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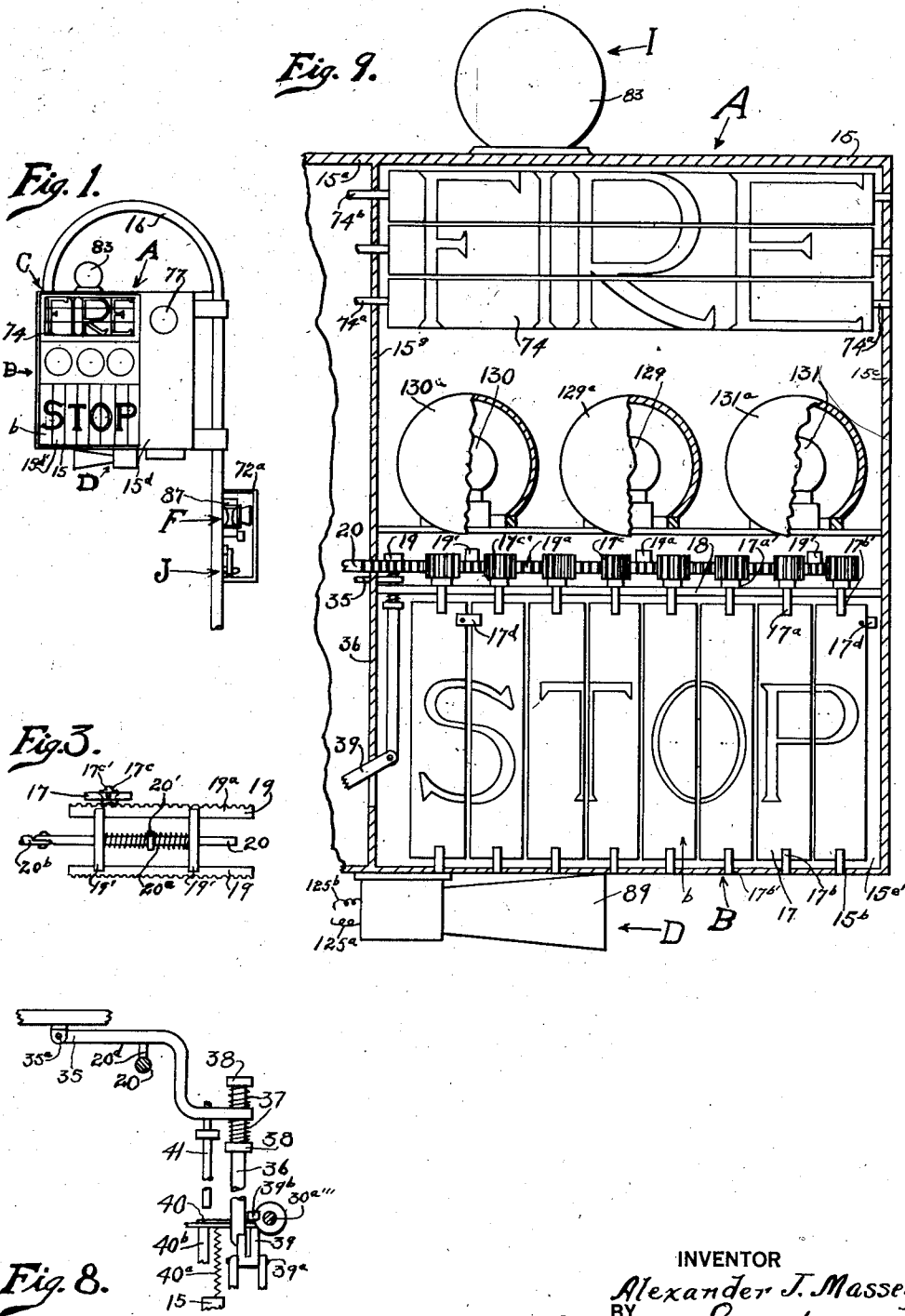
A. J. MASSEY

1,875,748

COMBINED TRAFFIC AND ALARM SYSTEM

Filed Oct. 2, 1924

4 Sheets-Sheet 1



INVENTOR
 Alexander J. Massey
 BY
 C. J. Larrabee
 His ATTORNEY.

Sept. 6, 1932.

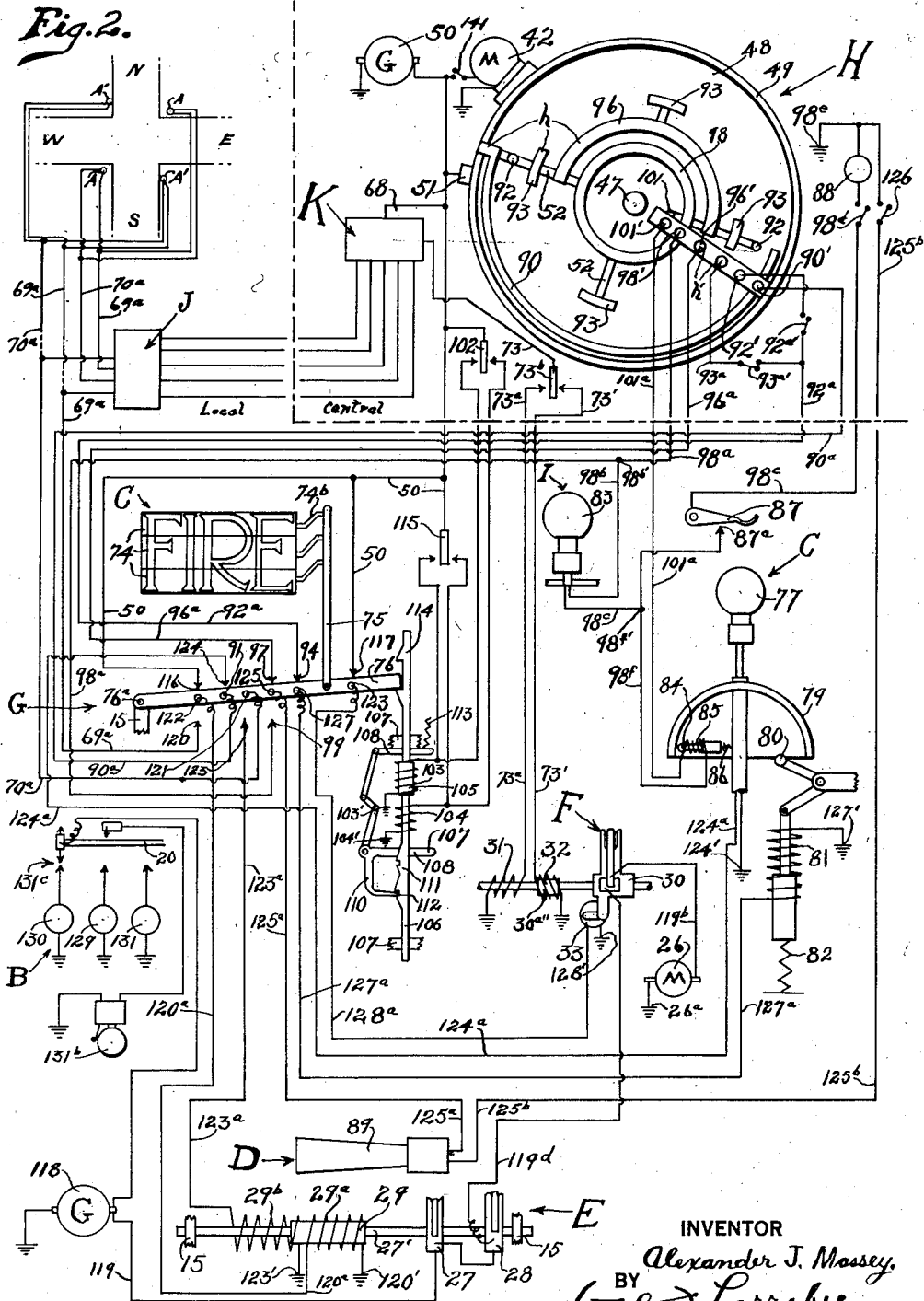
A. J. MASSEY

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4 Sheets-Sheet 2



INVENTOR
Alexander J. Massey.
BY
C. J. Larrabee
his ATTORNEY.

Sept. 6, 1932.

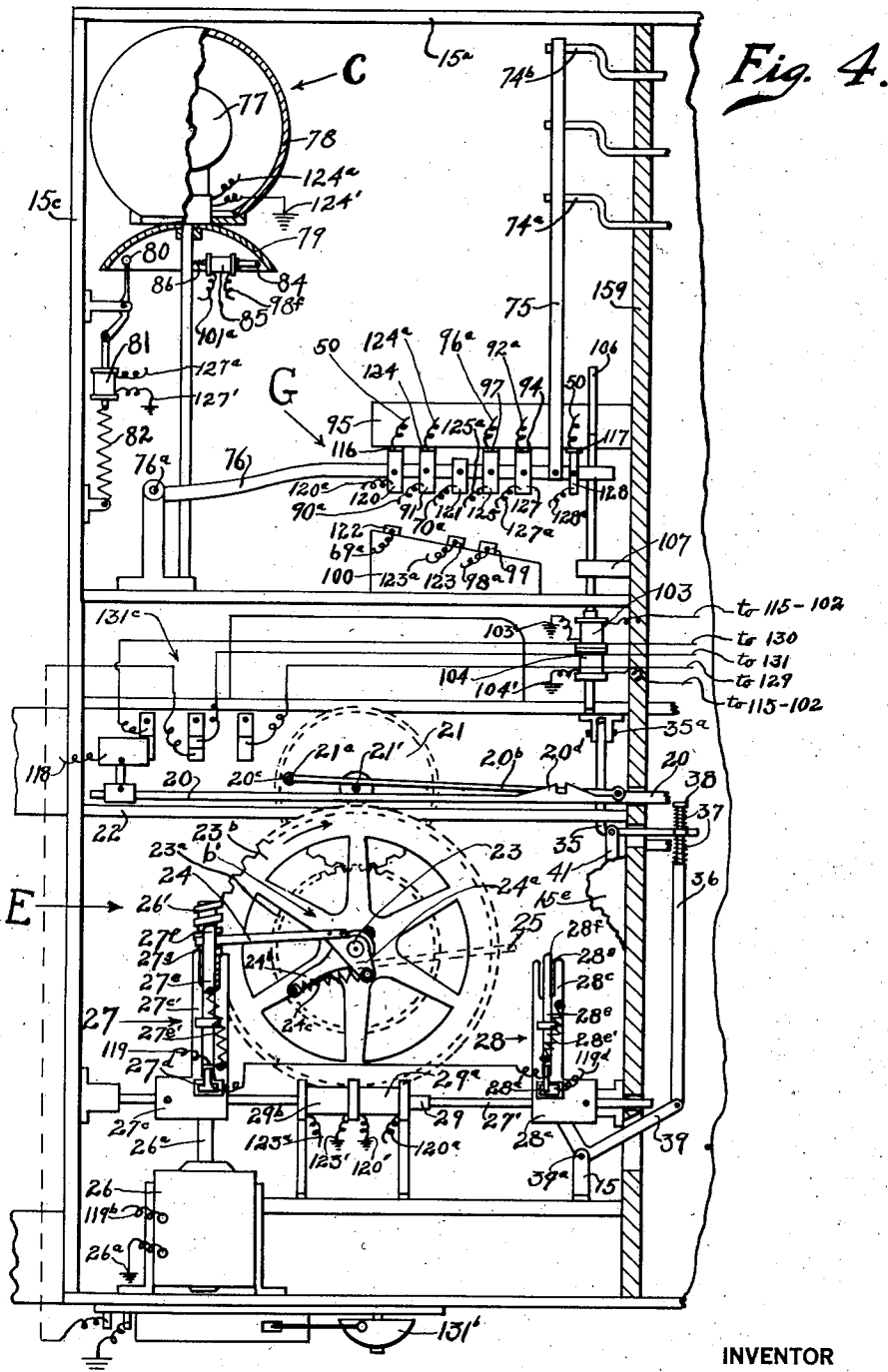
A. J. MASSEY

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COMBINED TRAFFIC AND ALARM SYSTEM

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4 Sheets-Sheet 3

**INVENTOR**

Alexander J. Massey.

BY

BY
Wm. J. Larrabee
 his ATTORNEY.

his ATTORNEY.

Sept. 6, 1932.

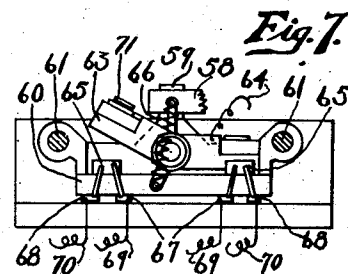
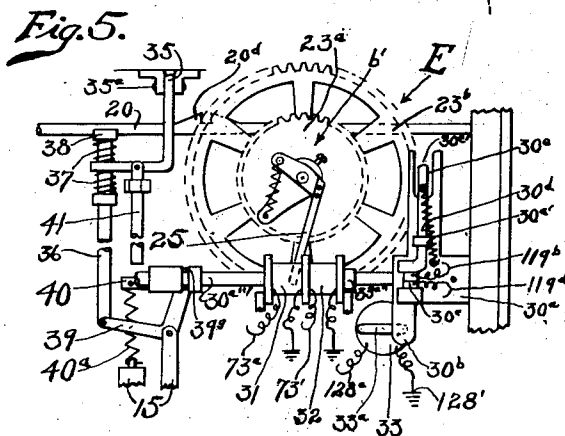
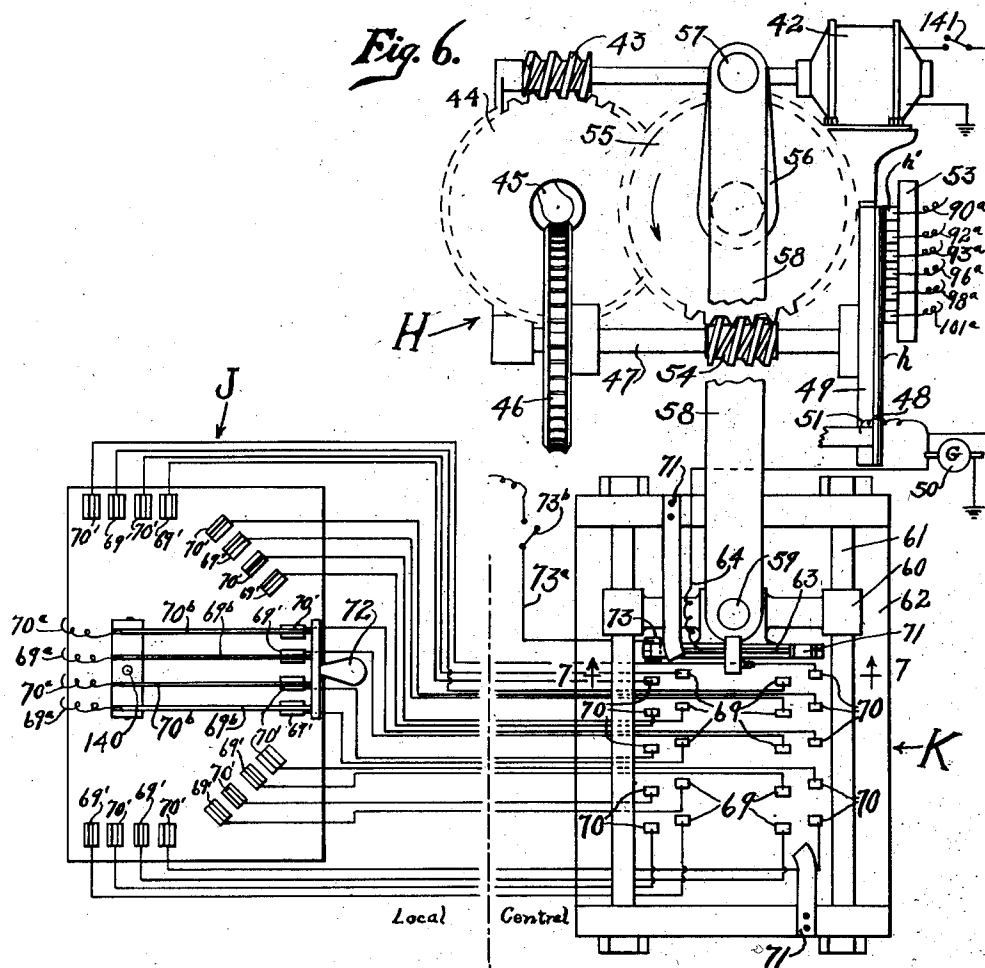
A. J. MASSEY

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COMBINED TRAFFIC AND ALARM SYSTEM

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4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

ALEXANDER J. MASSEY, OF LOS ANGELES, CALIFORNIA

COMBINED TRAFFIC AND ALARM SYSTEM

Application filed October 2, 1924. Serial No. 741,257.

This invention relates to combined traffic and alarm signaling systems and it has for its object to provide an improved system of this general character whereby traffic at street intersections and like places may be regulated or signaled to proceed and to stop and whereby notice of the approach of fire apparatus and police vehicles may be given; furthermore, the improved system contemplates the provision of means whereby police officers may be notified when a crime has been committed, in certain places, or over the entire district controlled by the system, in order that the criminal or criminals may be apprehended by cutting off every avenue of escape.

In accordance with the invention, and in the preferred practice thereof, I provide combined traffic, fire and police signals at spaced street intersections or like places and preferably control the display and sounding of signals from a central station or point of control. During the daily period of traffic regulation by signal, the "Stop" and "Go" faces or indicating means in each street may be alternately and intermittently actuated and in case of the approach of fire apparatus signal faces controlling the movement of traffic in the affected area or district may be held in "Stop" position and fire signals displayed or otherwise given. In case of police vehicles being called out a proper signal to indicate the fact is displayed or otherwise given. These fire and police signals are different and easily distinguished from one another and the special signal given when both fire and police vehicles are to be avoided is preferably so distinctive in character that it cannot be confused with either of the separate signals. For instance, this latter signal may consist of the intermittent lighting up of a powerful red light and the sounding of a siren during the dark or unlighted periods between successive red light displays, so giving an unmistakable signal indicating great danger. The fire signal or alarm, when used separately, may comprise a signal face bearing the word "Fire" supplemented, if desired, by an intermittently shown red light and the sounding of a fire gong. The police

vehicle signal or alarm may comprise the sounding of a siren. The traffic signaling "Stop" face may be displayed in connection with either the fire or police vehicle signals if desired.

In the form of the invention shown in the drawings, the signals located at the street intersections are each adapted to alternately display "Stop" and "Go" faces during the hours of traffic regulation by signal and to have such faces retired from view or extinguished during the remaining hours. In case the fire signals are to be given while the faces are in such retired or extinguished position, the signals may be started to functioning and the "Stop" faces thereof held in displayed position during the danger period and while the fire signal is displayed. When the fire display signal is removed from view, the traffic signal faces may again be extinguished. With the connections and central station illustrated in the drawings, the fire display faces and the traffic signaling faces may be simultaneously extinguished.

In the specific form of signal operating means or mechanism shown, provision is made for the correct display of "Stop" and "Go" faces without confusion, in order that no error of attendants or improper functioning of mechanism or parts can cause the display of a "Go" face in connection with the giving of the fire or other danger signal, as it is the "Stop" face that properly will be displayed therewith.

The traffic signal "Stop" and "Go" faces may be caused to be alternately displayed in any one of a wide variety of time relations, provision being preferably made at each street intersection for manually selectively connecting the mechanism of the signals at such intersection with any one circuit of a plurality of signal operating circuits leading from the central station. As these circuits are intermittently electrically energized by the central control station mechanism at different time periods, the signals at an intersection can readily be changed as to time period between changes of signal faces by being switched from one such circuit to another to meet varying traffic conditions.

At the central station manually operable switches may be provided for causing the changes in the signals required to meet the fire, police or other signaling requirements hereinbefore outlined. Switch mechanism is provided at such central station for controlling the energization of the circuits leading to the traffic signal face operating mechanism, and other switch mechanism is provided for properly energizing each circuit leading to the special fire or police alarms. The circuits leading to the devices such as a light and bell at each intersection for attracting the attention of the nearest officer may include a switch at each intersection which breaks the corresponding circuit and extinguishes the signals when the telephone receiver at such intersection is taken from its hook by an officer answering a call, as for the purpose of receiving instructions from the central station.

A further object of the invention is to provide a system of the general character above outlined which will be relatively simple in construction and organization when its advantages such as positiveness and reliability in operation, high centralization of the various signaling elements, and general superiority in service are considered.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, combination, association and inter-relation of parts, members and features, all as hereinafter described, shown in the drawings and finally pointed out in claims.

In the drawings:

Figure 1 is a fragmentary front elevation of a combined traffic and alarm signal constructed and organized to embody the invention;

Figure 2 is a diagrammatic view of the electric circuit a combined traffic and alarm system embodying the invention;

Fig. 3 is a plan view of vane-operating means hereinafter described.

Figure 4 is a sectional side view of part of the signal, taken looking in the opposite direction from Figure 1.

Figure 5 is a fragmentary elevation of a portion of the signal mechanism the view being taken looking in the opposite direction from Figure 4.

Figure 6 is a detailed view of the signal controlling or timing means alternative conduction sets, comprising four conductors each, being shown as connecting several sets of invariably-engaged contacts in a central timer (at the right of a vertical dash line) with a local switch (at the left of said line) which may be manually so shifted as to energize a local-motor circuit through any one of the mentioned sets of conductors and contacts, manually to vary the subdivision of a traffic-cycle interval in accordance with the

varying proportions of intersecting streams of traffic.

Figure 7 is a section on line 7—7 of Figure 6.

Figure 8 is a fragmentary elevation of a portion of the showing of Figure 5 looking in the opposite direction.

Fig. 9 is a sectional side view of part of the signal, being an extension on the right of Fig. 4.

Referring with particularity to the drawings, in the embodiment of the invention shown in Figures 1 to 5, inclusive, A designates, generally, a combined traffic and alarm signal (local); B designates the traffic signaling means (local) thereof; C designates means (local) for indicating that fire apparatus is out; D designates means for indicating that a police vehicle is out; E designates traffic signaling means operating mechanism (local); F designates means (local) for extinguishing the traffic signal faces; G (Fig. 2 left center) designates means (local) for operating the alarm means C; H designates generally a central station whereby the giving of signals is controlled; I designates means (local) for signaling officers to notify them that criminals are to be apprehended, or otherwise to inform or instruct them; J designates means (local) for controlling, by a selection of circuit connections, the turning of the traffic signaling means operating mechanism E, and K designates means (central) for timing the make-and-break intervals of the respective circuits available, through J for the signalling means operating mechanism E.

Each signal A, may comprise a casing having a top wall 15^a, a bottom wall 15^b, end walls 15^c, a front wall 15^d, and a rear wall 15^e, in and upon which casing 15 the signal mechanism and signal giving devices are mounted. A post 16 may support the signal casing at one or each of the four corners of a street intersection, the signal now being described being of the type adapted to be placed on or near the curb with the signal projecting therefrom slightly outward and over the street in position to be viewed by drivers of vehicles as well as pedestrians on the sidewalk.

The traffic signaling means B is shown as comprising a pair of composite signaling members *b*, one of which members *b* is mounted at the front face of the signal and is visible through a rectangular aperture 15^{d'}, provided in the front wall 15^d of the casing, and the other of which members *b* is mounted at the rear face of the signal and is visible through a rectangular aperture 15^{e'} provided in the rear wall 15^e of the casing. Each such composite signaling member *b* is shown as comprising a plurality of flat blades or vanes 17, shown as eight in number, each of which is formed with an upper journal or shaft 17^a and a lower journal or shaft 17^b on its central

longitudinal axis. The lower journals 17^b are each received in one of a series of suitable bores 17^{b'} in the bottom wall 15^b near the corresponding face of the casing, and the upper journals 17^a are each received in one of a series of suitable bores 17^{a'} in an intermediate wall or frame member 18 provided in the casing, and near the corresponding face of the casing. Where each upper journal or shaft 17^b projects through the member 18, it has a gear 17^c fixed thereon.

As best shown in Fig. 3, a frame comprising a pair of oppositely facing rack bars 19 is mounted for reciprocation in the casing between the two rows of gears 17^c, and the teeth 19^a of the rack bars are in mesh with the teeth 17^{c'} of the gears 17^c of the corresponding set of vanes 17. Cross members 19' unite the rack bars 19. A drive or connecting rod 20 is passed through a horizontal aperture in each of the cross members 19' and such drive rod 20 has an abutment device 20' thereon between the cross members 19', and a compression coil spring 20^a surrounds the rod 20 at each side of the abutment device 20' and extends therefrom to the corresponding cross member 19' so as to provide a yielding or resilient drive means for the rack bars and the vanes connected thereto. A connecting rod 20^b has its one end pivotally secured to the inner end of the drive rod 20 and has its other end apertured at 20^c to receive a crank pin 21^a fixed to one face of a crank device or means for reciprocating the rack bars. This reciprocating means is shown as comprising a drive gear 21, which is adapted to make one-half of a revolution at each signal setting actuation of mechanism, hereinafter described. This drive gear 21 is shown as rotatably mounted upon a suitable stud or stub shaft 21' fixed to the framework 22 inside of the casing 15. An intermittently actuated device 6' is shown as adapted to rotate or revolve the drive gear 21 and such device 6' is shown as comprising a shaft 23 rotatably journaled in the framework 22, a gear 23^a fixed thereto and in mesh with the drive gear 21 and of equal diameter therewith, a reduction gear or worm wheel 23^b fixed thereto, and switch-actuating stop arms 24 and 25 mounted thereon.

Operating means, to impart rotation to the worm wheel 23^b, may comprise an intermittently actuated electric motor 26 having a pinion or worm 26' fixed to the projecting end of its armature shaft 26^a and in mesh with the gear or worm wheel 23^b. The worm 26', shaft 23 with its worm wheel 23^b, gear 23^a and stop arms, together with the drive gear 21 and its connections with the vanes 17 may be considered as constituting means of operative connection between motive means such as electric motor 26 and the signaling vanes, and together with the motor may constitute means E, whereby the signals are alternately given through signals 6, for

traffic streams to proceed, or for traffic streams to stop, and with the described parts I may associate means for causing the retirement from view or extinguishment of the traffic signals when traffic regulation by signal is suspended. To prevent over-running of the vanes 17 or to cause the perfect alignment of the same, alternate vanes of each signaling member 6 are shown as provided with a stop lug or finger 17^d adapted to engage an adjacent vane.

The switch-actuating stop arm 24 comprises a rocker-arm 24^a mounted for rotation about the axis of the shaft 23, a short arm 24^b fixed to the shaft 23, and a yielding or resilient means shown as a spring 24^c connecting the arms 24^a and 24^b and whereby the arm 24^a is yieldably driven by the shaft 23 in its rotation.

The switch-actuating stop arm 25 may be similar in construction to the arm 24 and is shown as fixed to the shaft 23 at the end opposite to the arm 24. This arm 25 is comprised within means, hereinafter described for retiring or extinguishing the signal faces upon suspension of the regulation of traffic by the signals.

Electrical switches 27 and 28 may be provided for controlling the energization of the electric motor 26 and such switches may be mounted for oscillation, respectively, upon a longitudinally slidable body including a longitudinally slidable rod or shafts 27' which project from opposite ends of a solenoid armature 29, suitable bores being provided in the switches (the construction here referred to being shown in Fig. 4, and also indicated diagrammatically near the bottom of Fig. 2). These switches 27 and 28 are mounted for movement with the armature, that is from side to side, in order that the switches may be successively actuated or opened by the stop arm 24 in the regular traffic regulating action of the signal faces or vanes as will hereinafter be explained.

The solenoid armature 29 may be attracted by either of two solenoids 29^a or 29^b which when energized may shift both switches 27 and 28, which are in fixed spaced relation on the armature with its shaft extensions, to the right or left, (see Figs. 2, 4 and 5) as the case may be, so moving the arm-engaging portion of either switch into the path of travel of the stop arm 24. The switches 27 and 28 are so spaced apart along the shaft or slidable rod 27' that when one of the same is brought by such side-wise shifting action into position to be engaged by the arm 24, the other of the same is outside of the circular path of travel of such arm. It will thus be seen that by successively energizing the solenoids 29^a and 29^b, the arm 24 will strike the switches successively at every one-half of a revolution made by such arm, in the normal working of the mechanism in traffic

regulation, breaking the motor circuit, after each "Stop" and "Go" presentation of a signal face. The circuit will remain so broken until the next energization of the proper solenoid to cause a shifting of the switches, and the circuit will be closed during the short time period required for the motor to cause the stop arm 24 to move through its one-half revolution and strike the opposite switch, the arm-engaging portions of which are 180 degrees apart as measured on the circle of stop arm rotation, all as will be understood from the following description of the switches:

The switch 27 comprises a rigid body member 27^c which may be bored to rigidly connect the same with the shaft 27', and has a fixed switch point 27^a thereon. A longitudinally slidable switch bar 27^e, shown as mounted for substantially vertical reciprocation on the body member 27^c is normally moved to closed position or in contact with the fixed switch point 27^a by a tensile spring 27^f. At its upper end the switch bar 27^e is bent to form a stop arm-engaging finger 27ⁱ which projects through a guideway or slot 27^s in the body member 27^c, and into the path of travel of the stop arm 24, when the switch is normally positioned under the influence of the spring. The direction of rotation of the stop arm 24 is such that the finger 27ⁱ is struck and lifted thereby, so breaking the motor circuit,—which includes this switch as well as the switch 28 and another switch, the latter being movable into or out of the path of the stop arm 25. The stop arm 24 is caught by the finger 27ⁱ and the mechanism is mechanically stopped, in addition to the breaking of the motor circuit by such catching action. As hereinafter explained, this holds the signal faces *b* at "Stop". When, through movement of the switch, by the solenoid 29^b the finger 27ⁱ is withdrawn from the path of travel of the arm 24, the switch points come together and close the motor circuit, the arm 24 is freed, and the motor causes it to revolve until again intercepted by a switch finger.

The switch 28 is similarly constructed, and has a body portion 28^c rigidly secured on and laterally movable with a fixed switch point 28^a, a movable switch bar 28^e being biased to contact with the fixed point 28^a by a tensile spring 28^f and provided with a finger 28ⁱ projecting through a slot 28^s in the body member 28^c and adapted to engage and hold the stop arm 24 until released by movement caused by the solenoid 29^a. The switch 28 is arranged to be moved to open-circuit position when struck by the arm 24 in its rotation. The finger 28ⁱ of this switch is adapted to catch the stop arm and to break the motor circuit and so hold the signal face in position to indicate "Go" to a traffic stream until the parts are released, for further actuation, such

release being effected by an energization of the solenoid 29^a, to cause the parts to move to the position where the signal face indicates "Stop" to a traffic stream.

Each solenoid is connected with the circuits leading from a suitable point or points of control, as from a central source of electrical energy for the motor 26, which controls the movement of the signals *b*. Thus, the solenoid 29^a is to be connected with the circuits, leading from a suitable point of control, for the positioning of parts to indicate that traffic is to stop. Upon proper provision of separate and distinct controlling or impulse sending devices at any suitable point or points of control, and connecting such devices in circuit with the proper respective solenoids, no error in the action of the signal can occur. This is particularly important when a fire signal is given; and, as it is essential that the "Stop" signal and not the "Go" signal be given therewith, I may provide, within the operating means G, means for disconnecting the solenoids 29^a and 29^b from the mentioned timing means K, as well as means for connecting the solenoid 29^a with a suitable source of energy, as will hereinafter be explained, in such manner that when the fire alarm feature is in operation, the switch 27 will be drawn into the path of the stop arm 24, effective to open said switch, so that the motor circuit is reliably broken with the signal face displaying the "Stop" signal.

In order to provide for the retirement of the traffic signals from view during the period of suspension of regulation by the signals, and to provide for the giving of a traffic stop signal in conjunction with a fire signal when the fire signal is given during such period, I may provide a third switch 30 in the motor circuit somewhat as indicated diagrammatically in the lower central portion of Fig. 2. This switch 30 is shown in Fig. 5 as comprising an upstanding but laterally movable body 30^a having a fixed switch point 30^c and a vertically slidable switch bar 30^d mounted thereon. A laterally bent lower end of the bar 30^d is normally drawn downward into contact with the fixed point 30^c, as by a tensile spring 30^f, and said bar has a contact finger 30^e extending through a slot or guideway 30^g in the body 30^a and into the path of travel of the stop arm 25 on the shaft 23 but adapted to be engaged by said arm only at times when signals show "Stop" faces. A solenoid armature 30^h is connected to the body 30^a by a laterally slidable connecting rod 30ⁱ, upon which connecting rod the body portion 30^a is rigidly mounted. Armature 30^h is adapted to be drawn alternately into solenoids 31 and 32, in order to move the body 30^a laterally so that the finger 30^e may be either projected into the path of rotation of the arm 25 or withdrawn from such path of rotation.

The connecting rod 30^{a'''} may be rotatably as well as slidably mounted in the casing 15, so that the finger 30^a may be withdrawn from the path of rotation of the stop arm 25 independently of the operation of solenoids 31 and 32. The switch body 30^a is shown with a portion 30^b extending below the connecting rod 30^{a'''} and adapted to be acted upon by the armature 33^a of a magnet 33, thus oscillating the body portion 30^a and withdrawing the finger 30^a.

In order to insure positive positioning of the vanes 17 of signals *b*, during certain quiet hours, in the neutral or non-signaling position, a notch may be formed, as by the opposed vertical faces of two upstanding projections 20^a, on the connecting rod 20 (see Figs. 4, 5 and 8). This notch may be located centrally with reference to stroke, and it may be engageable by a latch member 35 pivoted to the framework as at 35^a at one end and having its opposite end apertured to receive the upper end of an operating rod 36. Above and below the latch member 35 and surrounding the operating rod 36 are shown compression coil springs 37, bearing against the latch member 35 and stop collars 38 fixed to the rod 36. The lower end of rod 36 may be pivoted to one end of a bell crank lever 39, pivoted to the casing 15, as at 39^a, and carrying on its other end a projecting pin 39^b, which is adapted to ride in a groove formed in the hub of a releasing lever arm 40, fixed to the laterally slidable and rotatable rod 30^{a'''}. A release rod 41 is attached to the latch member 35 and extends downwardly therefrom and into the path of swing of the releasing lever arm 40. Releasing lever arm 40 may be constantly pulled downwardly by means such as a tensile coil spring 40^a, attached to the casing 15, and normally holding said arm against a stop 40^b, serving to limit the oscillation of connecting rod 30^{a'''} and hence the switch body 30^a under the influence of magnet 33 acting on a magnetizable portion 30^b of body 30^a. Thus when the solenoid 32 is energized, as in the morning, in starting the signal in its daily action, the body 30^a and finger carried thereby will be withdrawn (to the right in Fig. 5) from its position in the path of the arm 25 and the arm will be released and the motor circuit (which had been interrupted at this switch, as in retiring the signal for the night) will be closed and the signals will spring into traffic regulating action, as controlled by impulses from the controlling device or station and by the breaking of circuits at switches 27 and 28, by arm 24. When however the solenoid 31 is energized, as in stopping the operation of the signals, or extinguishing the same, for the period of suspension of traffic regulation by signal, the body 30^a and finger carried thereby will be moved into the path of ro-

tation of the stop arm 25 and the motor circuit broken thereby. The longitudinal movement of the armature 30^{a'''} under the action of solenoid 31 will move the connecting rod, hence the lever 40, toward the left (looking at Figure 5) thus acting on pin 39^b to operate the bell crank lever 39, drawing the operating rod 36, and hence the latch member 35, downwardly into signal holding position. The compression coil springs 37 provide a yielding operative connection between the operating rod 36 and the latch 35, so that during the movement of the signal vanes 17 to the neutral or non-signaling position the latch may ride upon the beveled side of the projections 20^a on the connecting rod 30^{a'''} and also provide pressure to force the latch member into the notch, locking the mechanism against further movement.

It should be understood that when the latch 35 is drawn downwardly by the rod 36, the release rod 41 is lowered thereby, until its lower end is resting upon the release lever 40. The arm 25, connecting parts, and vanes 17 being held by the latch 35, and the vanes being in half-way position or with their edges presented to traffic streams and therefore substantially invisible, and the arm 25 being fixed to the shaft 23 in a position about its axis which is spaced about 90 degrees from the arm 24, in case of the giving of a fire signal while the traffic regulating vanes or faces are so held in invisible or extinguished position, the upper end or finger 30^a of the switch bar is drawn aside, out of contact, to clear the path of travel of the arm 25, by the magnet 33, working against the action of the spring 40^a, and at the same time swinging the lever 40 raising the release rod 41, and lifting the latch member 35 against the action of the upper coil spring 37. This action unlocks the connecting rod 20, permitting the signal vanes to be operated by the mechanism hereinbefore described until the "Stop" signal is displayed, as by reason of an engagement of the arm 25 with switch finger 30^a. The parts just described may thus be referred to as constituting the means F for extinguishing the traffic signal faces; and also as comprising means whereby, notwithstanding such extinguishment, the faces may display "Stop" signals in certain emergencies, being turned thereto from any other position.

In prior applications, such as that which matured into my Patent No. 1,640,845, granted Aug. 30, 1927, I described signals that may also be used with the following alarm-giving mechanism.

The central station mechanism H is shown in Figures 2 and 6 as comprising an electric motor 42 controlled by switch 141 driving, through a worm 43, wormwheel 44, worm 45 and worm wheel 46, a shaft 47 upon which is mounted a contact disc 48 of suitable insu-

lating material. A contact strip 49 encircles the contact disc 48 and is supplied with electrical energy from a suitable source of current 50 through a brush 51, adapted to bear against the contact strip 49. Upon the face of the contact disc, which is of suitable insulating material, are arranged various contact strips, *h*, best illustrated in Figure 2, connected with wires 52, set somewhat below the surfaces of the various contact strips *h*. Suitable brushes *h'* are mounted in an insulated support 53 and are adapted to contact with the contact strips *h* to operate various signals as will hereinafter be explained. A worm 54 is mounted on the shaft 47 and meshes with a worm-wheel 55, to which is attached a crank arm 56. A connecting link 58 is pivoted to the crank arm 56 by a crank pin 57 at one end, and at the opposite end this link is shown as pivoted by a pin 59, to a carriage 60.

Carriage 60 is adapted to slide on guide rods 61, mounted on an insulated support 62 and is moved back and forth (or up and down) corresponding to the rotation of the crank arm 56. As best shown in Fig. 7, the carriage 60 carries a pivoted switch arm 63, which may be supplied thru a connection 64 with electrical energy from any suitable source and adapted to make contact with either of two stationary contacts 65 mounted on the carriage 60, and to be held in contact with either of the two stationary contacts 65 by a tensile coil spring 66. The contacts 65 are each connected with two sliding contacts 67 and 68 on the bottom of the carriage 60. Contact 67 is adapted to make connection with a series of contacts 70, mounted on the support 62, for energizing, through the means J, the solenoids 29^a in a series of signals A, and contact 68 is adapted to make connection with a series of contacts 69, also mounted on the support 62, for energizing through the means J the solenoids 29^b in a series of signals A, the mentioned solenoids being used as described for operating the "Stop" and "Go" signal faces respectively. Means such as cams 71 at either end of the support 62 are positioned to throw the switch arm 63 from one of the contacts 65 to the other of the contacts 65 so that on the up stroke (referring to Figure 6) the contacts 69 and 70 on the right hand side of the support 62 will be energized and on the down stroke contacts 69 and 70 on the left hand side will be energized. Each of the contacts 69 and 70 are connected to corresponding contacts 69' and 70' respectively of a rotatable knife switch 72 which is pivoted at 140, comprised within the time control means, J, one of which switches 72 is preferably located at each intersection of streets where the signals A are located, and may be placed in an enclosure 72^a on the signal post 16, as illustrated in Figure 1. It will be noted that

the contacts 69' and 70', adapted to be connected with the lead wires 69^a and 70^a through the switch bars 69^b and 70^b, at the same time are connected with a series of contacts 69 and 70 so positioned on the support 62 as to be under the carriage 60 at or near the same time, the contacts 69 leading the contacts 70 by a small distance in the direction of the energizing movement of the carriage 60.

Contacts 69 are connected, through contacts 69', switch bars 69^b and lead wires 69^a to switch contact 122, and contact point 120 on bar 76 when bar 76 is down, then by means of wire 120^a connect to solenoids 29^a located in the signals A arranged in diagonal pairs on the four corners of a street intersection; for example, as illustrated in Figure 6, the contact 69 on the right of the support 62 when contacted by contact 67 will energize the solenoids 29^a in one pair of signals A on opposite corners of an east and west street. The contact 69 on the left of the support 62 when contacted by the opposite contact 67 will be connected to the solenoids 29^a in the second pair of signals A' on opposite corners of the north and south street. Via wires 70^a, the contact 70 on the "right" of the support 62, will be connected to solenoids 29^b in the pair of signals A on diagonally opposite corners of the north and south street, solenoids 29^b in the other two signals A' being connected to the "left" contacts 70.

The sequence of operation will therefore be as follows, considering only those contacts 69 and 70 which are connected through the switch 72 to lead wires 69^a and 70^a; contact 69 on the right of the support 62 energized showing "Stop" on the east and west street, contact 70 on the right of the support 62 energized showing "Go" on the north and south street; the carriage 60 travels to the upper limit of its path, the cam 71 reverses the switch arm 63, the carriage 60 starts downward; contact 69 on the left of the support 62 is energized, showing "Stop" on the north and south street, contact 70 on the left of the support 62 is energized showing "Go" on the east and west street; the carriage travels to the lower limit of its stroke, the switch arm 63 is reversed by the cam 71, the carriage 60 starts to travel upwardly and the cycle is repeated. It will be noted that there is a slight interval in which the signals on all corners show the "Stop" signal face, this being desirable to clear the traffic in the intersection before allowing traffic to proceed. It will be obvious that by changing the switch 72 to another series of contacts, and hence connecting the solenoids 29^a and 29^b to alternate sets of contacts 69 and 70, the various sets thereof being engaged at different intervals of time, that the east and west street may be left open to traffic for a longer period of time than the north and south street, or

vice versa, although the duration of the complete cycle remains unchanged.

A light 131 may operate in conjunction with the "Go" signal, and may be mounted in a light tube 131^a, covered at its ends with a green glass. A light 130 may operate in conjunction with the "Stop" signal, and may be mounted in a light tube 130^a, covered at its ends with a ruby glass. A light 129 may operate during change of signals, and may be mounted in a light tube 129^a, covered at its ends with an orange glass, and a bell 131^b may be caused to ring during such change by suitable arrangement of contacts 131^c on the connecting rod 20 and casing 15.

A contact 73 is shown as located at one end of the stroke of the carriage 60 and connected by a lead wire 73^a with the solenoid 31 for setting the signal faces in non-operative or neutral position. A switch may be interposed in the line 73^a as at 73^b which, during the normal operation of the signal, would be open but would be closed when it was desired to suspend signal operations. This may be a hand-operated switch, or may be automatically operated, as described in my application for traffic signaling systems, Ser. No. 647,666, filed June 25, 1923 now Patent No. 1,817,754, granted Aug. 4, 1931.

Fire signalling means C may consist of a series of vanes 74 shown as mounted horizontally in the casing 15 and visible through apertures in the front and back walls thereof, and adapted to pivot in the side wall 15^c and an intermediate wall 15^e, on gudgeons 74^a. The gudgeons passing through the intermediate wall are cranked as at 74^b and pass through apertures in a connecting rod 75. Connecting rod 75 is shown as pivotally attached near the lower end to a switch bar 76, hinged to the casing 15 as at 76^a. A light 77, mounted within the casing 15 and surrounded by a cylindrical light tube 78, is connected to the fire alarm operating means G through suitable connections, as will hereinafter be explained. A gong 79 is shown as secured inside the casing 15 and is sounded by a clapper 80 operated by a solenoid 81 and tensile coil spring 82. The vanes 74 preferably are red in color and have the word "Fire" prominently displayed thereon. The light tube 78, or its equivalent may be covered at its ends with ruby glass to give a red light.

Police calling means "I" comprise a light 83 mounted above the casing 15, and a small clapper 84, operated against the fire gong 79 by a solenoid 85 and tensile coil spring 86 and suitable connections therefrom to the central station H, including a telephone 87 and light 88 as will be hereinafter explained.

Police vehicle signaling means D may consist of a siren 89 mounted beneath the signal casing 15 and suitable connections therefrom to the central station H, as will be explained.

The contact strips *h* and the brushes *h'* may be arranged as follows: (referring more particularly to Fig. 2) a contact strip 90 extends half-way around the face of the contact disc 48 and is contacted by brush 90'. Brush 90' is connected by wire 90^a to a contact 91 on the switch bar 76. Contact points 92, of which there may be two, are contacted by brushes 92', and contact strips 93, relatively short and four in number, are contacted by brushes 93'. Switches 92^a and 93^a connect brushes 92' and 93' respectively, by a wire 92^a, to a switch contact 94 (see Fig. 4) mounted on an insulated member 95, secured above the switch bar 76. Contact strip 96 extends half-way around the face of the contact disc 48, opposite the contact strip 90, and is contacted by brush 96'. Brush 96' is connected by a wire 96^a to a contact point 97 on the insulated member 95. Contact strip 98 makes a complete circle on the face of the contact disc 48 and is contacted by brush 98'. Brush 98' is connected by wire 98^a to a contact point 99, mounted on an insulated member 100 attached to the casing 15 below the switch bar 76. Intermediate the brush 98' and the contact point 99, as at 98^b, a wire 98^b is connected; and this is also connected to the light 83. To the other contact of the light 83 is attached wire 98^c, which has a contact 87^a operated by the receiver of the telephone 87 to connect with another wire 98^c through a switch 98^d and a light 88, located within the central station H, to ground, as indicated at 98^e. A wire 98^f is attached to the wire 98^c, as at 98^f, and is connected to one end of the solenoid wiring 85. The other end of the solenoid 85 is connected by wire 101^a to brush 101'. Brush 101' contacts with contact point 101 upon the disc 48, for use in case a fire becomes known at "central," a double-throw switch 102, comprised within central station H, connects a source of current supply 50 with local solenoids 103 and 104 having a common armature 105 fixed to a rod 106, slidably mounted (as for vertical movement) in a casing 107, providing guides therefor, as shown. External armatures 108 are shown as hinged to the casing 107 at the outside ends of solenoids 103 and 104 and are connected by link work 109 to a latch member 110 adapted to enter one or more of a plurality of notches formed, as at 111 and 112, in the rod 106. The armatures 108 are apertured to permit passage of the rod 106. As diagrammatically shown, a coil spring 113 tends to hold the latch 110 in engaging position. Another notch may be formed in the opposite end of the rod 106, as at 114 to receive the outer end of the switch bar 76. The solenoids 103 and 104 are grounded, as at 103' and 104'. A switch 115, similar to switch 102, may be located in the enclosure 72^a to provide a parallel connection between the source of current supply 50 and the sole-

noids 103 and 104. Electrical energy may also be supplied to contact points 116 and 117, located on the insulated member 95, from the source of current supply 50, for use in energizing "Stop" solenoid 29^a and magnet 33 under certain conditions.

From any suitable source of electrical energy 118 current is supplied through switches 27, 28 and 30 to the electric motor 26, to ground at 26^a. Current may also be supplied from one of the mentioned sources, as by wire 69^a from device J, to the contact 122 on the member 100, and thence to wire 120^a via contact 120, to energize "Stop" solenoid 29^a. Current may similarly be supplied, as by wire 70^a, to a contact 121 on the switch bar 76, said contact normally engaging a contact 123, connected to "Go" solenoid 29^b by wire 123^a. The contact point 122, on bar 76, is adapted to make connection with contact 116 in its upper position and with contact 120 in its lower position, and is connected by wire 120^a to one lead of the solenoid 29^a, the other lead being grounded as at 120'. The contact point 121 may be adapted to contact in its lower position with a contact 123 mounted on the member 100 and is shown as connected by a wire 123^a to one lead of the solenoid 29^b, the other lead being grounded, as at 123'. A contact 124, mounted on the fixed insulating member 95, is adapted to make contact with the contact 91 on the switch bar 76, and said contact 124 is shown as connected by wire 124^a to the fire light 77. The other connection of the "Fire" light may be grounded, as at 124'. Contacts 97 and 99 are adapted to be alternatively contacted with a contact 125 mounted on the switch bar 76 and connected by a wire 125^a to one lead of the siren 89, the other lead being connected by a wire 125^b through switch 126 in the central station H to ground at 98^a. A contact 127 on the switch bar 76 is adapted to make contact with contact 94 on the member 95 and is connected by a wire 127^a with the one lead of the solenoid 81, the other lead being grounded, as at 127'. Another contact 128 on the switch bar 76 is adapted to make contact with and be energized by the contact 117 on the insulated member 95 and is connected by a wire 128^a to one lead of the solenoid 33, the other lead being grounded, as at 128'.

In Figure 2, "central" parts are shown above and to the right of a dotted line and, although Fig. 2 assumes a fire signal to have been given, (as, by a movement of switch 102 toward the right, energizing solenoid 103 and elevating bar 76) it will be understood that during routine traffic regulation said bar occupies a lowered position in which impulses through wires 69^a, contacts 122 and 120 and wire 120^a alternate with impulses through wires 70^a, via contacts 121 and 123 and wire 123^a, to energize intermittently and alternately the solenoids 29^a and 29^b,—for periods

dependent upon the operation of the central device K and the adjustment of the local switch J, if used. The motor 26 will be understood to be energized intermittently, and only when both of the switches 27 and 28, subject to control by said solenoids, and included in the circuit comprising source 118 and wires 119, 119^a and 119^b, are closed (the switch 30 being also closed) thereby effecting the desired intermittent rotation of vanes. These operations will be understood to be initiated through switch 73^b by such an energization of the solenoid 32, each morning, via wires 73, 73', as to cause a closing of the switch 30; and they are discontinued, with the mentioned neutralizing effect during the night,—by an opposite movement of switch 73^b, energizing solenoid 31.

The operation of the alarm-giving features is as follows: Referring to Figure 2—to give the alarm for fire, the operator at central station presses the switch 102 to the left, or the traffic officer on duty at the street intersection may press switch 115 to the left, should he notice a fire and desire to keep traffic clear. This action energizes solenoid 103, armature 108 is pulled toward solenoid 103, unlocking the bar 106 which moves upward with armature 105, raising the switch bar 76 to its upper position and turning the vanes 74 from their normal position, with edges presented to the traffic stream, to the position shown in the drawings. The movement of the switch bar 76 breaks the contacts between 122 and 120 and between 121 and 123, cutting off solenoids 29^a and 29^b, respectively, from the devices K and J. Contact 122 is brought into contact with contact 116, continuously energizing solenoid 29^a, thus stopping the signal vanes 17 in such position that the "Stop" face is presented to traffic. Magnet 33 is energized through contacts 128 and 117, thus unlocking the vanes 17 should the fire take place during the time traffic operations are suspended and the vanes be in the neutral position.

Contact 91 is brought into contact with the contact 124, lighting the light 77 intermittently, through the contact strip 90. Contact 127 is raised to contact 94, sounding the fire gong 79, through the solenoid 81 and spring 82 and the interrupted contacts 93 or 92 depending on whether switch 92^a or 93^a is closed (with different effects, depending on the lengths of these contacts). Contact 125 is brought into connection with contact 97, connecting the police siren 89 with the half circle contact strip 96 so that in case the police vehicles are for any reason called out simultaneously with the fire vehicles, the siren 89 will sound intermittently upon closing of the central station switch 126.

Upon movement, of switch 102 to the right, or switch 115 to the right, the solenoid 104 is energized and the switch bar 76 drawn back

and signal restored to its previous conditions, whether operative or non-operative.

In case it is desired to warn traffic of the approach of a police vehicle, the switch 126 is closed and the siren 89 sounds steadily through contact strip 98, except in case of fire, when the siren 89 sounds intermittently, mentioned means being effective to render the giving of a fire signal incidentally determinative of a "stop" indication by said traffic signal and intermittently interruptive of any police vehicle signal concurrently given.

In case it is desired to call a police officer to the telephone 87, the switch 98^a is closed, lighting the light 83 through the contact strip 98, and the receiver-switch 87^a; and the solenoid 85 is intermittently energized through the contact point 101, ringing the gong 79 through the small clapper 84 and spring 86. Upon the lifting of the receiver of the telephone 87, the circuit is broken, the light 83 goes out, the gong 79 stops ringing and the light 88 at central station goes out, signifying to the operator that the officer has answered, whereupon the switch 98^a is opened; (any desired conversation being carried on through a telephone line, not shown).

It is obvious that many changes and modifications may be made in my invention without departing from the true spirit thereof, as shown in the drawings, described in this specification and finally pointed out in the claims.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. A traffic signalling system comprising a central station a plurality of traffic signals located at street intersections and each including: vanes, means for rotating the same to signal traffic when to proceed and when to stop and to an neutral non-signalling position, and with means, operable from said central station, for holding said vanes in neutral position, fire alarm signaling means, means for operating said fire alarm signaling means and means associated therewith for releasing said holding means and energizing and then de-energizing said rotating means to bring said vanes to stop-indicating positions for restraining the movement of traffic streams during the operation of the fire alarm signalling means.

2. A traffic signalling system comprising: a plurality of traffic signals located at street intersections and each including vanes provided with means for rotating the same to signal traffic when to proceed and when to stop; a fire alarm signal associated therewith and including means for indicating that fire apparatus has the right of way; a police vehicle alarm signal; means for signalling traffic streams to stop when such fire alarm indicating signals are given; and means whereby the character of the police vehicle signal

is changed in case a fire alarm is simultaneously given.

3. A combined traffic signaling and alarm system comprising: composite signaling devices located at street intersections and like places and each including: means to indicate when traffic streams are to proceed and when traffic streams are to stop in the ordinary regulation of traffic; means to indicate when fire apparatus is to be avoided; means to indicate a special vehicle is to be avoided; and means to so vary the operation of said means as to indicate when both fire apparatus and such vehicles are to be simultaneously avoided,—at least one of the means concerned being operated intermittently when said means are concurrently energized.

4. In a traffic signal, oscillatory vanes including a "stop" indication and a "go" indication, an electric motor, mechanism connecting said motor to said vanes for imparting oscillatory motion to said vanes, means for so energizing said motor that a normal routine traffic control display of said "go" and "stop" indications of said vanes is obtained, additional oscillatory vanes including a "fire" indication and a non-signaling indication, means for normally maintaining last said vanes in non-signaling position, a control station, means actuated from said station for operating last said vanes to "fire" indicating position and at the same time rendering the first named means effective to cause a continuous display of the "stop" indications of the first said vanes, and the last named operating means restoring the normal signaling functions of said vanes upon cessation of its actuation by the control station.

5. A traffic signal unit comprising: means comprising cyclically operable signal elements, for the routine regulation of traffic; means for indicating the approach of fire apparatus; and means for indicating the approach of a special vehicle, one of said indicating means, when operated, being provided with means rendering the same intermittent when two of said means are concurrently energized.

6. A traffic signal comprising: means for routine regulation of traffic; means for indicating the approach of a fire apparatus; means causing the former to hold all traffic when the latter is operated; means for indicating the approach of a special vehicle; and means for rendering the operation of said fire indicator intermittent in case fire apparatus and a special vehicle are both approaching the same unit.

7. A traffic system comprising separate sets of conductors adapted to connect signals and controlling means; a central station; a time controlled central device at said central station for supplying electrical energizing impulses at differing intervals to said sets of conductors; a plurality of local traffic signals

to each of which a plurality of said sets of conductors are extended, each of said signals including a motor in a circuit provided with a plurality of switches, vanes provided with means operated by said motor for rotating the same to signal traffic when to proceed and when to stop, and a plurality of solenoids respectively governing release of said switches to effect a closure of said motor circuit to operate said vanes; and local means for a selection among said sets of conductors, to so connect the selected set of said conductors with some of said solenoids as to predetermine an independent timing of the rotations of the vanes of a specific signal in said signals in routine traffic regulation involving the alternate release of said switches.

8. A traffic signal system as defined in claim 7 including means, operable from said central station, for holding said vanes in a neutral position; and means operable both from said central station and from the local signal, to release said holding means.

9. A traffic signal system as defined in claim 7, including means for giving a "fire" signal; means for holding said vanes in neutral position; means operable from said central station for release of said holding means upon the giving of a "fire" signal; and means whereby upon the release of said holding means, said vanes are brought to a "stop" indicating position; and means operative upon a discontinuance of the "fire" signal, automatically to restore each signal to its previous routine cycle of operation.

10. A traffic signal system as defined in claim 7, said local means for selecting sets of conductors comprising an adjustable switch device connecting said central station with the signals at an intersection and connectable with a selected pair of mutually complementary impulse circuits leading from said control operating means thereto.

11. A traffic signal system as defined in claim 7, said local means for selecting sets of conductors comprising an adjustable switch device connecting said central station with the signals at an intersection and at will, with a selected pair of circuits leading from said central energizing means thereto; said central energizing means comprising time-controlled slidable switch means for supplying to various pairs of said circuits electrical signal-controlling impulses which variously sub-divide an identical total cycle period.

In testimony whereof, I have signed my name to this specification.

ALEXANDER J. MASSEY.