April 6, 1937. A. A. BLUE 2,076,396

TRAFFIC SIGNAL

Filed Oct. 4, 1928 2 Sheets-Sheet 1

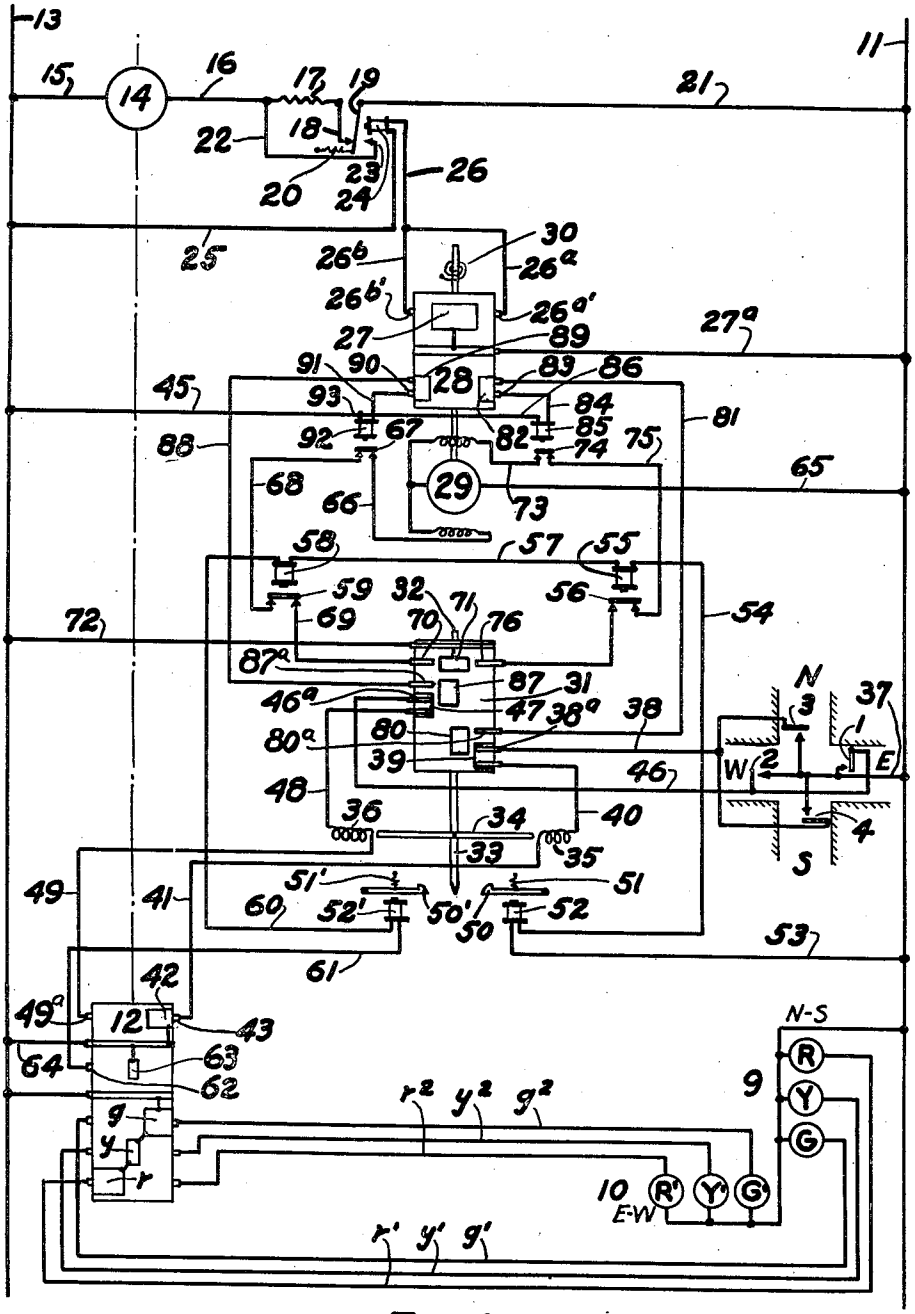

FIG. 1

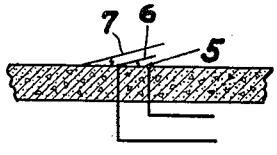

FIG. 2

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TRAFFIC SIGNAL

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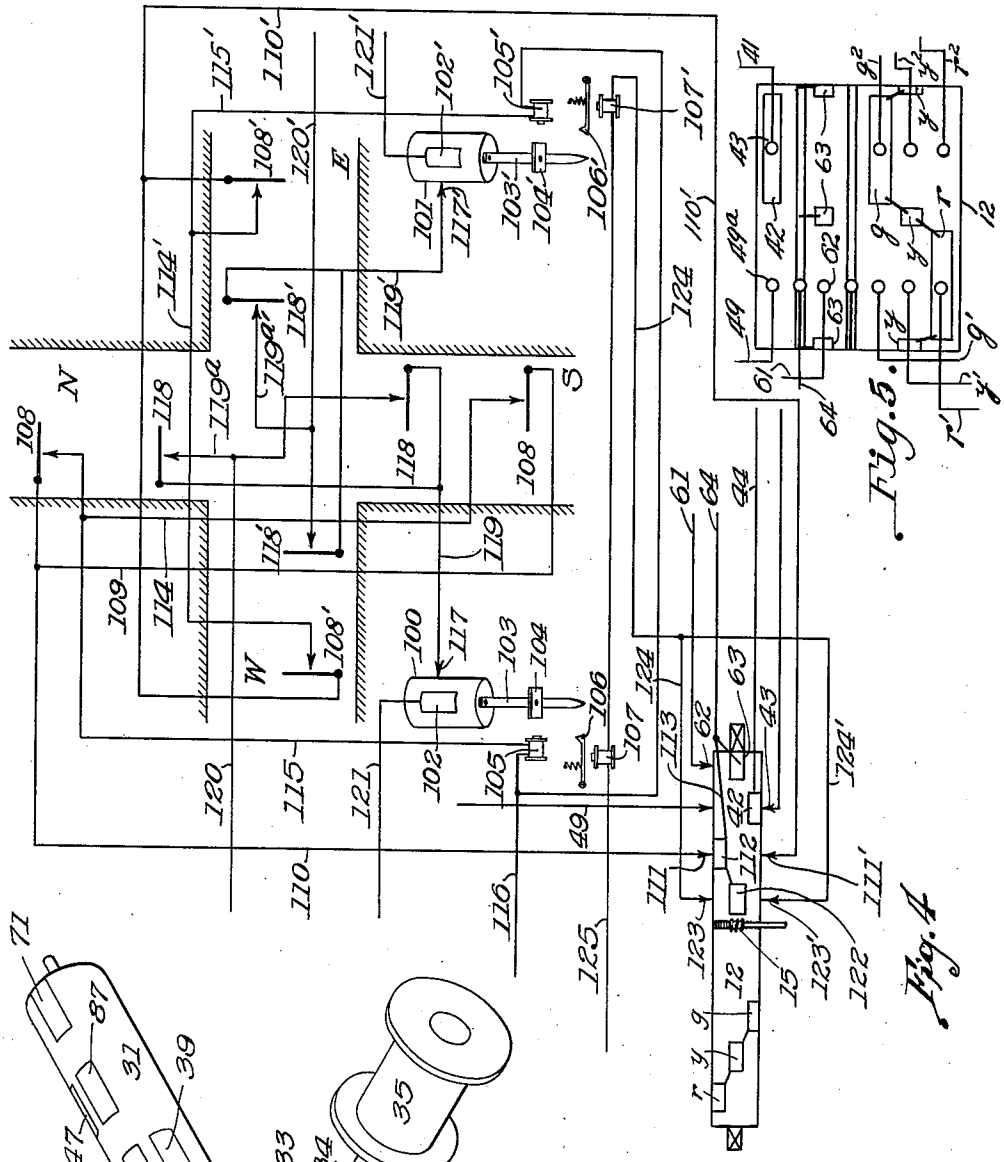

Fig. 4.

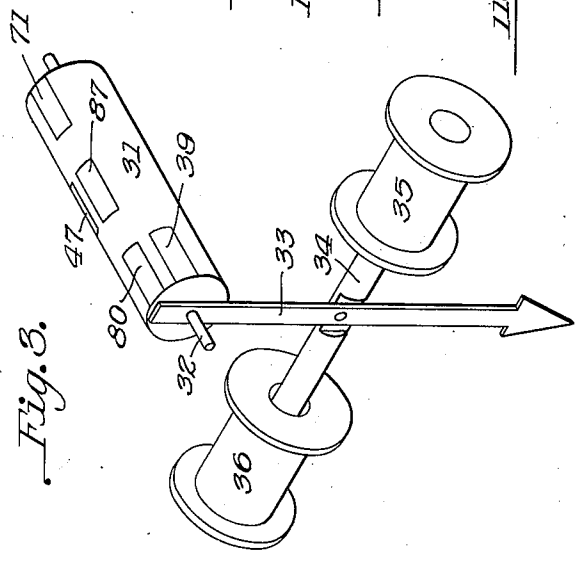

Fig. 3.

Fig. 5.

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UNITED STATES PATENT OFFICE

2,076,396

TRAFFIC SIGNAL

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Application October 4, 1928, Serial No. 310,263

24 Claims. (Cl. 177—337)

This invention relates to signals, and more particularly to traffic signals of the kind generally employed at street intersections for directing and regulating the movement of traffic across the intersection.

Such systems ordinarily are provided with one or more series of lights, each series having three lamps, one of which is red, one yellow, and one green. Frequently there are two such series of lamps, one for controlling north and south traffic, and the other for controlling east and west traffic. In the following specification, I will describe my invention with particular reference to a system wherein there are at least two such series of lamps, but it will be understood that the invention is equally applicable to a system employing one or more series of lamps, as sometimes only a single series of lamps is used with properly arranged colored lenses.

In systems of this kind, as now generally provided, there is a motor-driven switch which operates at uniform speed for periodically closing the circuits to the respective lamps, the arrangement being such that when there is a green light for north and south traffic, there is a red light for east and west traffic, and vice versa. There is ordinarily a time interval when the lights are changing from red to green, in which a yellow lamp is lit for traffic approaching in all directions. With such systems, the switch for controlling the lamps operates at a continuously uniform speed, and at the end of a predetermined period the signals will change. For instance, after they show green for east and west traffic for a given period, they will change at the end of the time interval to show green for north and south traffic and red for east and west traffic. The lights will remain this way until a predetermined time interval has elapsed, whether there be any traffic going in the north and south direction or not. This means that east and west traffic is being held up, although there may be no traffic moving north and south at all. In the same way, north and south traffic may be held up for the full time interval, although there be no east and west traffic at all.

According to the present invention, there is provided a system wherein the switch for controlling the lamps will normally operate at a uniform speed, but wherein there will be a selective operation of the switch at a non-uniform speed where a vehicle is being held up from travel in one direction, and there is no traffic in the other direction. For example, the arrangement is such that if a green light is showing for north and south traffic, and a red light for east and west traffic, and there are no vehicles traveling in a north and south direction, the switch mechanism will be accelerated by the approach of a vehicle in the east or west direction, so as to more quickly flash a green light in the east and west direction.

The arrangement further contemplates a mechanism wherein such acceleration of the movement of the switching means will not take place if a vehicle, in the example above given, should approach in a north or south direction. In other words, as long as there is traffic in each direction, the movement of the switch will be uniform, and acceleration will only take place where traffic is held up in one direction and there is no traffic in the other direction.

The arrangement may be readily understood by reference to the accompanying drawings, which illustrate an embodiment of my invention and in which:

Fig. 1 is a schematic view showing a crossing, crossing light signals, and a circuit for the crossing light signals, including means for selectively imparting a non-uniform movement to the light operating switch;

Fig. 2 is a diagrammatic view showing one form of vehicle-controlled detector which may be used in the system outlined in Fig. 1;

Fig. 3 is a detail perspective view of one of the switches;

Fig. 4 is a diagram showing a modified circuit for the detectors; and

Fig. 5 is a developed view of the light operating switch of Fig. 1.

In Fig. 1 E—W designates an east and west traffic lane, and N—S designates a north and south traffic lane, the two intersecting. Located some distance back from the intersection at each of the four corners, and arranged so as to be operated only by a vehicle approaching one of the corners, are detecting devices **1**, **2**, **3** and **4**. Detector **1** is adapted to be operated by traffic approaching from the east, and **2** by traffic approaching from the west. Detector **3** is arranged to be operated by traffic approaching from the north, and No. 4 is to be operated by traffic approaching from the south.

As most clearly indicated in Fig. 2, each detector comprises a stationary contact member **5** and a movable contact member **6**. The member **6** is adapted to make circuit with the contact **5** by the passage of a vehicle in the range of the detector. For instance, a movable plate **7** may be mounted in the roadway adapted to be pressed down by the passage of a vehicle thereover, and

this plate in moving down will force the circuit-closing member 6 into engagement with the contact 5 to complete a circuit, as hereinafter more fully described.

In place of the detector arrangement shown, any suitable arrangement for making a circuit by the passage of a vehicle may be substituted. As an example, the vehicle might be made to interrupt a beam of light or other radiant energy falling onto a photo-electric cell or other radiant energy responsive means and through response of such cell or other means close a relay to complete the circuit hereinafter described.

Also, a microphone or like sound responsive device can be disposed in position to produce the closing of circuit upon sounding of a horn on the vehicle, as will be understood by those skilled in the art and not considered necessary to illustrate here.

At 9 there is shown a series of three lamps R, Y and G for directing north and south traffic and at 10 is a similar series of lights R', Y' and G' for regulating east and west traffic, the letters R, Y and G standing for red, yellow and green, (conventionally representing "stop", "caution" and "go"), respectively. One side of each of the lamps in each series is connected to one side of a power supply line 11. At 12 is a revolving drum switch having contact plates, *r*, *y* and *g* thereon, the plate *y* having a duplicate part (shown only in Fig. 5) on the diametrically opposite side of the drum. Lamps R, Y and G each have a wire *r'*, *y'* and *g'* terminating in a contact brush adapted to make circuit at the proper time with the contact plates *r*, *y* and *g*, respectively, of the switch 12. Similarly, the lamps R', Y' and G' are connected through wires r^2, y^2 and g^2, respectively, with brushes that are also arranged to contact at the proper time with contact plates *r*, *y* and *g*, respectively. The contact plates *r*, *y* and *g* are connected with the other line 13 of the current supply.

With the arrangement shown in Fig. 1, the circuit is closed at the same time through lamp R, through lamp G', thereby showing "go" for east and west traffic, and showing "stop" for north and south traffic. As the switch 12 revolves, lights Y and Y' will be lighted at the same time, and then upon further rotation of the switch 12, lamps G and R' will be simultaneously lighted. As a result of the arrangement just described, rotation of the switch 12 will effect a cycle of signal displays which, for convenience in description, will be assumed to start with the lighting of the lamps R and G' when the switch 12 is positioned as shown, so that the plate *r* connects with conductor *r'* and the plate *g* connects with conductor g^2. Thereafter, intended rotation of the switch 12 will carry the plates *y*, *y* into connection with conductors *y'*, y^2, thus causing the lighting of lamps Y and Y'; and, at or about the same time, the plates *r* and *g* will be withdrawn from connection with conductor *r'* and g^2, respectively, thereby causing extinguishment of the lamps R and G'. During subsequent rotation of the switch 12, when the lamps Y, Y' have been lighted for desired time, the plates *r* and *g* will be carried into connection with the conductors r^2 and *g'*, respectively, thus causing the lighting of lamps R' and G; and, at or about the same time, the plates *y*, *y* will be withdrawn from connection with the conductors *y'*, y^2 and thereby causing extinguishment of the lamps Y, Y'. Subsequent rotation of the switch 12 will next bring the plates *y*, *y* into connection with conductors *y'*, y^2 and thereby cause relighting of the lamps Y, Y'; and, at or about the same time, the plates *g* and *r* will be withdrawn from connection with the conductors *g'* and r^2, respectively, thereby causing extinguishment of the lamps G and R'. The rotation of the switch 12 will next return the parts to the position first described, where the plates *g* and *r* connect with the conductors g^2 and *r'*, respectively, causing the lighting of the lamps G' and R; and the plates *y*, *y* are withdrawn from connection with the conductors *y'*, y^2 so that the lamps Y, Y' will be extinguished. The switch 12 is continuously rotated in any suitable manner by a motor 14. One side of the motor 14 is connected directly with the current supply line 13 through wire 15. Connected to the other side of the motor is a wire 16. Wire 16 is in series with a resistance 17, and on the other side of the resistance 17 is a contact 18. At 19 is a switch which is normally held against the contact 18 by means of a spring 20, and the switch 19 is connected through wire 21 with the other side of the current supply 11. The motor 14 is, therefore, normally supplied with current which passes through the resistance 17, whereby the motor 14 normally operates at slow speed. Shunted around the resistance 17 is a wire 22 terminating in a contact 23. The switch plate 19 may be moved out of engagement with the contact 18 into engagement with the contact 23. When the switch 19 is in contact with the contact 23, the resistance 17 is cut out of the circuit and the motor will operate at a much higher speed. For actuating the switch 19, I have shown an electro-magnet 24. One side of the electro-magnet 24 is connected to the line 13 through wire 25. Connected to the other side of the electro-magnet 24 is a wire 26. The wire 26 divides into two branches 26^a and 26^b, each of which terminates in a brush $26^{a'}$ and $26^{b'}$ adapted to make contact with a contact plate 27 on a rotating switch member 28. The switch member 28 may be rotated in either direction by a reversible torque motor 29, and the switch 28 will be returned to its normal position, shown in Fig. 1, by a spring 30, upon deenergization of the motor 29.

At 31 there is a movable switch member in the form shown in Fig. 3 comprising a cylinder of insulating material adapted to rotate on its axis indicated by a shaft 32 and having contacts thereon as hereinafter described. This switch member has an arm 33 projecting downwardly from one end thereof. Secured to the member 33 is an armature 34, which enters solenoids 35 and 36 located at opposite sides of the extension 33. The arm may be weighted to cause it to hang in a normal vertical position.

The one side of the solenoid 35 is in a circuit which includes the line wire 11, wire 37, detectors 3 and 4, wire 38, contact plate 39 on the switch 31 and wire 40. The other side of the solenoid 35 is connected through wire 41 with switch contact brush 43 adapted to contact with switch segment 42 also on the switch 12. The circuit is completed from segment 42 through wire 64 to the other side of the power circuit 13.

One side of the solenoid 36 is connected with the current supply line 11 through wire 37, detectors 1 and 2, wire 46, contact plate 47 on the movable switch member 31, and wire 48. The circuit is completed from the other side of the solenoid 36 through wire 49, contact brush 49^a adapted to engage segment 42 upon rotation of the switch 12, and from segment 42 through wire 64 to line wire 13.

At 50 is a ratchet-like latch which is normally held in an operative position by a spring 51, and which can be rocked downwardly to an inoperative position by means of an electro-magnet 52. Opposite the latch 50 is a similar latch 50' having a spring 51' and an actuating magnet 52'. The arrangement is such that when the solenoid 35 is energized to rock the switch 31 on its pivot 32 in one direction, the extension 33 thereof will ride over the catch or latch element 50 to retain the switch in the position to which it is moved until such time as the magnet 52 is energized to release the latch 50 and permit the switch to return to its normal position. The latch 50' operates in a similar manner when the solenoid 36 is energized to move the switch 31 in the opposite direction. The circuit for the electro-magnets 52 and 52' leads from line 11 through wire 53, magnet 52, wire 54, magnet 55 of an electrically-opened switch 56, wire 57, magnet 58 for a switch 59 similar to switch 56, wire 60, magnet coil 52', wire 61 and contact brush 62. Carried on the revolving switch 12 are contact plates 63, 63 (see also Fig. 5) which are adapted to be brought by rotation of the switch 12 into engagement with contact brush 62, thereby completing a circuit through wire 64 back to the other side of the power circuit 13. With this arrangement, it is assured that with movements of the switch 12 for effecting changes in the display of signals from "go" to "stop" and from "stop" to "go" or with other predetermined movements of said switch 12, the latches 50 and 50' will be released. At the same time, the switches 56 and 59 hereinafter described are momentarily opened by the energization of magnets 55 and 58.

One side of the reversible motor 29 connects with one side of the power line 11 through wire 65. For driving the switch 28 in one direction, the motor 29 is connected with the other side of the source of power through a wire 66, electro-magnetically opened switch 67, wire 68, electro-magnetically opened switch 59, wire 69 and contact brush 70. The contact brush 70 is adapted upon operation of the switch 31 by the solenoid 35 to make contact with contact plate 71 on the switch 31. Plate 71 is connected through wire 72 with the power circuit 13. For driving the motor 29 and the switch 28 in the reverse direction, the motor circuit includes wire 73, switch 74, similar to switch 67, wire 75, switch 56, and contact brush 76. Contact brush 76 is adapted to close the circuit through contact plate 71 on switch 31 when the switch 31 is operated by energization of solenoid 36. On the switch 31 is a contact plate 80 which is adapted to contact with contact members 38^a and 80^a when the switch 31 is operated by the solenoid 36. Contact member 80^a is connected through wire 81 to contact plate 82 on the reversible switch 28. At 83 is a brush adapted to make circuit with the plate 82, this brush being connected through a wire 84 with a magnet coil 85 for opening switch 74. From the magnet 85 the circuit is completed through wire 45 to the power line 13. On the switch 31 is a plate 87 similar in purpose to plate 80 adapted to make contact upon movement of the switch toward the left in Fig. 1 with brushes 46^a and 87^a. The contact member 87^a is connected by a wire 88 to a plate 89 on the reversible switch 28. Plate 89 is adapted to contact with brush 90. Leading from the brush 90 is a wire 91 connected to one side of magnet coil 92 for opening the switch 67. From the other side of the magnet 92 is a wire 93 which connects back to line 13 through conductor 45.

With this description of the arrangement of the circuit, the operation may now be traced. Assume traffic is open in the E—W direction, and closed in the N—S direction, due to the position of the switch 12 at a given moment, and a car approaches on the N—S roadway with no traffic on the E—W route. By means of one of the detecting elements 3 or 4, the approaching car causes a current to pass from brush 38^a of switch 31 then in contact with segment 39 to the wire 40, through the solenoid 35, wire 41, contact segment 42 on switch 12 and wire 64 to the other side of the power circuit 13. The energization of the solenoid 35 acts upon armature 34 to rock the switch 31 about the pivot 32, and causing the extension 33 of the switch to be engaged by the latch 50. When the upper part of the switch 31 is thrown to the left, as viewed in Fig. 1 by the operation of the solenoid 35, segment 71 on the switch moves into contact with brush 70, closing the circuit through wire 69, switch 59, wire 68, switch 67, wire 66 to motor 29, and from motor 29, through wire 65 to line 11. When the motor 29 is thus energized it starts to rotate the switch 28, moving contact plate 27 thereon, which contact plate 27 is connected with line 11 through wire 27^a, into contact with brush 26^b'. A circuit is then completed through wire 26^b, wire 26, electro-magnet 24, wire 25, back to the other side 13 of the power circuit. This energization of the electro-magnet 24 moves the switch 19 from contact 18 to contact 23, thereby shunting the resistance 17 of the motor 14, speeding the driving motor up to more rapidly rotate the switch 12. As soon as the switch 12 has rotated far enough to make contact on the intermediate zone *y* of the switch 12, one of the segments 63 on the switch 12 will be in contact with brush 62. A circuit will then be closed through the magnet 52', magnet 58, magnet 55 and magnet 52. The energization of the magnets 52 and 52' releases both the latches 50 and 50', and since the switch 31 is being held over by the latch 50, the switch will be released in the example assumed upon energization of the magnet 52. At the same time, both switches 56 and 59 will be opened by the energization of magnets 55 and 58, thereby breaking the circuit to the reversible motor 29. Upon deenergization of the motor 29 the spring 30 rotates the switch 28 back to neutral position.

It will be evident from the foregoing that in the instance assumed, the car approaching on the closed N—S roadway will thus control the speeding up of the motor 14 to effect a quick change of signals. A car approaching on the E—W roadway at this time will cause none of the mechanism herein described to operate because no circuit can be completed from the solenoid 36 through the wire 49 to the contact plate 42 on the switch 12, the plate 42 being located to close circuit with the green light positions of switch 12. Contacts 63, 63 are coordinated with the yellow light segments *y* of the switch 12.

Assume that shortly after the car approaches in a N—S direction, as just described, another car comes along the E—W roadway where the alternating signal already shows green, and where normally the right of way should be on a time basis. It will be noted that after the motor 29 starts to operate, a time interval elapses before the contact plate 27 makes contact with either

of the brushes 26a' or 26b'. This space, and the speed of the motor can be adjusted as may be desired to secure a suitable time interval before the speeding up of the motor 14 is secured. If this second car, coming in the E—W direction, arrives before this time interval has passed, it operates one of the detectors 1 or 2, causing a current to pass through wire 46, brush 46a, contact plate 87, contact member 87a, wire 88, contact segment 89, brush 90, magnet 92, and back to line 13 through wire 45. The energization of the magnet 92 opens the switch 67 temporarily breaking the current to the motor 29. It will be understood that brush 46a will contact with plate 87 because of the switch 31 at that time being rocked to the left of the position shown in Fig. 1. Upon opening of the switch 67 to deenergize the motor 29, the spring 30 returns the switch 28 to the normal position. As soon as the car on the E—W highway has passed the switch 67 will be closed, and again the motor 29 starts to turn the switch 28. This is repeated until no cars on the E—W highway interrupt the action, or until the switch 12 has moved in the course of its normal operation to a position where it opens all of the circuits previously described. It will be noted that a car coming in the E—W direction does not restore the circuit to normal. In other words, after a detector operates, its operation registers in the actuation of one of the solenoids, 35—36 and the effect thereof, while it may be retarded, is not negatived by a passage of a car in the open direction.

If a car on the E—W highway approaches after the time interval has passed for the segment 27 to close the circuit with brush 26b', it has no effect on the action, due to the fact that the segment 27 having reached a point of contact with brush 26b', the rotation of the switch 28 has carried segment 89 out of contact with brush 90. By this time the switch 12 would have revolved sufficiently to flash red in the E—W direction and green in the N—S direction. With the changing of the lights, the various circuits are restored to normal, as previously described. While the lights show green for the N—S direction, the condition is just the reverse of that described when the light is green for the E—W direction, and the same operation will take place when a car approaches on the E—W roadway, the solenoid 36 in this instance being energized instead of the solenoid 35, so that switch 31 is moved to the right, as viewed in Fig. 1, instead of the left, and this results in the motor 29 revolving to the right instead of to the left, as viewed in Fig. 1.

It will be seen that the invention results in an arrangement wherein the alternating time signal is caused to operate preferentially, except when the interval between cars is not great enough to justify a change in traffic flow for vehicles waiting in an intersecting direction.

When it is desired to have a detecting device which will respond only to vehicles approaching the intersection, and not those leaving it which is desirable when the detecting devices are in such positions as to be likely to be subject to unintended operation by traffic which is moving away from the intersection, the arrangement shown in Fig. 4 may be used in combination with the apparatus hereinbefore described. In this arrangement, there is provided a rotary switch 100 and a similar switch 101. The switch 100 is of the general construction of the switch 31 shown in Fig. 3, but carries a single contact plate 102. The switch is rotated by means of an arm 103 having a weighted armature 104 thereon adapted to be attracted by the electro-magnet 105. At 106 is a latch similar to the latch 50 previously described, adapted to cooperate with the end of the arm 103 for holding the cylinder 100 in the circuit-closing position after it has been moved to this position by the electro-magnet 105. An electro-magnet 107 is provided for releasing the latch 106.

Switch 100 is for the north and south detectors, and switch 101 is for the east and west detectors. Two detectors are placed on each of the intersecting directions at suitable distances apart, not less than the length of an average vehicle. The first detectors 108 in the north and south direction are connected in parallel, one side of each detector being connected to a source of power through wires 109 and 110. The wire 110 terminates in a brush 111 adapted to make circuit with contact plate 112 provided on the rotating switch 12 in addition to the contact plates hereinbefore described. The plate 112 is connected through wire 113 to one side of the power supply circuit. The other sides of the detectors 108 are connected to wire 114 which connects to wire 115 connected to one end of the electro-magnet 105. The other end of the electro-magnet 105 connects to the other side of the power supply circuit through wire 116.

When a vehicle actuates either of the detectors 108, a circuit is closed through the electro-magnet 105 and the switch 100 actuated. The actuation of the switch 100 moves the plate 102 into contact with a brush 117. The second detectors 118 are connected in parallel. One side of each of the detectors 118 is connected to the brush 117 through the wire 119. The other sides of the two detectors 118 are connected by a wire 119a. Connected to wire 119a is a wire 120 corresponding to the wire 38 of Fig. 1. The contact plate 102 is connected to the other side of the source of power, there being a wire 121 leading to the other side of the source of power.

After the switch 100 has been rotated, as previously described, the plate 102 connects the detectors 118 into an operative circuit. With the switch in the position shown in Fig. 4, the inside detectors 118 are not in an operative circuit.

In operation, a car may be assumed to be approaching the intersection from the north, the signal being clear to east-west traffic. It first actuates the detector 108 to rotate the switch 100, thereby connecting the detector 118 in an operative circuit. When the vehicle approaches the second detector 118 it operates this detector and causes the apparatus described in connection with Fig. 1 to function just the same as the detectors 3 or 4 of Fig. 1 cause it to function. The effect of operating the detector 118 is to accelerate the changing of the signal so that the vehicle can proceed. Just as soon as the switch 12 rotates to change the signal, the circuit through plate 112 and contact 111 is broken. At the same time, another contact plate 122 on the switch 12 having one side thereof connected to the source of power through wire 113 makes contact with a brush 123 and closes a circuit including wire 124 through the electro-magnets 107 and 107' back to the source of power through wire 125. This energizing of the electro-magnet 107 releases the latch 106 and allows the switch 100 to return under action of the weighted arm 103 to the position shown in Fig. 4, whereupon the circuit

through wire 119 to the inner detectors 118 is broken. Although the vehicle might operate the detector 118, when leaving the intersection, such detector would not, upon such an occasion, be in an operative circuit. Hence there would be no significant response to such operation of the detector 118. Thus it will be seen that the inner detectors 118 will not function to control the signal unless one of the outer detectors 108 is first operated. A vehicle leaving the intersection will therefore have no effect, the signal being operated entirely by one approaching the intersection. This arrangement can be provided in lieu of having detectors at the side of the road, as indicated in the arrangement shown in Fig. 1, wherein each detector is in one line of traffic only.

The switch 101 is in all respects similar to the switch 100 and the circuits correspond to the circuit for the switch 100. For convenience, the reference numerals applied to the switch 101 are the same as those used on the switch 100, except that the prime mark has been affixed thereto to correspond to reference numerals.

While I have shown a specific embodiment wherein the signal is changed by means of a rotating motor-driven switch, it will be understood that the invention is not confined to the particular arrangement shown, and various other means, such as brakes, clutches, gears or the like may be used for varying the motor speed, instead of the shunting of a resistance, as shown. It will also be understood that the invention is not limited to an arrangement wherein the switch is necessarily operated by an electric motor, but includes any system wherein an alternating traffic light is operated in preference by the vehicles, except where the traffic in each direction is such as to justify the regular periodic changing of the lights.

I claim:

1. The combination with intersecting roadways, of stop-go traffic signals for alternate display at the intersecting roadways, automatic switch means periodically changing the signals at normal regular intervals, a traffic detector in each roadway in advance of the intersection, control means for said automatic switch means operable by response of a selected traffic detector in one roadway for accelerating the operation of said switch means upon the approach of a vehicle to the intersection, selector means operating with said switch means and operative to place said control means for said switch means under successive control of said traffic detectors so that the operation of a traffic detector in the roadway having the stop signal at a given instant will tend to accelerate the operation of the switch means, and means controlled by non-selected traffic detectors for preventing the operation of said control means and cooperating with said control means so that acceleration of the traffic-controlled means by traffic on the roadway having at a given instant a "stop" signal will not accelerate the operation of the switch means if the traffic detector in the other roadway is operated before the signal is changed.

2. The combination with a road intersection, of an alternating stop and go traffic signal and switch means operative in recurrent cycles having a normal period to periodically change the signal at normally regular intervals, said signal being adapted to give a stop indication along one of the intersecting roadways at the same time that it indicates "go" along the other of the intersecting roadways, vehicle-controlled means for temporarily shortening the normal operating period of the switch means, and means for effecting restoration of the normal period of the operation of said switch means with each cycle thereof.

3. The combination with a road intersection, of a stop and go traffic signal and switch means having a normal operating period for changing the signal at normally regular intervals, said signal being adapted to give a stop indication along one of the intersecting roadways at the same time that it gives a "go" indication along the other of the intersecting roadways, vehicle-controlled means temporarily shortening the normal operating period of the switch means, and other traffic-controlled means preventing the shortening of the normal operating period of the switch means, said arrangement being characterized by the provision of a means whereby only traffic which approaches the signal in the direction in which a "stop" is indicated can shorten the normal operating period, and further characterized by the provision of means wherein only a vehicle approaching in the direction in which the signal indicates "go" can prevent such shortening of the normal operating period, said arrangement being further characterized by the provision of means for restoring the signal to normal operation with each change of the signal.

4. A traffic signaling system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means normally cyclically presenting said right-of-way indications successively to the several traffic lanes, a vehicle controlled means for temporarily accelerating the cycle of the signal control means, and other vehicle controlled means for retarding the function of said first vehicle controlled means.

5. In a traffic signaling system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means normally cyclically presenting said right-of-way indications successively to the several traffic lanes, a vehicle responsive detector in each lane in advance of the intersection, means governed by the operation of the detector in one lane for temporarily accelerating the cycle of the switch signal control means, means governed by and responsive to the frequency of operation of the detector in another lane for retarding the accelerating function of said accelerating means, and means operating with the signal control means for alternately connecting the detector of each lane for control of the accelerating means and then of the retarding means.

6. In a traffic signaling system for interfering roadways having means presenting right-of-way signal indications, signal control means normally cyclically presenting said right-of-way indications successively to the several roadways, traffic detectors located in the roadways in advance of the intersection, means governed by said detectors and operable for temporarily accelerating the cycle of the signal control means, means governed by said detectors and operable for temporarily retarding the operation of said accelerating means, and means for alternately and separately connecting said detectors of the several roadways for control of said accelerating means and said retarding means.

7. In a system for controlling traffic at highway intersections, a signal for approaching vehicles on each highway including clear and stop indications, constantly operating timing means operative regardless of traffic conditions for controlling said signals whereby said timing means oper-

ates through successive cycles during which the signal for one highway changes from the stop indication to clear and then back to stop while the signal for the other highway changes from the clear indication to stop and then back to clear, and means influenced by the approach of a vehicle on one highway for automatically reducing the time of operation of said timing means for reducing the period of operation of the clear indication for the other highway.

8. In a system for controlling traffic at highway intersections, a signal for approaching vehicles on each highway including clear and stop indications, motor driven timer means operative regardless of traffic conditions for controlling said signals whereby said timing means operates through successive cycles during which the signal for one highway changes from the stop indication to clear and then back to stop while the signal for the other highway changes from the clear indication to stop and then back to clear, and means influenced by the approach of a vehicle in one highway when the clear indication is in operation for the other highway for accelerating the speed of operation of the motor of said timer means.

9. In a system for controlling traffic at highway intersections, a signal for approaching vehicles on each highway including clear and stop indications, timing means for controlling said signals whereby said timing means operates through successive cycles during which the signal for one highway changes from the stop indication to clear and then back to stop while the signal for the other highway changes from the clear indication to stop and then back to clear, a shaft for operating said timing means, a motor constantly energized for rotating said shaft, and means influenced by the approach of a vehicle on one highway for increasing the speed of rotation of the motor while the clear indication is in operation on the other highway.

10. In a system for controlling highway traffic at highway intersections, a signal for approaching vehicles on each highway including right-of-way and stop indications, timing means for controlling said indications to transfer the right of way back and forth between said highways, a shaft for operating said timing means, a motor constantly energized for rotating said shaft, electrical means normally arranged in the circuit of said motor for retarding the speed thereof when the right-of-way indication is in operation on one highway, and means rendered operative by the approach of a vehicle on the other highway for rendering said electrical means inoperative whereby the speed of said motor will be accelerated when the right-of-way indication is in operation for the first named highway.

11. In traffic signal system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means including a continuously moving signal control device operative at a normal rate to cyclically present said right-of-way indications successively to the several traffic lanes, a traffic responsive device associated with one of said lanes, and control means operative by response of said traffic responsive device to increase the rate of movement of said continuously moving signal control device.

12. In a traffic signal system as defined in claim 11, said signal control means including a continuously rotating motor for continuously moving said signal control device and wherein said control means is operable by response of said traffic responsive device for temporarily increasing the speed of said motor to increase the rate of movement of said signal control device.

13. In a traffic signaling system as defined in claim 11, the combination therewith of a second traffic responsive device in a second traffic lane, and control means operable by response of said second traffic responsive device to render inoperative said control means responsive to said first traffic responsive device.

14. In a traffic signal system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means including a continuously moving signal control device operative at a normal rate to cyclically present said right-of-way indications successively to the several traffic lanes, a traffic responsive device associated with one of said lanes, and control means operative by response of said traffic responsive device for temporarily accelerating the rate of movement of said signal control means.

15. In a traffic signaling system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means normally operable to cyclically present said right-of-way indications successively to the several traffic lanes, a traffic responsive device associated with one of said lanes, acceleration control means controlled and operable by response of a traffic responsive device associated with one lane to accelerate the operation of said signal control means to shorten the current cycle, and means controlled and operable by sufficiently frequent response of a traffic responsive device in the lane having the right-of-way for temporarily interrupting the operability of said acceleration control means.

16. In a traffic signaling system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means cyclically presenting said right-of-way indications successively to the several traffic lanes and including signal control mechanism and motor means operating said signal control mechanism, traffic responsive devices associated with said several lanes, motor control means operable for varying the speed of operation of said motor means to vary the cycle of signal presentation, switch means operable governed by the response of a traffic responsive device associated with a lane not having the right-of-way for controlling the operation of said motor control means, switch means operating with said signal control means for successively placing said traffic responsive devices in control of said first named switch means, and means operable governed by response of a traffic responsive device in the lane having the right-of-way for temporarily interrupting the operability of the motor control means during its operation.

17. In a traffic signaling system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means including a constantly driven motor cyclically presenting said right-of-way indications successively to the several traffic lanes, traffic responsive devices in the several lanes, control means operable governed by response of said devices to vary the speed of said motor, and means operable governed by response of a second traffic responsive device in one lane within a predetermined time period following the response of a first traffic responsive device in another lane for preventing the operation of said control means.

18. In a traffic signaling system for interfering traffic lanes having means presenting right-of-way signal indications, signal control means

cyclically presenting said right-of-way indications successively to the several traffic lanes, a traffic responsive device associated with each of said traffic lanes, control means operable by response of said traffic responsive devices to hasten the cycle of said signal control means when there is approaching traffic on a lane that does not have the right-of-way and insufficient traffic on the lane that has the right-of-way, means also operable by response of said traffic control devices tending to interrupt the operation of said control means, when there is sufficient traffic on the lane that has the right-of-way, and means alternately placing said traffic responsive devices in control of said cycle hastening control means and said interrupting means.

19. In a traffic signaling system for interfering traffic lanes having means presenting stop-go signals, signal control means including a constantly driven motor cyclically presenting said stop-go signals successively to the several traffic lanes, traffic responsive devices associated with said means, and control means operable by response of a traffic responsive device, in a stop lane only, to increase the speed of said motor, and means operable by response of a traffic responsive device on a go lane for hindering the operation of said acceleration control means.

20. In a traffic signaling system for interfering traffic lanes having means presenting right-of-way signal indications, switch means for effecting presentation of said right-of-way indications successively to the several traffic lanes, motor means which operates said switch means at a normal rate, means operable to modify the rate of operation of said motor means to change the rate of operation of said switch means, traffic responsive devices in the several lanes, means operable by response of a selected traffic responsive device to effect the operation of said rate modifying means, means operative synchronously with said switch means to select a particular traffic responsive means to effect the control of said rate modifying means, means operative to hinder the operation of said rate modifying means, and means operable by response of a selected one of said traffic responsive devices for rendering said hindering means responsive to the operation of another of said traffic responsive devices.

21. In a traffic signal system for interfering traffic lanes having means presenting right-of-way signal indications, a signal device, when operative, to display the signals progressively to the several lanes, a timing device in control of said signal device and constantly operating the same to determine the normal period of signal presentation on any lane and having means, when conditioned, providing signal presentations of shorter durations than such periods, traffic responsive means associated with certain of said lanes, means operative by response of a traffic responsive means associated with a lane that does not have a right-of-way signal displayed thereon for conditioning said timing means for a shorter than normal period duration of signal presentation on the lane on which the signal is set at the time of response of said traffic responsive means, and means responsive to the change of signal presentation to restore said timing means to the normal period duration of signal presentation.

22. In a traffic signal system for interfering traffic lanes having means presenting right-of-way signal indications, a signal device, when operative, to display the signals progressively to the several lanes, a timing device in control of said signal device and constantly operating the same to determine the normal period of signal presentation on any lane and having means when conditioned, providing signal presentations of shorter durations than such periods, traffic responsive means associated with certain of said lanes, means operative by response of a traffic responsive means associated with a lane that does not have a right-of-way signal displayed thereon for conditioning said timing means for a shorter than normal period of signal presentation on the lane on which the signal is set at the time of response of said traffic responsive means, means operable by response to traffic on a lane having a right-of-way signal displayed thereon for preventing the shortening of the normal period of signal display, and means responsive to the change of signal presentation to restore said timing means to the normal period of signal presentation.

23. In a traffic signaling system for interfering traffic lanes, means for concurrently displaying a "go" signal to one lane and a "stop" signal to another lane, means for operating said signal display, means to effect periodic display of said signals to the several lanes in an irrevertible progressive manner under all conditions of traffic on said lanes, means operable in response to traffic on a lane having the "stop" signal displayed thereon for hastening the progression, and means operable in response to traffic on a lane having the "go" signal displayed thereon for preventing the hastening of the progression.

24. The combination with a road intersection, of an alternating "stop" and "go" traffic signal and switch means operative in recurrent cycles having a normal period to periodically change the signal at normally regular intervals, said signal being adapted to give a "stop" indication along one of the intersecting roadways at the same time that it indicates "go" along the other of the intersecting roadways, vehicle-controlled means for temporarily shortening the normal operating period of the switch means, and means for effecting restoration of the normal period of the operation of said switch means with each change of said signal.

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