron 158 whereby the total time interval for movement of the indicator hand across the window 22 can be controlled with accuracy. Such alternate time control is particularly desirable where traffic signals are changed for different times of the day. It will also be evident that the rate or cycle of both sets of resistances can be the same.

From the above description it is believed that the operation of the modification of the invention shown in FIGS. 15 to 19, inclusive, is obvious and such modification provides for controlled variation in the pedestrian walk time interval and to take care of the situations where a right turn signal for vehicles is provided. The right turn signal serving to return the pedestrian indicator hand to its initial position.

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 signal for indicating a time interval comprising a casing, a bracket mounted in said casing, a combination electric motor and clutch mounted on said bracket, a shaft driven from said electric motor and clutch, a pointer secured to said shaft and movable in one direction by said motor, a spring for urging said pointer in the direction opposite that caused by said motor, an adjustable stop to limit the motion of said pointer in the said opposite direction, a window in said casing across which the pointer moves and through which the pointer may be observed, a switch in the path of said pointer whereby the movement of said pointer may cause said switch to be operated, means to adjust said switch along the path of movement of said pointer whereby the switch may be

actuated upon a pre-determined movement of said pointer, a male plug having a pair of electrical contacts, a female socket for cooperation with said male plug and having its contacts connected to the source of electric power for energizing the conventional green light, a relay, means to connect one of the contacts of said male plug to one lead of the motor and to one lead of the coil of said relay, means to connect the other contact of said plug through the armature of said relay and the normally closed contact of said relay to the other lead of said motor, said switch being normally open and having one contact connected to said armature and the other contact connected to the other lead of the relay coil, the second contact of said relay being connected to the other contact of said switch, whereby energization of said male plug contacts will cause said motor and clutch to operate and move said pointer and upon a predetermined movement of said pointer said switch will be operated to cause said relay to interrupt the operation of said motor and clutch whereby the pointer may indicate a shorter interval than the period of energization of said male plug contacts.

2. The invention according to claim 1 in which a second window of translucent material is provided and a silhouette sign is positioned behind said second window to be normally obscured, and lamps are provided in parallel with said motor for lighting said silhouette sign making it observable only when the motor is operating.

3. The invention according to claim 1 in which the switch may be adjusted relative to the motor for varying the time of energization of said motor and said lamps.

4. A pedestrian control signal for attachment to the energized leads of vehicle Thru and Turn signals, said pedestrian control signal including two pairs of prong contacts, one pair of prong contacts being connectible with the vehicle Thru signal and the other pair of prong contacts being connectible with the vehicle Turn signal, said Turn signal contacts being connected to a coil of a relay, one of said Thru signal prong contacts being connected to one lead of a motor and one lead of signal illuminating lights, the other prong of said other Thru signal being connected to the armature of said relay with the armature normally biased against a contact connected to the other leads of the motor and signal illuminating lamps whereby the motor and lamps are energized when the Thru signal is energized and when the Turn signal is de-energized, said lamps and motor being immediately de-energized when the Turn signal is energized causing the armature of said relay to move to a second contact of the relay for holding said armature against said second contact of said relay and breaking the circuit to said motor and lamps.

5. A pedestrian traffic signal for operation for a limited period of a vehicular signal for a longer period, said pedestrian signal comprising prong connection means to the vehicle signal for obtaining energy therefrom, one of said prongs being connected to one lead of a relay coil, to one lead of a motor coil, to one lead of a motor, and to one lead of lamps, a switch, the other prong of said connection being connected to one contact of said switch and to the armature of the relay, the armature of said relay being normally biased into engagement with a contact connected to the other lead of said motor and to the other lead of said lamps, the other contact of said switch being connected to the other lead of said relay and to the normally open contact of said relay, said motor having means driven thereby for closing said switch after a predetermined interval whereby said relay will be energized stopping said motor and extinguishing said lamps, said relay maintaining a holding circuit until said prong contacts are de-energized upon change of the vehicular signal.

6. A traffic control comprising an open front housing, a front wall hingedly mounted on said housing for movement from a position closing the housing to an open

position, a pair of lights mounted in the housing and supported from the bottom wall, the said front wall having a pair of wings extending inwardly into the casing, a bar extending between said wings adjacent the bottom thereof and a bar extending between said wings adjacent the top thereof, a Z-shaped chassis extending between said bottom and top bars and secured thereto, an auxiliary chassis mounted on said Z-shaped chassis, a shaft rotatably mounted in said auxiliary chassis, a hand mounted on said shaft, a spiral spring connected to said shaft and said auxiliary chassis to urge said shaft in one direction, a ratchet wheel fixedly mounted on said shaft, a first pawl swingable toward and away from said ratchet, a first spring to urge said first pawl away from said ratchet, a first solenoid for drawing said first pawl into said ratchet, a second pawl overlying a portion of said first pawl adjacent the ratchet for engaging the ratchet teeth of said ratchet wheel, a second spring to urge said second pawl toward said ratchet teeth, said second spring means being of less effective strength than said first spring whereby when the first solenoid is de-energized said first pawl will cause the first and second pawls to be disengaged from said ratchet, a second solenoid for reciprocating said second pawl in a generally circumferential direction with respect to said ratchet for producing rotation of said ratchet when said first solenoid is energized and when said second solenoid is repeatedly energized to cause rotation of said shaft and movement of said hand, means to repeatedly energize said second solenoid and means to vary the number of energizations of said second solenoid in a given time whereby the rate of movement of said hand may be accurately controlled.

7. The invention according to claim 6 in which the green light signal energizes said first solenoid and repeatedly energizes the second solenoid.

8. A timing mechanism for obtaining various rates of movement of an indicating hand for use in a traffic signal to indicate the time remaining for exhibition of a traffic signal, said control comprising a plug for connection to a source of power in a control circuit, a chassis, an insulated terminal connection block mounted on said chassis and connected by suitable leads to said plug, said plug having a plurality of prongs, leads for connection to said terminal bar for a red light, a green light, a right turn light, a common wire lead, and an alternate time cycle control, a ratchet wheel rotatably mounted on said chassis, a first solenoid, a first pawl controlled by said first solenoid for engagement with the ratchet teeth to prevent reverse movement, a second solenoid, a second pawl extending generally tangential to said ratchet wheel and normally held out of contact with said ratchet wheel by said first pawl, means to energize said first solenoid in response to energization of the green light, a first relay having a normally open and a normally closed contact, a second relay having a normally closed contact, a third relay having a normally closed and a normally open contact, a fourth relay having a normally open and a normally closed contact, one lead of the coil of each relay being connected to said common lead, the armatures and normally closed contacts of said first and second relays being in series with said green lead, a right turn signal control line connected to the other terminal of the coil of said second relay whereby when the right turn signal lead is energized, said second relay will break the circuit from said green lead to the coil of said first relay, a ratchet, an indicator hand on said ratchet, a spring normally urging said hand and said ratchet to an initial position, a pin on said ratchet, a pin operated switch in the path of said pin and having one terminal connected to one lead, the armature of said first relay and thereby to the normally closed contact of said first relay and to the normally closed contact of said second relay, the other lead of said first relay coil being connected to the other terminal of said pin operated switch to energize the coil of the said first relay whereby when the hand and ratchet

are moved a predetermined distance from said initial position, the pin operated switch breaks the circuit through the armatures of said first and second solenoids, said first relay armature closing a holding circuit and the coil of said first relay maintaining the holding circuit to prevent energization of said first and second solenoids, said holding circuit being rendered inoperative when the green light lead is de-energized, a rectifier between said first and second solenoids and the normally closed contact of said first relay, a first capacitor between said common lead and said second solenoid, the other lead of said second solenoid being connected to the plate of thyatron tube, a first and second resistance in series across said first capacitor, the armatures and normally closed contacts of said first and second relays being in series with said green lead, a lead from the common connection of said first and second resistances and the grid of said thyatron, a second capacitor between the cathode of said thyatron and the common lead, a transformer for heating the filament of said thyatron, one lead of said transformer being connected to said common lead, the third relay having its normally closed contact connected to said green lead energizing said transformer when the green lead is energized, the coil of said third relay being energized by the red light lead upon opening said normally closed contact of said third relay and closing the normally open contact of said third relay and connecting the armature of said third relay with the red light lead whereby the transformer is supplied from the red light lead when the green light lead is de-energized whereby a constant supply of power is provided to said transformer and thereby to the filament of said thyatron, a fourth relay having a coil energized by said alternate time control cycle lead and having its armature connected to the cathode and its normally closed contact connected to an adjustable resistor providing for wide and accurate variations in the discharge of the thyatron tube, the normally open contact of said fourth relay being closed when the alternate time cycle control lead is energized to draw the armature of said fourth relay into contact with the normally open contact and thereby to a second series of adjustable resistances to provide a different adjustable time cycle for discharge of the thyatron tube whereby the time interval for each rate of discharges of the thyatron tube can be remotely controlled through said alternate time cycle control lead, said circuit providing for infinite variations in the period of oscillation of said ratchet and the hand carried thereby for the same distance of movement whereby the movement of the hand for the different time intervals can be controlled by the green light operation and the alternate time cycle control.

9. A signal for indicating a time interval comprising a casing, a bracket mounted in said casing, a combination electric motor and clutch mounted on said bracket, a shaft driven from said electric motor and clutch, a pointer secured to said shaft and movable in one direction by said motor, a spring for urging said pointer in the direction opposite that caused by said motor, an adjustable stop to limit the motion of said pointer in the said opposite direction, a window in said casing across which the pointer moves and through which the pointer may be observed, a switch in the path of said pointer whereby the movement of said pointer may cause said switch to be operated, means to adjust said switch along the path of movement of said pointer whereby the switch may be actuated upon a predetermined movement of said pointer, a pair of electrical contacts for connection to the source of electric power for energizing the conventional green light, a relay, means to connect one of the contacts of said pair to one lead of the motor and to one lead of the coil of said relay, means to connect the other contact through the armature of said relay and the normally closed contact of said relay to the other lead of said motor, said switch being normally open

and having one contact connected to said armature and the other contact connected to the other lead of the relay coil, the second contact of said relay being connected to the other contact of said switch, whereby energization of said pair of contacts will cause said motor and clutch to operate and move said pointer and upon a predetermined movement of said pointer said switch will be operated to cause said relay to interrupt the operation of said motor and clutch whereby the pointer may indicate a shorter interval than the period of energization of said pair of contacts.

10. The invention according to claim 9 in which a second window of translucent material is provided and a silhouette sign is positioned behind said second window to the normally obscured, and lamps are provided in parallel with said motor for lighting said silhouette sign making it observable only when the motor is operating.

11. The invention according to claim 9 in which the switch may be adjusted relative to the motor for varying the time of energization of said motor and said lamps.

12. A pedestrian traffic signal unit comprising a support, a pointer mounted on said support for movement from a starting position to a return position in a path transverse to the pointer, a motor for moving said pointer in the direction from the starting position to the return position, a biasing means urging said pointer from said return position to the starting position, a limit switch mounted on the support in the path of the mechanism for operating said pointer, said limit switch serving to de-energize said motor and said mechanism to permit said pointer to return to said starting position, whereby pedestrian traffic signal may be used with any existing vehicular traffic control by direct connection of the motor for operating said pointer regardless of the timing of the vehicular control signal whereby the pedestrian signal of the present invention may be connected to the ener-

gizing lead of the vehicular traffic signal without modification of the vehicular traffic signal.

13. A pedestrian signal unit for attachment to existing vehicular traffic signal systems by the connection of electrical conductors, comprising a support, a pointer mounted for movement from a starting position on said support to a return position spaced from said starting position in a direction transverse to the pointer, motor means to move said pointer at a predetermined rate from said starting position to said return position, a control switch mounted in the path of mechanism operated by said motor for releasing the drive of said motor and said pointer, and biasing means to return said pointer from said return position to said starting position, said pointer returning from an intermediate position to said starting position upon deenergization of said motor whereby said pointer may indicate a time period between said starting position and any intermediate position between said starting position and said return position, whereby said pedestrian control unit can be applied to existing vehicular control systems without requiring timing changes in said pedestrian control unit.

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