ABSTRACT: There is disclosed an apparatus and method for controlling a traffic signal means for alternately allocating "go" and "stop" signals to at least a first and second conflicting traffic lane wherein the first traffic lane has vehicle detection means associated therewith for detecting vehicles in the first phase, the second traffic lane has at least a first and second detection means associated therewith for detecting vehicles in the second traffic lane, a first circuit means coupled to the vehicle detection means for developing a signal upon detection of a vehicle by the vehicle detection means; and, timing means means coupled to the first circuit means for deactivating the first detection means of the second traffic lane at a predetermined period of time after a signal is developed by the first circuit means in response to the detection of a vehicle by the vehicle detection means.
FIG. 2

INVENTORS.
FRANK W. HILL
WILLIAM W. HUPPERT &
BY JAMES J. VANDEMORE
Meyer, Tilberry & Body
ATTORNEYS
GAP REDUCTION THROUGH USE OF DETECTORS

This application pertains to the art of traffic control and, more particularly, to improved gap reduction circuitry to be employed with a traffic controller.

The invention is particularly applicable to a two or more phase, full-actuated traffic controller and will be described with particular reference thereto; although, it is to be appreciated that the invention may be used in conjunction with various types of traffic controllers including, for example, a two-phase, semi-actuated traffic controller.

Traffic controllers having time-waiting, gap reduction circuits are known in the art of traffic control. One purpose of such a circuit is to effect a change in right-of-way signals allocated to two intersecting traffic lanes as a function of the elapsed time a vehicle is waiting (known as “time-waiting period”) in the lane which is denied right-of-way movement, as well as the actual time gap between successive vehicles in the phase to which right-of-way is allocated. Generally, when the actual time gap exceeds a predetermined or referenced time gap, and/or after a predetermined time-waiting period has elapsed, a change in allocation of right-of-way is initiated. Provisions may be made for last car passage time to permit the last vehicle in the phase having right-of-way to reach the intersection before that phase is denied right-of-way movement.

Various aspects of such time-waiting, gap reduction circuits are disclosed in U.S. Pat. application, Ser. No. 586,127, entitled Traffic Controller Having Improved Time-Waiting-Gap Reduction Circuit, filed Oct. 12, 1966, now U.S. Pat. No. 3,466,599, assigned to the same assignee as the present invention. That patent application is directed toward a time-waiting, gap reduction circuit which includes a passage time having means for developing a first signal which progressively varies in a linear manner with elapsed time between successive vehicle detections, and a time-waiting timer having means for developing a second signal which progressively varies in a linear manner with elapsed time during the period that a vehicle is waiting in the lane to which a “stop” signal is displayed, and means for comparing the first and second signals and developing a “go” terminating signal when the first and second signals attain a predetermined relationship with respect to each other.

The present invention is directed toward circuitry for providing gap reduction measurements which may be utilized with relatively noncomplex, conventional intersection controllers. In addition, the gap reduction circuitry may be utilized with such a conventional controller without necessitating changes to the internal circuitry of the controller, thereby providing gap reduction circuitry which is compatible with existing traffic controllers.

The present invention contemplates new and improved gap reduction circuitry which overcomes all of the above-referred-to problems, and others, and provides circuitry which is simple in construction and installation.

The present invention contemplates gap reduction circuitry to be utilized with a traffic controller for controlling allocation of “go” and “stop” signals to at least two intersecting traffic lanes wherein the first traffic lane includes vehicle detection means associated therewith for detecting vehicles in the first lane, and the second traffic lane includes at least a first and second detection means associated therewith for detecting vehicles in the second traffic lane. A first circuit means is coupled to the vehicle detection means of the first traffic lane for developing a signal upon actuation of the vehicle detection means, and second detection means is coupled to the first detection means for deactivating the first detection means of the second traffic lane at a predetermined period of time after a signal is developed by the first circuit means upon actuation of the vehicle detection means of the first traffic lane.

In accordance with a more limited aspect of the present invention, the gap reduction circuitry includes circuit means coupled to the second detection means for deactivating the second detection means at a second predetermined period of time after a signal is provided by the first circuit means upon actuation of the vehicle detection means of the first traffic lane.

Still further in accordance with the invention, there is provided a method of alternately allocating “go” and “stop” signals to at least a first and second lane by utilizing vehicle detection means associated with the first traffic lane and second detection means associated with the second traffic lane, first circuit means coupled to the vehicle detection means. In accordance with the method, the steps include: activating the traffic signal means to display a stop signal to one of the traffic lanes and a go signal to the other one of the traffic lanes; activating the first, second and vehicle detection means; detecting traffic in one of the traffic lanes with the vehicle detection means; developing a signal with the first circuit means in response to a detection of traffic by the vehicle detection means; detecting traffic in the other of the traffic lanes with the first and second detection means; developing a control signal with the first and second detection means in response to the detection of a vehicle by the first and second detection means, respectively; applying said control signals developed by the first and second detection means to a traffic signal means to thereby allocate the go and stop signals to the traffic lanes; deactivating the first detection means at a predetermined period of time after a signal is developed by the first circuit means so that at a predetermined period of time after a signal is developed by the first circuit means the first detection means becomes ineffective in controlling the operation of a traffic signal means in allocating go and stop signals to the traffic lanes.

The primary object of the present invention is to provide an improved gap reduction circuit, wherein gap reduction is obtained by deactivating at least one of a plurality of traffic detection means associated with a first traffic lane at a predetermined period of time after a vehicle is detected in a second traffic lane.

Another object of the present invention is to provide a gap reduction circuit which may be utilized with conventional traffic controllers.

Another object of the present invention is to provide a gap reduction circuit which may be utilized with conventional traffic controllers without necessitating changes in the internal circuitry of the traffic controller.

A still further object of the present invention is to provide an improved gap reduction circuit wherein linear gap reduction measurements may be obtained.

In accordance with a still further object of the present invention, there is provided a gap reduction circuit wherein exponential gap reduction measurements may be obtained.

Another object of the present invention is to provide a gap reduction circuit in which the vehicle detection means may be positioned with respect to each other to provide any desired gap reduction measurements.

These and other objects and advantages of the invention will become apparent from the following description of the preferred embodiment of the invention as read in connection with the accompanying drawings in which:

FIG. 1 is a block diagram of a traffic controller incorporating the preferred embodiment of the present invention;

FIG. 2 is a schematic circuit, block diagram of the preferred embodiment of the invention as illustrated in FIG. 1;

FIG. 3 is a block diagram of a second embodiment of the present invention;

FIG. 4 is a block diagram of a third embodiment of the invention; and,

FIGS. 5, 5A, and S5 are charts illustrating various aspects of the operation of the invention.

Referring now to the drawings wherein the showings are for purposes of illustrating the preferred embodiments of the present invention, and not for purposes of limiting same, FIG. 1 illustrates a typical intersection of two traffic lanes, i.e., lanes for which traffic signals are generated in corresponding phase A and phase B of a traffic control system. Vehicle de-
ectors are provided at two approaches in the intersection, to wit, detectors L-A, L-1, L-2, and L-3 are located along a line to the approach for phase A, and detector L-B is located in the approach for phase B. Preferably, the other two approaches to the intersection would be provided with a corresponding arrangement of traffic detectors; however, detectors are illustrated in only two approaches to traffic simplify the description. Detectors L-A, L-1, L-2, L-3, and L-B may take the form of loop detectors, which are well known in the art of traffic control, and generally comprise a closed wire loop embedded in a roadway, with the loop configuration defining an area under surveillance by the detector.

Vehicle detectors L-A, L-1, L-2, L-3 and L-B are respectively connected to loop detection circuits LD-A, LD-1, LD-2, LD-3, and LD-B. These loop detection circuits may take the form of an oscillator circuit for applying a reference frequency signal to the loop detector, and when a vehicle enters the zone of influence of the loop, the inherent metallic mass of the vehicle causes a decrease in inductive reactance of the loop thereby actuating a relay coupled to the output of the oscillator circuit. Preferably, loop detector circuits LD-A, LD-1, LD-2, LD-3, and LD-B take the form of the object detection circuits disclosed in U.S. Pat. application, Ser. No. 613,257, entitled Object Detection System, filed Feb. 1, 1967, now U.S. Pat. No. 3,493,954, and assigned to the same assignee as the present invention, or similar object detectors, such as ultrasonic detectors; however, it is contemplated that various detector arrangements could be employed, including spot detectors, such as magnetic or treading detectors. It is also contemplated that the detectors L-A and L-1 through L-3, respectively, be situated with respect to each other such that an automobile may pass between the distances of the zones of influence of adjacent detectors, provided that the length of any automobile to be detected. Also, spot detectors could be substituted for the preferred presence detectors L-A and L-1 through L-3, if conventional memory circuits were employed either external or internal of traffic controller TC in order to store signals indicating the short-duration pulses developed by the spot detectors. With reference to FIG. 2, it is also contemplated that presence detector L-B could be replaced by a spot detector if a memory circuit is included to cause transistor L-2 to remain reverse biased, once reverse biased by detector L-B and detection circuit LD-B, until reset by other circuitry, whenever a right-of-way display is returned to phase A.

The detection circuit may generally be represented by an oscillator-amplifier circuit 10 having its output connected through the coil of a normally open relay 12. Relay 12 of loop detection circuit LD-B includes a pair of normally open contacts 14 and 16 which are connected between the input terminal 18 of a ramp generator RG, and ground. Also connected to input terminal 18 of ramp generator RG is the phase B detector terminal 20 of a two-phase, full-actuated traffic controller TC. Preferably, the traffic controller TC includes a maximum timer in the phase A detection circuit for transferring the right-of-way display from phase A to phase B at a predetermined period of time after traffic has been detected in phase B, irrespective of traffic detections in phase A. It is contemplated, however, that a timing circuit could be coupled to loop detection circuit LD-A to deactivate this circuit in order to provide this maximum time function, as discussed hereinafter. As may be apparent, a plurality of detectors and associate circuitry, as illustrated in phase A, could be employed in phase B if similar traffic control is desired in phase B. In the preferred embodiment, traffic controller TC also includes a maximum timer in the phase B detection circuitry in order to return the right-of-way display to phase A at a predetermined maximum period of time after traffic has been detected in phase B, irrespective of traffic detection in phase B.

Input terminal 18 of ramp generator RG is connected through a resistor 22 to the base of a NPN transistor 24, having its collector connected through a resistor 26 to a B+ voltage supply source. The collector of transistor 24 is also connected through a capacitor 28 to ground, and the emitter of this transistor is connected directly to ground. Also, the collector of transistor 24 provides the output terminal 30 of ramp generator RG which is connected to the input terminals 32, 34 and 36, of differential amplifiers DA-3, DA-2, and DA-1, respectively.

Briefly, differential amplifiers DA-1, DA-2, and DA-3 are provided with reference voltage signals from level selectors LS-1, LS-2 and LS-3, respectively. The signals developed by differential amplifiers DA-1, DA-2, and DA-3 are applied to an expander gates G1, G2 and G3 respectively. In addition, the output signals of gates G1, G2 and G3 are applied through the normally open relay contacts of loop detection circuits LD-1, LD-2 and LD-3, respectively, to the phase A detector terminal 38 of traffic controller TC.

Preferably, differential amplifiers DA-1, DA-2 and DA-3 are similar in design and operation, therefore, only differential amplifier DA-3 will be described in detail. Input terminal 32 of differential amplifier DA-3 is connected to the base of an NPN transistor 40 having its emitter connected in common with the emitter of NPN transistor 42 through a resistor 43 to ground. The collectors of transistors 40 and 42 are respectively connected through a pair of resistors 44 and 46 to the B+ voltage supply source, and the collector of transistor 40 also provides an output terminal 48 of differential amplifier DA-3.

The base of transistor 42 is connected to the movable arm of a potentiometer 50 in level-selector circuit LD-3. Level-selector circuits LD-1, LS-2 and LS-3 preferably take the same form and are generally comprised of potentiometer 50 having one of the stationary contacts connected to the B+ voltage supply source, and the other stationary contact of potentiometer 50 is connected directly to ground.

The output terminal 48 of differential amplifier DA-3 is connected to an input terminal 52 of expander gate G3. Expander gate G3 takes the same form as gates G1 and G2, and generally comprises a resistor 54 connected between the input terminal 52 and the base of an NPN transistor 56, having its emitter connected directly to ground. The collector of transistor 56 provides the output terminal 58 of gate G3 which is coupled to loop detection circuit LD-3.

Loop detection circuits LD-A, LD-1, LD-2, and LD-3, preferably take the same form as loop detection circuit LD-B; therefore, similar elements are designated with like reference numerals. Normally open relay contacts 14 and 16 of relay 12 in loop detection circuit LD-3 are connected in series between an output terminal 58 of gate G3 and phase A detector terminal 38. Loop detection circuit LD-A is connected into the circuit similar to detector LD-3; however, relay contact 14 of detector circuit LD-A is connected directly to ground.

OPERATION

Having now described the circuit arrangement of the preferred embodiment, reference is now made to FIGS. 1, 2, and 5, which graphically illustrated a preferred procedure of practicing a method, in accordance with the invention, for controlling traffic flow through the intersection illustrated in FIG. 1.

Assuming the initial condition is that a vehicle in lane A has the right-of-way, when a vehicle in lane B is detected, the loop detector circuit LD-B applies a ground potential signal through contacts 14, 16 of relay 12 to full-actuated traffic controller TC. In the event no vehicles are located in phase A, a change in right-of-way will occur soon as a yellow signal is displayed for phase A. If, however, vehicles are located in the lane of phase A, the right-of-way will transfer as soon as none of the detectors L-A through L-3 are detecting a vehicle.
In addition to actuating the full-actuated traffic controller TC, the output signal developed by loop detector circuit LD-B applies a reverse bias signal to transistor 24 of ramp generator RG. With transistor 24 in a reverse-biased condition, capacitor 28 commences charging thereby causing an increasing voltage signal to be generated at output terminal 30 of ramp generator RG. This increasing voltage signal is applied to differential amplifiers DA-1, DA-2, and DA-3. As this voltage becomes greater than the level set by level selectors LS-1, LS-2, and LS-3, loop detector circuits LD-3, and LD-2, and LD-1 become deactivated, leaving only loop detector LD-A in operation.

With reference to FIG. 2, when loop detector circuit LD-B detects a vehicle, the output signal is amplified by amplifier 10 and is applied to the coil of normally open relay 12 thereby energizing this relay. Upon activation of relay 12, the normally deenergized pull-up transistor T1 is turned on. This pull-up transistor with its associated circuitry is designed to supply a voltage signal to the base of transistor 56 which provides a ground potential signal to the base of transistor 56 in the normal operating mode. As transistor 56 becomes excited, it provides the drive signal to the base of transistor 57 which thereby energizes relay 12 thereby applying a ground potential signal to the output circuit.

Similarly, when the signal developed by ramp generator RG attains a second and third predetermined level, differential amplifier DA-1 is excited to thereby deactivate loop detection circuits LD-3 and LD-2.

Also, it is contemplated that loop detector circuit LD-A may, in a manner similar to detector circuits LD-1 through LD-3, be connected to a differential amplifier and a level-select circuit, as well as ramp generator RG, and this circuit arrangement would serve as a maximum timeout circuit for lane A, if such is desired.

Briefly, the method in accordance with the invention for controlling the operation of a traffic signal means TC for allocating "go" and "stop" signals to vehicles in at least a first and second traffic lanes utilizes vehicle detection means L-B associated with the first traffic phase for detecting vehicles in the first traffic lane; first and second detection means L-1, L-A, associated with the second phase for detecting vehicles in the second traffic lane; first circuit means L-D-B coupled to the vehicle detection means L-B for developing a signal in response to the detection of traffic by the vehicle detection means L-B; second and third circuit means L-1, L-D-A coupled to the first and second detection means L-1, L-A. The steps in accordance with the method include: energizing the traffic signal means S, under control of traffic controller TC, to activate signals for vehicles in conventional traffic lanes; generating a signal from a ramp generator RG and a go signal to vehicles in the other one of said traffic lanes; activating the first, second and third circuit means L-D-B, L-1, L-D-A; detecting traffic in one of the traffic lanes with the vehicle detection means L-B; developing a signal with the first circuit means L-D-B in response to a detection of traffic by the vehicle detection means L-B; detecting traffic in the other of the traffic lanes with the first and second detection means L-1, L-A; developing a control signal with the second and third circuit means L-1, L-D-A in response to the detection of a vehicle by the first or said second detection means L-1, L-A, respectively; applying a control signal developed by the second and third circuit means L-1, L-D-A to a traffic signal means to thereby allocate the go and stop signals to the traffic lanes.

Preferably, the signal generator takes the form of a voltage signal which increases in value exponentially with respect to time; however, it is contemplated that a ramp generator having an output signal which increases linearly with respect to time could be employed, as will be discussed hereinafter.

In the preferred embodiment, loops L-A, L-1, L-2, and L-3 are linearly spaced along a line which is generally parallel to the axis of lane A; however, various spacing configurations are contemplated within the scope of this invention. Thus, with linear spacing between the detector loops, the total gap distance within the zone of influence of the energized loops decreases linearly from gap H1 to gap H4 with the passage of time, assuming the voltage developed across capacitors 28 increases linearly with time. If, however, the detector loops are exponentially spaced, the total zone of influence will decrease exponentially from gap H1 to gap H4 with respect to time assuming the voltage developed across capacitors 28 increases exponentially with time. With exponentially spaced loops, the total average gap area decreases approximately linearly with respect to time, as illustrated in FIG. 5B. In other words, with detector loops L-A, L-1, L-2, and L-3 spaced exponentially, the total average gap area will decrease linearly even though the voltage developed across capacitors 28 increases exponentially with time. Various detector loop con-
each having a common loop side, and being connected to a scanner circuit S. Also, a detector loop LD-B for detecting vehicles in lane B is connected through a loop detection circuit LD-B, to scanner circuit S and lane B detector terminal 70 of traffic controller TC. The common side of detector loops L-1, L-1, L-2, and L-3 is connected directly to bridge and amplifier circuit BA-C, which is turned on through a presence tuning circuit P and threshold detector circuit TD to phase A detector terminal 72 of traffic controller TC. In addition, loop tuning circuit L is coupled between scanner circuit S, and bridge amplifier circuit BA-C. Scanner circuit S, bridge and amplifier circuit BA-C, and threshold detector TD, are preferably similar in design and operation to the corresponding circuits illustrated in FIG. 3.

Loop tuning circuit L, and presence tuning circuit P, are preferably of the type disclosed in U.S. Pat. application, Ser. No. 613,257, now U.S. Pat. No. 3,493,954 entitled Object Detection System, filed Feb. 1, 1967, and assigned to the same assignee as the present invention. The operation of the gap reduction circuit illustrated in FIG. 4 is similar to the operation of the circuit illustrated in FIG. 3; however, since the size of the detector loop connected to bridge and amplifier circuit BA-C varies from the relatively small-size loop L-A to the large-size loop L-3, it is necessary that a loop tuning circuit L be provided to rebalance the bridge circuit of bridge and amplifier circuit BA-C, each time the size of the detector loop changes. For example, if the bridge circuit of bridge and amplifier circuit BA-C is tuned to the inductance exhibited by loop L-A, when loop L-1 is connected to bridge and amplifier circuit BA-C, the bridge circuit must be rebalanced to compensate for the additional inductance exhibited by loop L-1.

Presence tuning circuit P, being somewhat similar to the presence tuning circuit disclosed in the above-mentioned patent application, provides a tuning circuit which is coupled to the bridge circuit of bridge and amplifier circuit BA-C to thereby rebalance the bridge circuit, so as to tune out a vehicle which may be stalled in the detection zone, and thereafter continue to be responsive to the presence of additional vehicles in the detection zone.

Thus, with the circuit configuration as illustrated in FIG. 4, gap reduction may be accomplished with a plurality of detector loops each having a common side. In addition, with this circuit configuration, a single bridge and amplifier circuit BA-C, presence tuning circuit P, and detector circuit TD, may be employed to provide a signal in response to a vehicle detection by a plurality of detector loops.

The invention has been described in connection with a particular preferred embodiment, and two variations thereof, but is not to be limited to these embodiments. Various modifications may be made without departing from the scope and spirit of the present invention as defined by the appended claims.

Having thus described our invention, we claim:

1. In a traffic control system for alternately allocating go and stop signals to at least a first and second conflicting traffic lane, said first traffic lane having vehicle detection means associated therewith for detecting vehicles in said first traffic lane; said second traffic lane having at least a first and second detections means associated therewith for, when activated, detecting vehicles in said second traffic lane, the combination with said vehicle detection means comprising:

first circuit means coupled to said vehicle detection means for developing a signal upon detection of a vehicle by said vehicle detection means;

means for activating said first and second detection means;

second circuit means coupled to said first and second detection means for developing a control signal upon detection of a vehicle by either of said first or second detection means; and,

timing circuit means coupled to said first detection means for deactivating said first detection means at the end of a predetermined period of time after a said signal is developed by said first circuit means.

GAP REDUCTION CIRCUIT HAVING A COMMON LOOP CONFIGURATION

Reference is now made to FIG. 4 which illustrates a third embodiment of the present invention, and is generally comprised of a plurality of detector loops L-A, L-1, L-2, and L-3.
2. The combination set forth in claim 1 wherein said first and second detection means are generally situated along a line extending substantially parallel to the axis of said second traffic lane.

3. The combination set forth in claim 1 including circuit means for maintaining said second detection means in an activated condition for a said predetermined period of time after a signal is provided by said first circuit means.

4. The combination set forth in claim 3 wherein the space between said first and second detection means is less than 12 feet so that when said first and second detection means are activated, a continuous control signal is developed by said second circuit means upon passage of traffic from said first to said second detection means.

5. The combination set forth in claim 3 including a third detection means associated with said second traffic lane for detecting vehicles in said second lane.

6. The combination set forth in claim 5 wherein said first, second, and third detection means are spaced substantially linearly with respect to each other so that a zone of influence defined by the activated detection means reduces linearly upon deactivation of said second and third detection means respectively.

7. The combination set forth in claim 5 wherein said first, second, and third detection means are generally located along a line extending substantially parallel with the axis of said second traffic lane.

8. The combination set forth in claim 5 wherein said first, second, and third detection means are generally located along a line extending substantially parallel with the axis of said second traffic lane.

9. The combination set forth in claim 5 including circuit means coupled to said third detection means for deactivating said third detection means at a third predetermined period of time after a signal is provided by said first circuit means upon actuation of said vehicle detection means of said first traffic lane.

10. The combination set forth in claim 1 wherein said timing circuit means is coupled to said first and second detection means for deenergizing said first and said second detection means at a first and second predetermined period of time, respectively, after a said signal is provided by said first circuit means.

11. The combination set forth in claim 1 wherein said timing circuit means includes generator circuit means for, upon receipt of said signal from said first circuit means, developing a timing signal which increases in value with respect to time; and comparator circuit means having a first and second condition and an output circuit means for deactivating said first detection means when said comparator circuit means is actuated to said second condition; said comparator circuit means for monitoring said timing signal developed by said generator circuit means so that when said signal attains a predetermined level said comparator circuit means is actuated from said first condition to said second condition to thereby cause said first detection means to become deactivated.

12. The combination set forth in claim 11 wherein said output circuit means of said comparator circuit means includes an electronic control means being normally conductive, and upon actuation of said comparator circuit means from said first condition to said second condition, said electronic control means becomes nonconductive to thereby deactivate said first detection means.

13. The combination set forth in claim 1 wherein said means for activating said first and second detection means includes scanner circuit means for selectively activating said first and said second detection means.

14. The combination set forth in claim 2 wherein said first detection means includes a sensing means for detecting the presence of traffic situated within a first predetermined area within said second traffic lane; and said second detection means includes a sensing means for detecting the presence of traffic situated situated a second predetermined area being larger than said first predetermined area.

15. A method of controlling the operation of a traffic signal means for allocating go and stop signals to at least a first and second conflicting traffic lane by utilizing vehicle detection means associated with said first traffic lane, first and second detection means associated with said second traffic lane, first circuit means coupled to said vehicle detection means and comprising the steps of:

a. activating said traffic signal means to display a stop signal in one of said traffic lanes and a go signal in the other one of said traffic lanes;

b. activating said first, second and vehicle detection means;

c. detecting traffic in one of said traffic lanes with said vehicle detection means;

d. developing a signal with said first circuit means in response to a said detection of traffic by said vehicle detection means;

e. detecting traffic in the other of said traffic lanes with said first and second detection means;

f. developing control signals with said first and second detection means in response to the detection of a vehicle by said first and said second detection means, respectively;

g. applying said control signals developed by said first and said second detection means to a said traffic signal means to thereby allocate said go and stop signals to said traffic lanes;

h. deactivating said first detection means at a predetermined period of time after a said signal is developed by said first circuit means so that at said predetermined period of time after a signal is developed by said first circuit means the first detection means becomes ineffective in controlling the operation of a said traffic signal means in allocating go and stop signals to said traffic lanes.

16. A method of controlling the operation of a traffic signal means as set forth in claim 15 including the additional step of deactivating said second detection means at a second predetermined period of time after a signal is developed by said first circuit means so that at said predetermined period of time after a signal is developed by said first circuit means, the second detection means becomes ineffective in controlling the operation of a said traffic signal means in allocating go and stop signals to said traffic lanes.

17. A method of controlling the operation of a traffic signal means as set forth in claim 15 including the additional step of deactivating said first and said second detection means.

18. A method of controlling the operation of a traffic signal means as set forth in claim 16 including the additional step of deactivating said first and said second detection means.

19. A method of controlling the operation of a traffic signal means for allocating go and stop signals to at least a first and second conflicting traffic lane by utilizing vehicle detection means associated with said first traffic lane, N detection means associated with said second traffic lane, first circuit means coupled to said vehicle detection means, and N circuit means each respectively coupled to one of said N detection means and comprising the steps of:

a. activating said traffic signal means to display a stop signal to one of said traffic lanes and a go signal to the other one of said traffic lanes;

b. activating said vehicle detection means and said N detection means;

c. detecting traffic in one of said traffic lanes with said vehicle detection means;

d. developing a signal with said first circuit means in response to a said detection of traffic by said vehicle detection means;

e. detecting traffic in the other of said traffic lanes with said N detection means;

f. developing control signals with said N circuit means in response to the detection of a vehicle by any of said N detection means;
g. applying said control signals developed by said N circuit means to a said traffic signal means to thereby allocate said go and stop signals to said traffic lanes; and,

h. deactivating one of said N detection means at a predetermined period of time after a said signal is developed by said first circuit means.

20. A method of controlling the operation of a traffic signal means as set forth in claim 19 including the additional steps of sequentially deactivating the others of said N circuit means.

21. A method of controlling the operation of a traffic signal means as set forth in claim 19 including the additional steps of sequentially deactivating N−1 of the others of said N circuit means.

22. A method of controlling the operation of a traffic signal means for allocating go and stop signals to at least a first and second conflicting traffic lane by utilizing at least first and second detection means associated with one of said traffic lanes and means for allocating a go signal periodically to vehicles in a second lane intersecting said one lane and comprising the steps of:

a. positioning said first and second detection means generally along a line parallel to the axis of said one traffic lane;

b. activating said first and second detection means;

c. developing periodic control signals for activating a go signal in said second lane;

d. developing control signals with said first and second detection means in response to the detection of a vehicle by said first and second detection means;

e. applying said control signals to said traffic control means to thereby allocate said go and stop signals to said traffic lanes;

f. deactivating said first detection means at a predetermined time after each development of said first-mentioned control signals so that said first detection means is ineffective in controlling the operation of a said traffic signal means in allocating go and stop signals to said traffic lanes.