Sept. 10, 1946. A. P. MANEWICH 2,407,432

TRAFFIC SIGNALING SYSTEM

Filed Dec. 12, 1944

FIG. 1.

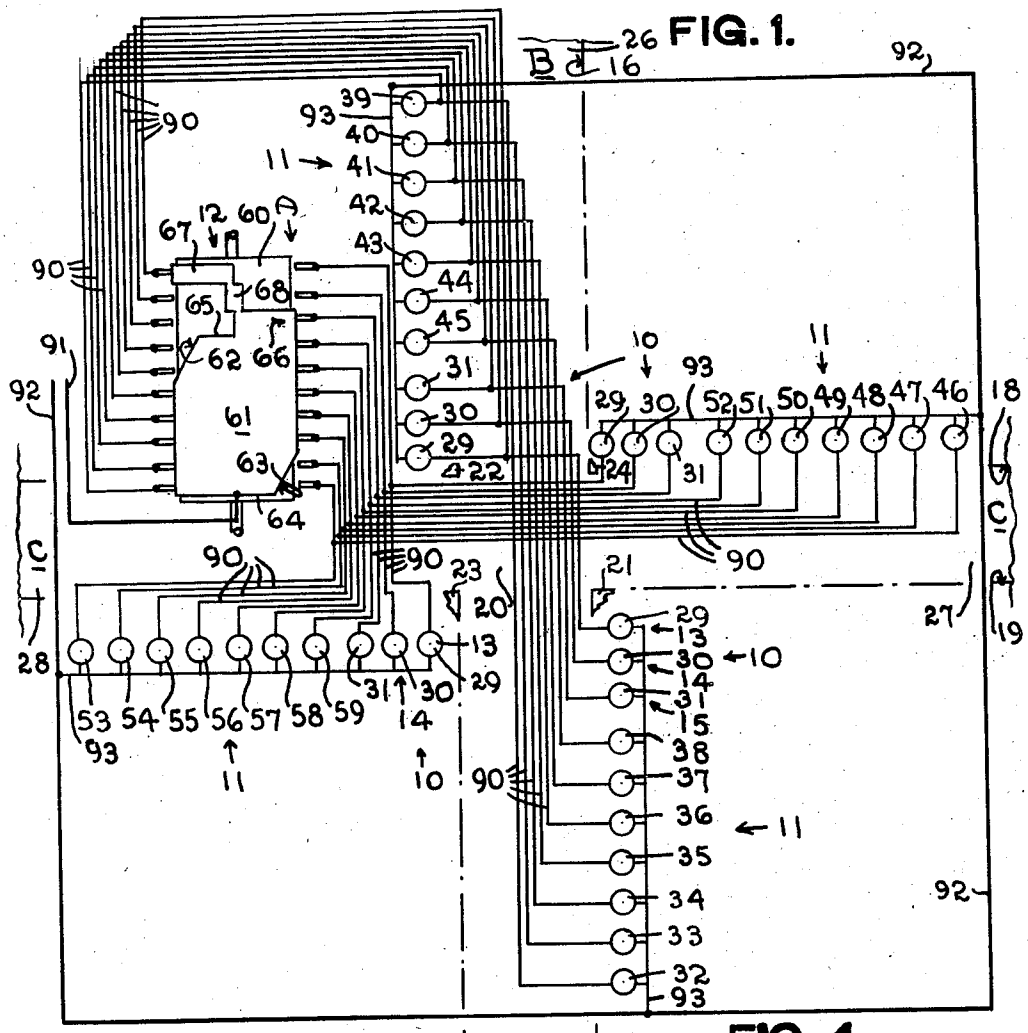


FIG. 4.

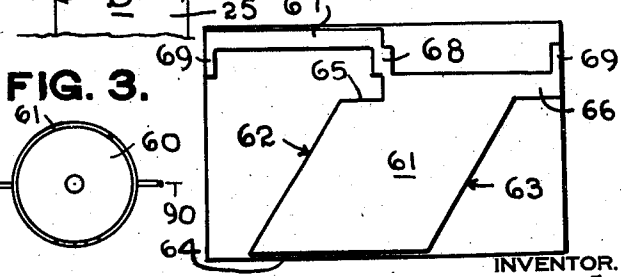


FIG. 2.

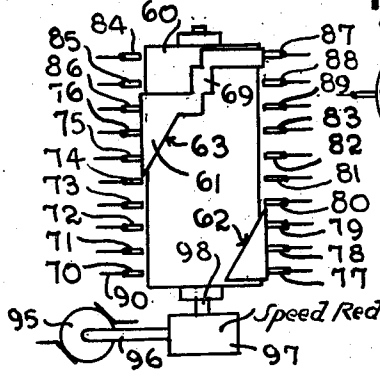


FIG. 3.



INVENTOR.

Anthony P. Manewich

BY Lancaster, Allwine and Rommel

ATTORNEYS.

Patented Sept. 10, 1946

2,407,432

# UNITED STATES PATENT OFFICE

2,407,432

## TRAFFIC SIGNALING SYSTEM

Anthony P. Manewich, Detroit, Mich.

Application December 12, 1944, Serial No. 567,869

5 Claims. (Cl. 177—337)

1

This invention relates to traffic signaling systems and more particularly to a vehicular and allied traffic signaling system adapted for use in conjunction with highway intersection signaling.

In the majority of instances, where traffic stop-caution-go lights are employed at a plurality of highway intersections, changes in the signals are based upon a certain vehicle speed so that a vehicle, travelling at this speed along the highway, will cross each intersection just prior to the lighting of the caution light, whereby the vehicle, if there are no conditions interfering with its normal progress, will be able to travel a number of blocks without being stopped by a stop light. However, various conditions interfere, at times, with this normal progress, and the operator of a vehicle, which may be slowed, which turns into another highway, or which resumes progress after being parked midway a block, for instance, frequently does not know if his speed is sufficient to enable him to cross the intersection before a change in signals.

An important object of this invention is to provide a traffic signaling system which includes auxiliary signal means, preferably comprising a plurality of signal lamps, disposed longitudinally of a highway, between intersections, the signaling condition of which means, at any time, indicating to a vehicle operator, coming abreast of any of the lamps, whether or not he will be able to cross the next intersection without a change in his vehicle's speed.

Another important object of the invention is to visually indicate to an operator of a vehicle, intermediate two intersections, the condition of the signal lamps at the intersection ahead of the operator, even though this intersection may be around a bend in the highway, or the intersection signal lamps be obscured by trees, a hill, or the like.

Still another object is to provide auxiliary traffic signals disposed along a highway and intermediate intersections which will indicate approximately how much time an operator has to cross the next intersection before the main signal lamps change signals. That is, if the auxiliary signal (as a lamp) abreast the operator's vehicle is extinguished but the next auxiliary signal lamp is still lighted, the operator will know that, if he increases his speed to a minor extent so that he reaches the next auxiliary signal (as a lighted lamp) and continues such speed, he will be able to cross the intersection before a change in the main signals. Thus, the condition of the various auxiliary signals (lamps) of the row of

2

auxiliary signal lamps, will indicate just about what speed must be maintained in order to reach and cross the intersection before a change in main signals to halt traffic.

Other objects and advantages of the invention will be apparent during the course of the following detailed description of the invention taken in connection with the accompanying drawing, and in which drawing:

Fig. 1 is a diagrammatic showing of the system with the change signal means of the system in one position.

Fig. 2 is a view of the change signal means of Fig. 1 in another position.

Fig. 3 is an end elevation of portions of the change signal means.

Fig. 4 is an unrolled or flattened out plan of movable contact surfaces forming a part of the change signal means.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views, the letter A may designate the system as a whole, disposed at the intersection and along two highways B and C.

The system A includes main traffic signaling means 10, auxiliary traffic signaling means 11, and means 12 for operating and synchronizing the means 10 and 11. The means 10 may include stop signal means 13, caution signal means 14 and go signal means 15.

In the example shown there are two intersecting highways B and C, one being normal to the other, but they may cross, of course, at angles other than right angles, and there may be other like intersections. The highway B is shown as having curb lines, which may be designated as the east curb line 16, west curb line 17, and the highway C, is shown as having curb lines which may be designated as the north curb line 18 and south curb line 19. At the intersection 20 are corners 21 to 24 inclusive. For convenience, the highway B may be divided into two sections, the section below the intersection 20 being designated the near side or section 25, and that above the intersection 20, as the far side or section 26, while the section of highway C to the right of the intersection 20 is designated as the near side or section 27 and the section to the left thereof, as the far side or section 28.

The main traffic signaling means 10 may include four traffic signals, one being disposed at or near each of the corners 21 to 24, and each signal comprise a stop (red) signal means 13,

a caution (amber) signal means 14 and a go (green) signal means 15. Preferably, the means 13 to 15 inclusive, include conventional "stop" "caution" and "go" electric lamps 29 to 31 inclusive which may be mounted upon suitable standards to elevate them above the level of the highways.

As for the auxiliary traffic signaling means 11, this may include a plurality of spaced-apart electric lamps, arranged in four rows, one being arranged longitudinally of each highway B and C at each side of the intersection 20. Since, in the United States, traffic moves along the right hand side of the highway, one of these rows is disposed along and paralleling the right hand curb lines of each section 25 to 28 inclusive. The number of these lamps may vary, seven being shown in each section and numbered, for convenience, 32 to 59 inclusive. These lamps 32 to 59 may be conveniently mounted in any approved way so as to be readily seen from the street. Their spacing is important for proper synchronizing with the main traffic signaling means and best operation of the system. For example, on a highway, whereon traffic may move at a maximum speed of 25 miles an hour, the lamps 32 to 59 may be placed about 600 feet apart, and the stop and go signals remain on alternately for 60 seconds each. The reason for spacing the lamps 32 to 59 as described is so that an operator in a vehicle coming abreast of the auxiliary signal lamps farthest from the intersection, i. e., the lamps 32, 39, 46 and 53, will know (in the event they are lighted) that he can cross the intersection before a change in signals which would prevent his crossing, provided he travels at the 25 miles-an-hour speed. Conversely, if this lamp is extinguished, the operator will know he cannot make the intersection, at 25 miles an hour, to cross before the change in signals. Of course, the other auxiliary signal lamps function in the same way. Obviously, if an operator notes that not only the lamp abreast of him is extinguished, but that three or more others are extinguished, in the same row, he could not possibly make the intersection in time to cross before a change in signals. Thus, the system, in effect, gives the operator an idea of the approximate time interval or period which will elapse before a change from the go to the stop signals.

In order to effect synchronism between all the signals, the operating means 12 is provided coupled with a plurality of electric circuits for the various lamps, the means 12 being interposed in these circuits.

Preferably, there is provided a substantially, cylindrical rotor 60, suitably mounted for rotation on its axis with electric contact means carried on its periphery. This means may comprise a suitable sheet 61 of electricity-conducting material, as copper, shaped substantially as shown in Fig. 4, curved about the periphery of the rotor 60 and suitably secured thereto, so that the sheet 61 has two substantially paralleling edges 62 and 63 which are diagonally disposed with reference to the axis of rotation of the rotor 60, the edge 62 being the forward edge, and it is the area bounded by these edges 62 and 63 and the edge 64, adjacent the end of the rotor 60, together with the paralleling edge 65 which define the contact area for association with certain fixed contacts, to afford operation of the auxiliary signals.

The sheet 61 also includes two sections 66 and 67, being contacts, associated with certain fixed



contacts, to afford operation of the main go and stop signals, and two small sections 68 and 69 associated with certain fixed contacts, to afford operation of the main caution signals.

These fixed contacts will now be described. For each auxiliary signal, occupying a like position at both sides of the intersection 20 along the highway B, as well as a like position at both sides of the intersection 20 along the highway C, there is one fixed contact, that is, there is one fixed contact for each two auxiliary signal lamps. These fixed contacts for the lamps 32 to 45 are designated as 70 to 76 and the fixed contacts for the lamps 46 to 58 are designated as 77 to 83, all the fixed contacts being shown in Fig. 2. For like main traffic signal means 13 for the highway B, there is a fixed contact 84, for like main traffic signal means 14 for that highway, a contact 85, for means 15, for that highway, a contact 86, while for the highway C, the like signal means 13 there is a fixed contact 87, for the means 14, a contact 88 and for the means 15, a contact 89. As will be seen in Fig. 2, the fixed contacts 70 to 76 and 84 to 86, are arranged in one row, and the fixed contacts 77 to 84 and 87 to 89 are arranged in another row, each row positioned substantially 180° apart, so that the fixed contacts 70 to 89 will brush over the sheet 61 but will not contact the periphery of the rotor 60. They may be fixed in any suitable manner and properly insulated in any desirable way known to the art.

From each fixed contact 70 to 89 a conductor 90 electrically connects with the lamp with which such fixed contact is associated, and at the terminal of one main line conductor 91 is a suitable electrical connection with the sheet 61, made in any of the well known methods of the art. From the other main line conductor 92, conductors 93 extend to electrically connect with the lamps 29 to 59.

It is obvious that the rotor 60 may be rotated at any fixed speed by a suitable means, such as the motor 95 shaft 96 therefrom, conventional speed reducer 97 and shaft 98 coupled to the rotor 60. It is also obvious that changes in the positions of the various edges of the sheet 61 will afford changes in the timing of the lighting and extinguishing of the various lamps 32 to 59, as well as the associated main signal lamps, whereby the system is both simple and flexible. For instance, the auxiliary signal lamps may be spaced farther apart than stated, or closer together and the timing of the main signals may be varied, simply by substitution of a rotor 60 having the edges of the sheet 61 disposed differently than stated, since the nearer together the paralleling edges 62 and 63 are, the shorter will be the interval during which the auxiliary lamps will be lighted.

With the system as described and illustrated, the "stop" electric lamps 29 at the corners 21 and 22 come on or are lighted, signaling traffic on the highway B to halt, while the "go" electric lamps 31 at the corners 23 and 24 come on or are lighted, signaling traffic on the highway C to cross the intersection and proceed. Some seconds before the next change, and while the "stop" lamps are still lighted, the auxiliary signal lamps 32 and 39 will light and thereafter, the lamps 33 and 40, 34 and 41, 35 and 42, 36 and 43, 37 and 44 and 38 and 45 will light. (It should be understood that some of the auxiliary lamps along highway C are also burning at this time, since the object of these auxiliary lamps is to signal

the operator of a vehicle that, if he is abreast of one of the lighted auxiliary lamps and traveling at the normal speed for the highway on which he is traveling, he can cross the intersection before the "caution" or "stop" lamps are lighted.) If, on the contrary the auxiliary lamp (as the lamp 34) abreast of him is extinguished but the next lamps (lamps 35, 36, 37 and 38) are still lighted, with a slight increase in speed along the highway, the operator can still cross the intersection before change in signals. However, if the operator is abreast of lamp 34, for instance, and it, together with lamps 35, 36 and 37 are extinguished, he will know that he cannot reach the intersection before a change in signals. Consequently, it may be seen, from the above and from Fig. 4 (where it will be noted that lines which may be drawn across the flattened area in the direction of the axis of rotation of the cylinder 60 will, at points intersect the contact areas 61 and 66, the contact areas 64 and 67, the areas 61 and 68, and the areas 61 and 69) that auxiliary signal lamps may be burning along both highways, at both sides of the intersection 20, at the sime time, but that no auxiliary signal lamp is burning along either highway when the main stop signal is first lighted for that highway. Thus, the system is not simply one in which the auxiliary lamps light as the associated main go signal is lighted, but is one adapted to signal operators of vehicles below an intersection as to whether or not they will be able to cross that intersection before a stop signal flashes, the system operating whether or not the intersection may be around a curve in the highway or over the brow of a hill, or obscured by trees and the like.

As the time interval for a change in the main traffic signals at the corners approaches, the lamps 33 to 45 will be extinguished while the lamps 46 to 59 will have been lighted. Then the caution signals at lamps 30 will be lighted (if such signals are employed) by changes in the main signals for the highways B and C, with the go signals showing at the corners 21 and 22 and the stop signals at the corners 23 and 24. In turn, the auxiliary lamps 32 to 45 will be extinguished, beginning with the lamps 32 and 39, and ending with the lamps 38 and 45, and during this interval, the lamps 46 to 59 will begin to burn, beginning with the lamps 46 and 53. All these changes are made by rotation of the cylinder 60, as is now apparent, the same contact area 61 providing the movable contact for all the fixed contacts 70 to 83.

Various changes may be made to the form of the invention herein shown and described, without departing from the spirit of the invention or scope of the claims.

What is claimed is:

1. In a traffic signaling system for two highways crossing one another and forming an intersection, signaling means for signaling traffic to alternately "stop" and "go" along one of said highways, including a signal at said intersection, signaling means for signaling traffic to alternately "go" and "stop" along the other of said highways, including a second signal at said intersection, a plurality of electric lamps, associated with one of said signals, disposed in a row longitudinally of one of said highways and visible therefrom, an electric circuit to and from each of said lamps, operating means interposed in said circuits to alternately open and close said circuits, including a row of fixed contacts, one for each circuit, and a row of movable contacts, one for each circuit, said contacts being disposed so that the lamp, farthest from said signal with which said lamps are associated, will light first and be followed by the lighting of each next lamp in turn until all are lighted, and said lamps will thereafter be extinguished in turn, beginning with the lamp farthest from said signal with which said lamps are associated, and means synchronizing the operating means with the signaling means, connected with the signal with which said lamps are associated, so that, subsequent to one change in said signal, said lamps will light as aforesaid and will then be extinguished as aforesaid and, subsequent to the next change in said signal, said lamps will remain extinguished.

2. In a traffic signaling system for two highways crossing one another and forming an intersection, signaling means for signaling traffic to alternately "stop" and "go" along one of said highways, including a signal at said intersection, signaling means for signaling traffic to alternately "go" and "stop" along the other of said highways, including a second signal at said intersection, a plurality of electric lamps, associated with one of said signals, disposed in a row longitudinally of one of said highways and visible therefrom, an electric circuit to and from each of said lamps, operating means interposed in said circuits to alternately open and close said circuits, including a row of fixed contacts, one for each circuit, and a row of movable contacts, one for each circuit, said contacts being disposed so that the lamp, farthest from said signal with which said lamps are associated, will light first and be followed by the lighting of each next lamp in turn until all are lighted, and said lamps will thereafter be extinguished in turn, beginning with the lamp farthest from said signal with which said lamps are associated, and means synchronizing the operating means with the signaling means, connected with the signal with which said lamps are associated, so that, subsequent to change in said signal to signal traffic to "go," said lamps will light as aforesaid and will then be extinguished as aforesaid and, subsequent to change in said signal to signal traffic to "stop," said lamps will remain extinguished.

3. In a traffic signaling system for two highways crossing one another and forming an intersection, signaling means for signaling traffic to alternately "stop" and "go" along one of said highways, including a signal at said intersection, signaling means for signaling traffic to alternately "go" and "stop" along the other of said highways, including a second signal at said intersection, a plurality of electric lamps, associated with one of said signals, disposed in a row longitudinally of one of said highways and visible therefrom, an electric circuit to and from each of said lamps, operating means interposed in said circuits to alternately open and close said circuits, including a row of fixed contacts, one for each circuit, and a row of movable contacts, one for each circuit, said contacts being disposed so that the lamp, farthest from said signal with which said lamps are associated, will light first and be followed by the lighting of each next lamp in turn until all are lighted, and said lamps will thereafter be extinguished in turn, beginning with the lamp farthest from said signal with which said lamps are associated, and means synchronizing the operating means with the signaling means, connected with the signal with which said lamps are associated, so that, subsequent to change in said signal to signal traffic to "go,"

said lamps will light as aforesaid and will then be extinguished as aforesaid and, subsequent to change in said signal to signal traffic to "stop," said lamps will remain extinguished, the lamp farthest from said signal with which said lamps are associated being disposed a distance therefrom, substantially equal to the distance which can be travelled, by a vehicle at a fixed speed, from a position abreast said lamp to immediately beyond the farthest side of the other of said highways, in a time interval between the lighting of said lamp and the stop-traffic signal of said signal with which said lamps are associated.

4. In a traffic signaling system for two highways crossing one another and forming an intersection, signaling means for signaling traffic to alternately "stop" and "go" along one of said highways, including a signal at said intersection, signaling means for signaling traffic to alternately "go" and "stop" along the other of said highways, including a second signal at said intersection, a plurality of electric lamps, associated with one of the said signals, disposed in a row longitudinally of one of said highways and visible therefrom, an electric circuit to and from each of said lamps, operating means interposed in said circuits to alternately open and close said circuits, including a row of fixed contacts, one for each circuit, and a row of movable contacts, one for each circuit, said contacts being disposed so that the lamp, farthest from said signal with which said lamps are associated, will light first and be followed by the lighting of each next lamp in turn until all are lighted, and said lamps will thereafter be extinguished in turn, beginning with the lamp farthest from said signal with which said lamps are associated, and means synchronizing the operating means with the signaling means, connected with the signal with which said lamps are associated, so that,



subsequent to change in said signal to signal traffic to "go," said lamps will light as aforesaid and will then be extinguished as aforesaid and, subsequent to change in said signal to signal traffic to "stop," said lamps will remain extinguished, each of said lamps being disposed a distance, from said signal with which said lamps are associated, substantially equal to the distances which can be traveled, by a vehicle at a fixed speed, from a position abreast each lamp, to immediately beyond the farthest side of the other of said highways, in time intervals between the lighting of each lamp, in turn, and the stop-traffic signal of said signal with which said lamps are associated.

5. In a traffic signaling system for two highways crossing one another and forming an intersection, "stop" signal means and "go" signal means at said intersection for respectively signaling traffic to "stop" and "go" along said highways at adjacent said intersection, a plurality of auxiliary signal means disposed in a row along one of said highways and visible therefrom, and a signal means for operating and synchronizing said "stop" and "go" signal means and said auxiliary signal means so that, after the "go" signal is given for movement of traffic over said intersection in a direction substantially paralleling said row of auxiliary signal means, each of said auxiliary signal means will give a signal, in turn, beginning with the auxiliary signal means farthest from said intersection, and that, prior to the "stop" signal is given for stopping traffic over said intersection in a direction paralleling said row of auxiliary signal means, each of said auxiliary signal means will give a signal, in turn, beginning with the auxiliary signal means farthest from said intersection.

ANTHONY P. MANEWICH.