F. J. HUSBANDS.

AUTOMATIC TRAFFIC SIGNAL.

APPLICATION FILED OCT. 9, 1916.

1,236,441. **Patented Aug. 14, 1917.**

FIG. 1.

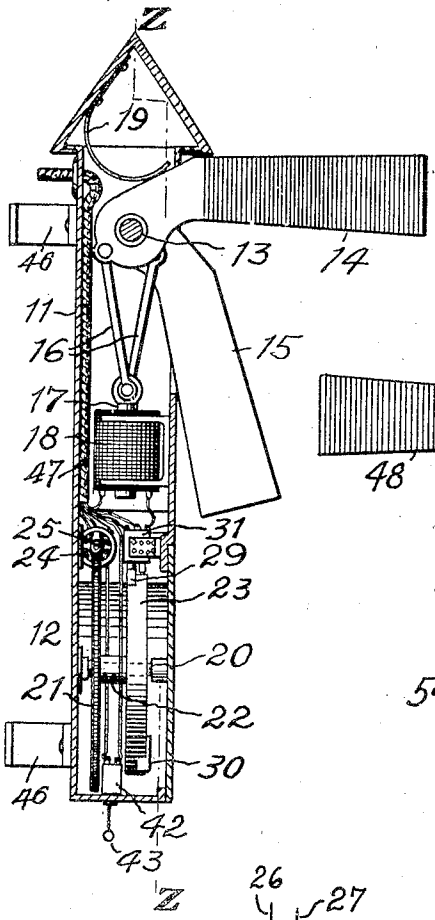


FIG. 5.

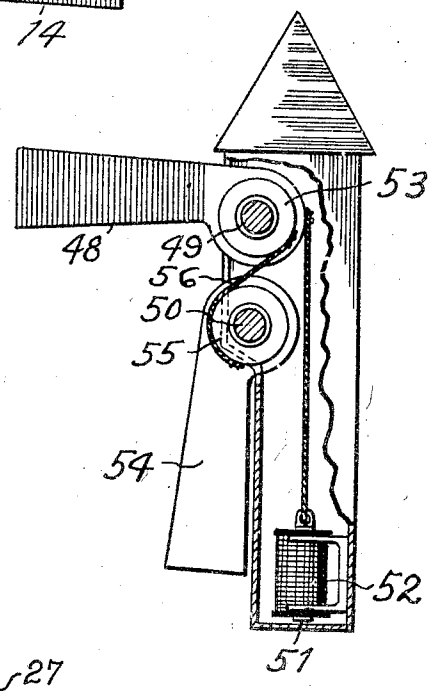


FIG. 2.

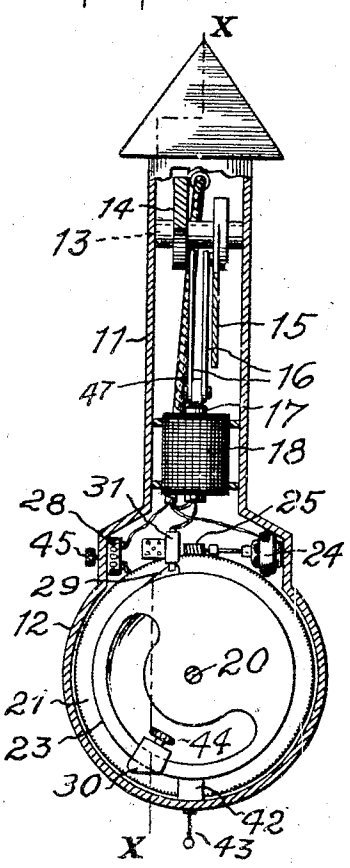


FIG. 3.

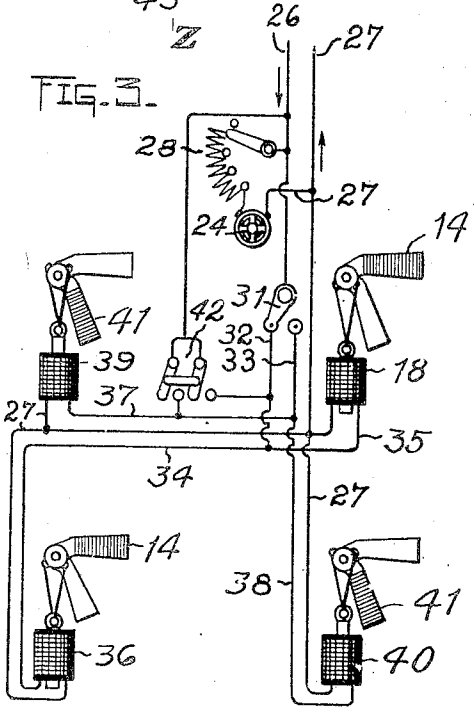
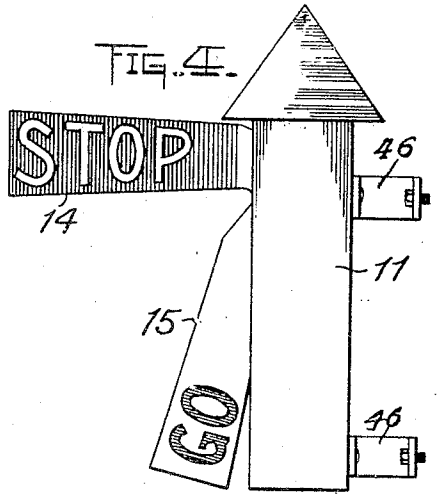


FIG. 4.



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AUTOMATIC TRAFFIC-SIGNAL.

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To all whom it may concern:

Be it known that I, FRANK J. HUSBANDS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Automatic Traffic-Signal, of which the following is a specification.

This invention relates to an improved signal system for the control of traffic at street intersections, and the objects of this improvement are to display signals whereby the traffic may proceed for a limited period of time on one of two intersecting streets, and alternately upon the other street, and to accomplish the change of signals automatically.

Another object of this improvement is to provide means whereby the traffic signals may be manually operated, the device being arranged to automatically resume the automatic operation of the signals whenever the manual control thereof is discontinued.

Another object is to provide means for varying the regular sequence of the automatic change of signals, so that traffic may proceed upon one street longer than on the other.

The invention may be embodied to comprehend mechanical and electrical elements in combination whereby some of the elements will be operative relatively to the others for regulating and controlling the flow of an electric current to others, whereby the others will operate to govern the display signals.

In the drawings, Figure 1 is a sectional elevation of a signal device incorporating the principles of this invention, the housing being sectioned on line X—X, of Fig. 2, and all inner parts in elevation. Fig. 2 is a similar view of the device turned at an angle of 90 degrees, the housing being sectioned on the line Z—Z, of Fig. 1. Fig. 3 is a diagram of the electrical elements and wiring. Fig. 4 is an elevation of one of the signals and housing therefor. Fig. 5 is a modified form of signal.

Referring to the drawings, this traffic signal consists of four housings, of which one is to be located at each corner of intersecting streets, and of which one housing 11 is provided with a control box 12 integral therewith. The electrical and mechanical elements referred to are contained in the housing with control box.

The housing 11 has an axial bar 13 on which are pivotally mounted the movable semaphore vanes 14, 15. Link members 16 connect the semaphore vanes with a plunger 17, movable in a solenoid 18. When the solenoid is energized, the plunger is pulled downward thereby raising the vane 14 and lowering vane 15, and, when the solenoid is deënergized, the vane 14 drops by gravity, simultaneously raising the vane 15, the vane 14 being simply heavy to more than counterbalance the plunger and vane 15. A spring 19 secured in the housing cushions the upward movement of vane 14 and assists in the downward movement thereof. Vanes 14, 15, respectively, may be provided with the words "Stop" and "Go" to indicate the movement of vehicles at the street intersection, and are also of different color, the stop vane having a red color and the go vane having a white color.

On a shaft 20 is mounted a gear-wheel 21 which rotates independently thereon, the hub 22 of the wheel 21, having fixed thereon a drum 23 which rotates in unison with wheel 21. A motor 24 actuates a worm pinion 25, which in turn actuates wheel 21. The motor is driven by an electric power circuit indicated in Fig. 3, by wires 26, 27. A rheostat 28 regulates the circuit so that any required speed of the motor may be maintained, or the motor may be cut out of circuit if desired.

The drum 23 has fixed on the periphery thereof, a cam 29. A similar cam 30 is clamped to the opposite edge of the periphery, the cam 30 being adjustable to different positions relative to fixed cam 29. Cams 29, 30, alternately actuate a three-point snap switch 31, which controls circuits represented by wires 32, 33. When the circuit comprising wires 32, 34, 35, solenoids 18, 36, and wire 27, is closed by switch 31, the stop signals 14, on diagonally opposite street corners, will be raised to the horizontal or display position. When the circuit comprising wires 33, 37, 38, solenoids 39, 40, and

wire 27 is closed by switch 31, the stop signals 41, on diagonally opposite street corners, will be raised to display position.

When it is desired that the signals shall operate automatically, the current is turned on through rheostat 28, actuated by handle 42, and the motor 24, thus energized, will actuate the drum 23, hereinafter called a timer, and thereby throw the switch 31. The "go" signals will automatically assume the display position by gravity, when the circuits are broken.

A snap switch 42, actuated by a pull-chain 43, is arranged to place both solenoid circuits in contact with wire 26. This may be a double-pole switch as shown in Fig. 3, or it may be simply a single pole switch to connect the two solenoid circuits, so that, when closed, the switch 31 will connect both circuits in either position.

From the foregoing it may be seen that when the current is on and energizing the motor, the timer will in turn be actuated to automatically throw the switch 31. Thus either one or the other of the solenoid circuits will be in active operation to hold certain of the signal vanes in set position. The revolution of the timer will bring the cams thereon alternately into contact with switch 31. In case there is more traffic on one of the intersecting streets than on the other, the cams may be unequally spaced upon the timer, in this case the cam 30 being clamped to the timer by a thumb screw 44, may be set to allow the three-point snap switch to remain in one position longer than in the other. The intervals elapsing between change of signals may be varied by adjusting the rheostat, a knob 45, being provided for that purpose. A traffic officer may if necessary, cut out the motor, thereby leaving the signals set for traffic on one of the intersecting streets, or he may, by actuating pull switch 42, stop traffic on both streets. The signal housings, of which one is constructed as shown in Figs. 1, 2, and three as shown in Fig. 4, are provided with brackets 46, whereby they may be attached preferably to street lamp posts. The wires may be arranged to pass out through the conduit 47, and thence overhead or underground from one to another of the signal housings.

In the modified form shown in Fig. 5, the red, or "stop" signal 48 is hung to swing on axial pivot 49, and the white, or "go" signal is swung upon a separate pivot 50. Signal 48 is operated by a plunger 51, actuated by a solenoid 52. Signal 48 is provided with a drum 53, concentric with its pivotal axis, and signal 54 is provided with a similar drum 55. A cord 56 is attached to both drums, on opposite sides relative to the axial centers of the signal vanes, so that as one signal is swung to display position, the cord will wind on the corresponding drum, and will unwind from the other drum. The stop signal 48 is heavy to counterbalance the weight of vane 54 and plunger 51, and drops by gravity when the solenoid is deenergized. A signal 48 falls, signal 54 will rise to display position. When signal 48 is brought into display position, signal 54 drops by gravity.

While simple and efficient means are herein provided for accomplishing the objects of the invention and the elements shown and described are well adapted to serve the purposes for which they are intended, it is to be understood that the invention is not limited to the precise construction exhibited in the drawings, but that changes, alterations, and modifications may be made within the scope of the appended claims.

What is claimed is:

1. A traffic signal comprising two semaphores hung upon a common pivot, a solenoid, a plunger working therein, means to energize the solenoid, and link members pivoted to the semaphores on opposite sides with respect to the semaphore pivot centers whereby one of the semaphores is lowered as the other is raised to set position.

2. A traffic signal comprising two semaphores hung to swing upon a common pivot, a solenoid, a plunger working in the solenoid, link members pivoted to the plunger and pivoted to the semaphores on opposite sides relative to the semaphore pivot center whereby one of the semaphores is lowered as the other is raised to set position, and means to alternately energize and deënergize the solenoid.

3. A traffic signal comprising two semaphores hung to swing upon a common pivot, a plunger, link members pivoted to the plunger and to the semaphores on opposite sides relative to the semaphore pivot centers whereby one of the semaphores is lowered as the other is raised to set position, a solenoid to actuate the plunger, and means to alternately energize and deënergize the solenoid, one of said semaphores being heavy relative to the other semaphore and plunger whereby the signals are changed by gravity when the solenoid is deënergized.

4. A traffic signal comprising two semaphores hung to swing upon a common pivot, a plunger beneath the semaphores, link members connecting the plunger and semaphores whereby one semaphore is lowered and the other is raised upon the movement of the plunger, a solenoid to actuate the plunger, and means to alternately energize and deënergize the solenoid.

5. The combination with semaphore signals, one of which is lowered as the other is raised to set position, and one of which is heavier than the other whereby the signals

are operated by gravity to one position, and electrical means for operating the signals to the other position.

6. In combination with four signals normally operated by gravity to the "go" position, each one of which is located at a corner of intersecting streets, and a source of electric energy to throw the signals to "stop" position, of solenoid circuits arranged to operate simultaneously the signals on diagonally opposite corners, switch means to alternately connect the solenoid circuits with the source of electric energy, a timer to actuate said switch, and a motor also in circuit with the source of electric energy to constantly operate the timer.

7. In a traffic signal system, the combination with a series of signals, one of which is located at each corner of intersecting streets, and a source of electric energy, of solenoid circuits, each of which operates the signals on two diagonally opposite street corners, a switch to alternately connect the solenoid circuits with the source of electric energy, a motor actuated timer in constant operation, and cams on the timer to actuate the switch, one of said cams being fixed in position, and the other cam being adjustable relative to the fixed cam whereby one solenoid circuit will be in contact with the source of electric energy for a longer interval than the other solenoid circuit.

8. In a traffic signal system, the combination with four signals, one of which is located at each corner of intersecting streets, and a source of electric energy, of electric circuits arranged to operate the signals on two diagonally opposite corners, means for alternately placing said electric circuits in contact with the source of electric energy, means for varying the intervals of contact relative to one another, and means for lengthening and shortening the intervals of contact proportionally.

9. In a traffic signal system having a signal at each corner of intersecting streets, means to operate two signals located on diagonally opposite corners to allow traffic to proceed on one street, simultaneously, means to alternately operate the signals for the opposite corners, relative to the first-named signals, means for varying the intervals elapsing between the change of signals, relative to one another, means for varying the intervals between change of signals, proportionally manually operated means to keep the signals in a set position indefinitely and manually operated means to set the signals all in stop position.

10. In a traffic signal system, means to automatically operate simultaneously a pair of signals on diagonally opposite street corners, means to automatically and simultaneously operate a pair of signals located on the remaining street corners, means for alternately operating the different pairs of signals, means for varying the intervals between change of signals proportionally, means for varying the intervals between change of signals relatively, and means to hold all signals in stop position indefinitely, all operated from one source of electric energy.

11. In a traffic signal, two semaphores hung to swing upon a pivot, a plunger, link members connecting the plunger and semaphore signals whereby one semaphore will swing downward as the other assumes the horizontal display position, one of said semaphores being counterweighted to normally swing downward, and electric means for actuating the plunger and hold the counterweighted semaphore in display position.

12. In a traffic signal system, a source of electric energy, two solenoid circuits, signals operated to "stop" position when the solenoid circuits are energized, a switch to throw either solenoid circuit in connection with the source of electric energy, a timer for throwing the switch, and means for limiting the flow of current that operates the timer independent of the current flowing through the switch.

13. In a traffic signal system, a source of electric energy, two solenoid circuits, two signals operated to "stop" position when either circuit is energized, a three point snap switch arranged to throw either solenoid circuit in connection with the source of electric energy, a timer to operate the snap switch, a motor to operate the timer, said motor being energized from the original source of electric energy, and means to throw both solenoid circuits in connection with the source of electric energy independent of the electrically actuated switch.

14. In a traffic signal system, a primary electric circuit, two solenoid circuits, two signals operated to "stop" position when one of the solenoid circuits is energized, two other signals, similarly operated when the other solenoid circuit is energized, electrical means for alternately energizing the solenoid circuits, and manually operated means for energizing both circuits simultaneously.

15. In a traffic signal system, four signals electrically operated to "stop" position when connection with a primary circuit is made, and returning by gravity to "go" position, electric motive and timing means to automatically operate said signals in pairs, alternately, and means for manually operating the signals in independent circuits or in unison.

16. In a traffic signal system, four signals operated by gravity to "go" position, and operated by electricity to "stop" position, electric solenoid circuits, each controlling

two signals, a switch to throw either solenoid circuit into connection with a source of electric energy, a timer to actuate the switch, and cams on the timer, one of which is fixed in position and the other is adjustable in position.

In testimony whereof, I have hereunto affixed my signature this 11th day of September, 1916.

FRANK J. HUSBANDS.

In presence of—
JAMES W. MASTER,
GLADYS M. HUNTER.