

[54] **RESTORATION CIRCUITRY FOR A TRAFFIC LIGHT CONTROL SYSTEM**

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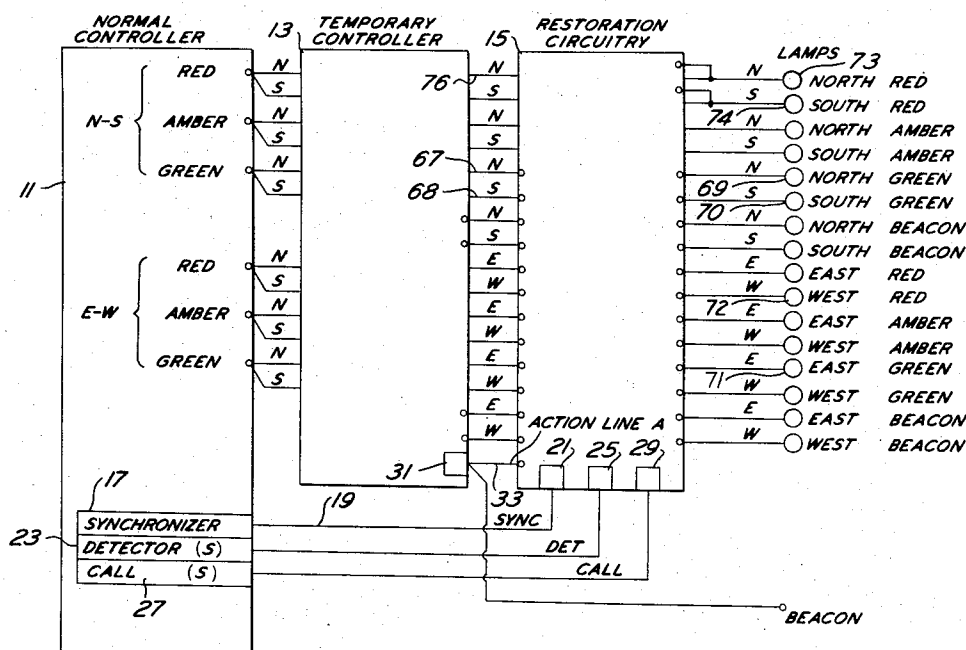
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[57] **ABSTRACT**

A traffic control system for intersecting roads or streets is provided controlled by a traffic light system, and the present circuitry provides a means which acts, in response to a temporary traffic control mode of operation, to interrupt and hold the master timing means in such a way that upon termination of said temporary mode of operation, a go-ahead signal, facing the major one of said roads, will always be initially generated in order to move the traffic through said intersection along said major road. In addition, the present circuitry insures that said go-ahead signal, which initially permits traffic flow, will be in existence for at least a predetermined minimum amount of time and that thereafter within a reasonable time each of said intersecting roads will be subjected to a go-ahead signal in accordance with said traffic light system phasing into normal operation.

6 Claims, 3 Drawing Figures



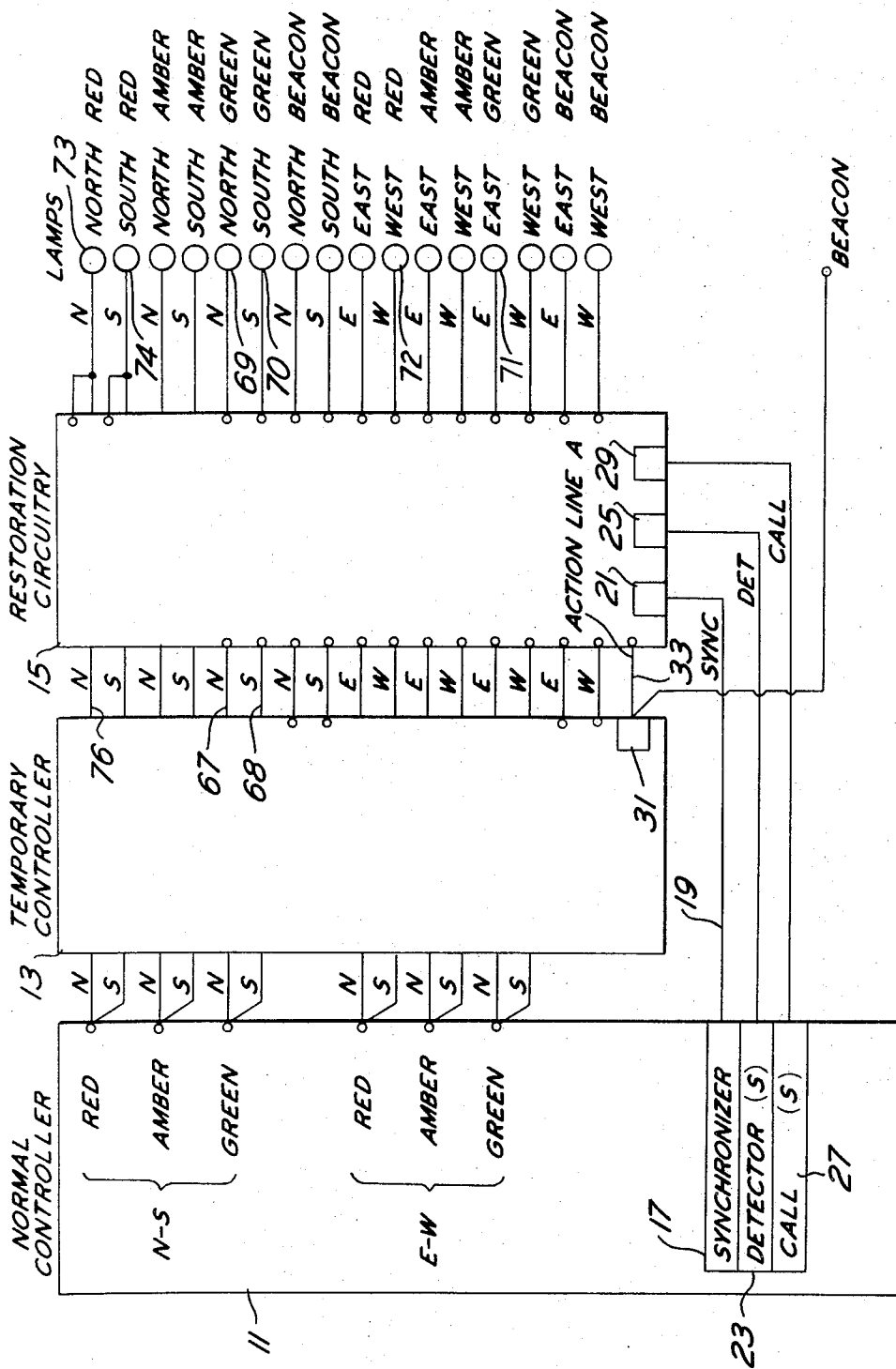
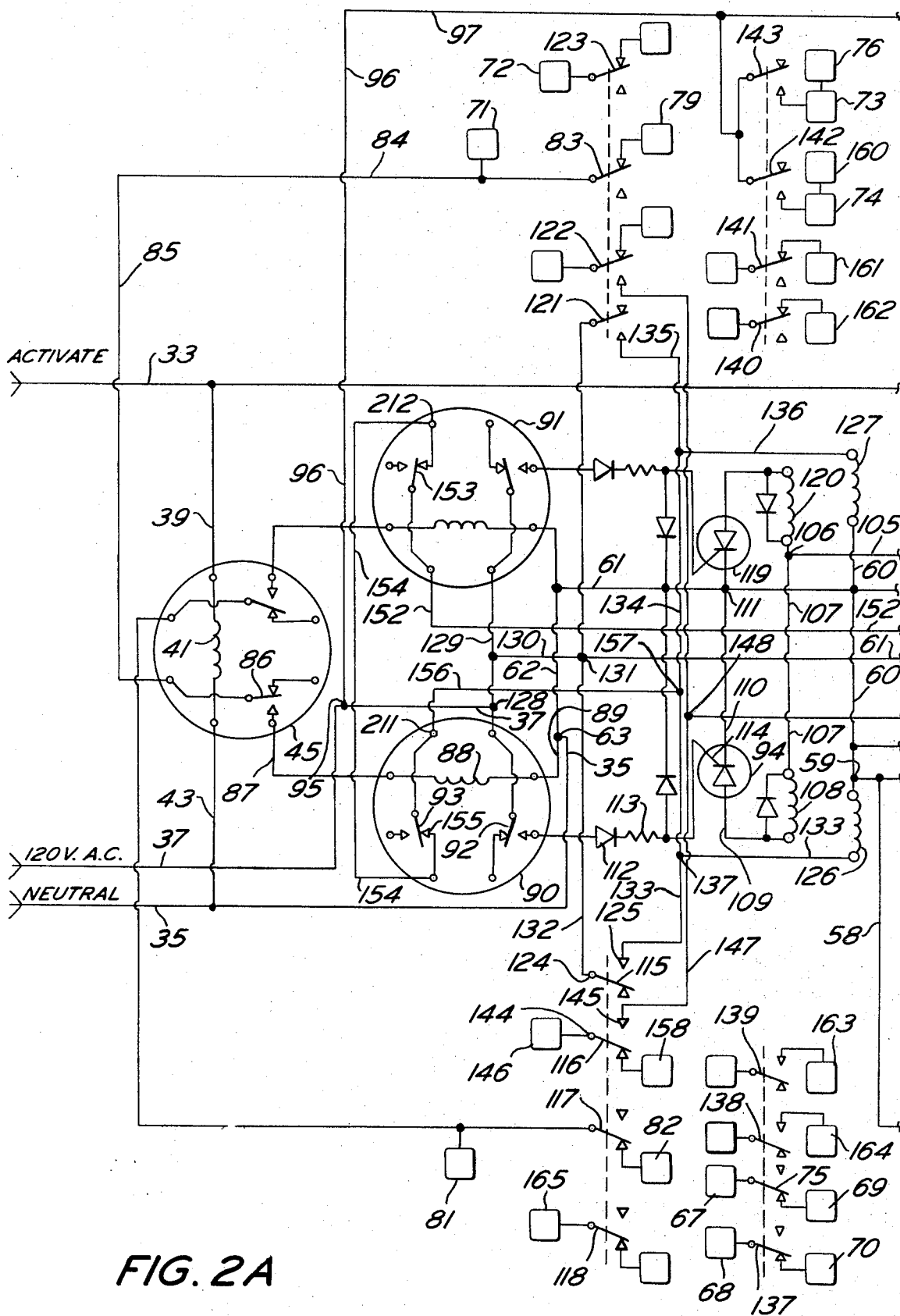
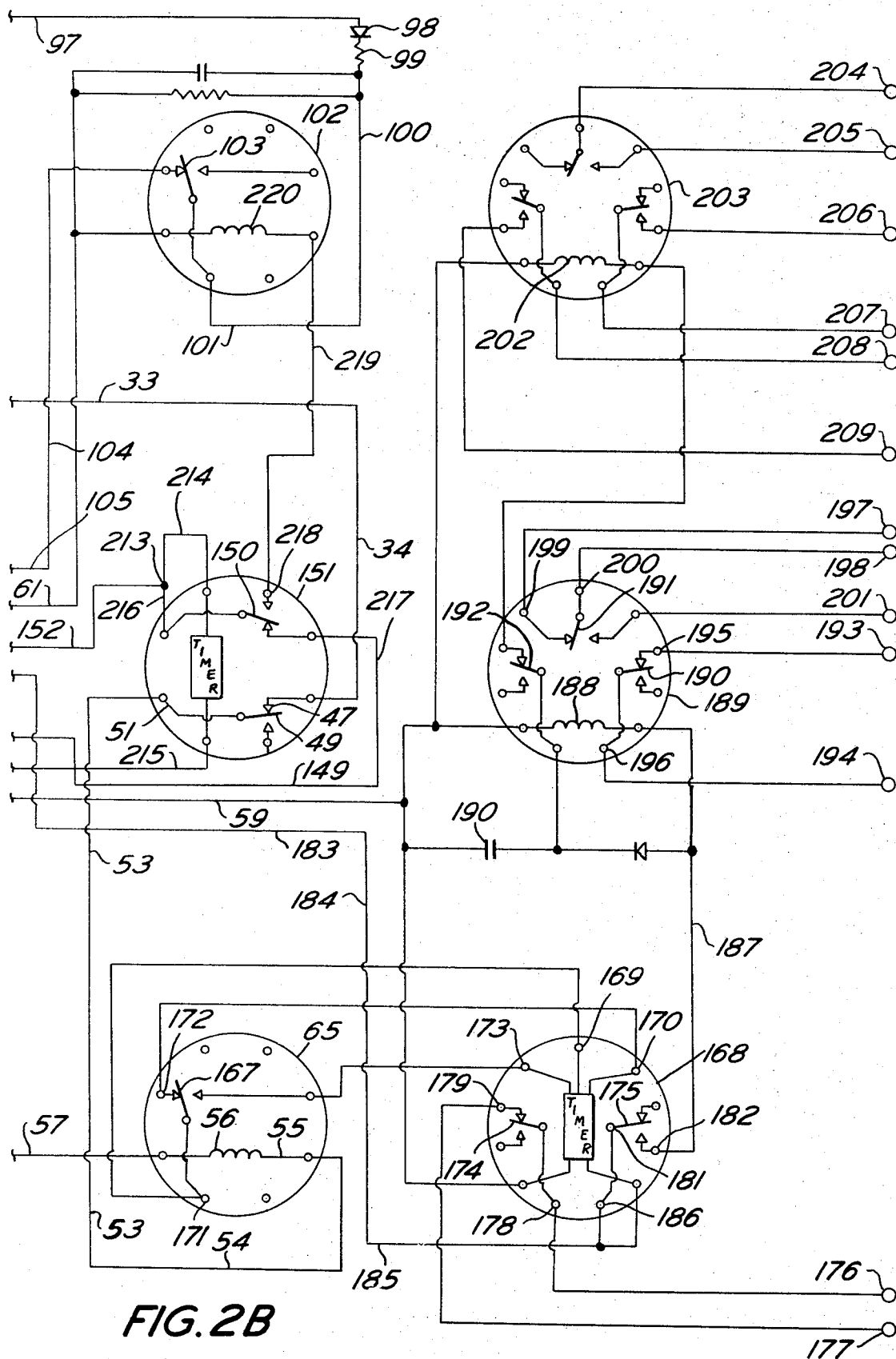


FIG. 1





RESTORATION CIRCUITRY FOR A TRAFFIC LIGHT CONTROL SYSTEM

BACKGROUND

Traffic control systems can generally be classified into one of three categories; i.e., a pre-timed control system, a semi-actuated control system, or a full-actuated control system.

In the pre-timed control system there are normally found a locking circuit, a releasing circuit and an advance circuit, and these circuits are usually activated by cams on a driven camshaft. Generally, in a pre-timed system, the traffic lights facing the major highway are rendered green, or illuminated in their go-ahead mode, for as long as the system is under control of the locking circuit, and further such systems are normally designed such that the locking circuit will remain in control unless the release circuit is energized.

In the semi-actuated system, the traffic lights facing the major highway will remain in the green, or go-ahead state, unless a vehicle, or a person, or some event related to the roads which cross the major highway, sends a signal to the system. For instance if a vehicle on a secondary road approaches the intersection with the major highway such a vehicle would depress a switch located beneath the road bed (often called a trap); and in response thereto, the traffic light facing the major highway would become amber and subsequently red while the traffic light facing the vehicle (facing the secondary road) would change from red to green, or the go-ahead color. In response to closing said switch, a synchronizing circuit is activated which cycles the major highway lights from green, through amber, through red and back to green in a fixed interval of time. In semi-actuated systems if the synchronizing circuit is not activated then the traffic lights facing the major highway remain in the go-ahead, or green, state and are not cycled.

In the full actuated system, there is no timing means as found in each of the above described systems. Instead the traffic lights respond to events (e.g., automobile riding over a trap or a pedestrian pushing a cross-walk switch, etc.). Accordingly the road along which the last event occurs will be the road subjected to the go-ahead traffic light or green light.

As described in my U.S. Pat. No. 3,638,179, the foregoing systems have very often been interconnected with sophisticated temporary control systems. Such a temporary control system acts to seize control of the traffic lights from the normal system upon the happening of an extraordinary event (e.g., the approach of a fire engine enroute to a fire). In the past, it has been the practice with respect to the operation of such temporary control systems that when the control of the traffic lights was returned to the normal system, the go-ahead light would remain in the direction determined by the temporary controller and would so remain for a normal interval. In other words if the temporary controller upon seizure of the traffic light control caused the east-west green lights to be illuminated, then in accordance with the prior art, when said traffic lights were returned to normal control, the green lights in the east-west direction would still be illuminated for a normal interval. In a situation where under temporary control, the major highway lights are illuminated, there is no great likelihood of an undesirable aftermath. However, it has been found that in situations where the seized direction

is a secondary road, there have been undesirable after effects. For instance, if the secondary road is the main artery to the firehouse and police station, then the secondary road will have the green light during an emergency. It is highly likely that traffic will back up on the major highway during the period of time that the traffic light system has held the secondary road open for the passage of the emergency vehicles. Accordingly, it becomes desirable to clear out such backed-up traffic on the main highway as soon as the temporary control releases its seizure.

SUMMARY

The present circuitry provides a means for causing the normal control system to always start out, (after release from a temporary control system), with the go-ahead signals, i.e., the green lights, facing the major highway. If the present circuitry is used with a pre-timed normal control system, the release circuit is rendered inactive; hence as explained earlier, the normal control system is in a locked position which means that the go-ahead signals facing the main highway will be illuminated when the traffic lights are returned to normal control. Somewhat similarly, if the present circuit is used with a semi-actuated normal control system, the synchronizing circuit is held inactive so that when the traffic lights are returned to normal control, the green lights facing the main highway will be turned on. The present circuitry provides a similar control for a fully actuated normal control system as will be explained in detail hereinafter.

In addition to inactivating the circuits mentioned above, the present circuitry inactivates such circuits for a predetermined period of time so that there is an assurance that not only will there be a green light for the major highway upon the return to normal operation, but an assurance that the green light will be present for a substantial period of time in order to enable the removal of any backed-up traffic on the major highway.

DESCRIPTION OF THE DRAWINGS

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawings forming part hereof, in which:

FIG. 1 is a block diagram showing the interconnections between the normal controller, the temporary controller and the restoration circuitry;

FIG. 2A and FIG. B, side by side, are a wiring schematic of the present invention.

It should, of course, be understood that the description and drawings herein are illustrative merely and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings in FIG. 1 there is shown a block diagram of an overall system having a normal controller 11, a temporary controller 13 and restoration circuitry 15 (the present invention). The normal controller 11 which is depicted in FIG. 1 is a semi-actuated type system, employing a

synchronizer means 17. It will be recalled that in a semi-actuated system, the green lights facing the major road are continually illuminated unless the system receives an event signal which in effect requests that the green light facing the major road be terminated and that possibly the secondary road traffic be allowed to pass or a pedestrian be allowed to walk or some other event take place. Be that as it may, when the event signal is received, the synchronizer commences to operate and the traffic lights are cycled until the traffic lights facing the major road are again illuminated. It will be noted that the synchronizer 17 is connected via the line 19 to the sync switch 21 in the restoration circuit 15. In a similar manner the detector means 23 is connected to a detector switch 25 and the call means 27 is connected to a call switch 29; both of said last-mentioned switches are located in the restoration circuit 15.

It should be borne in mind that neither the normal controller 11 nor the temporary controller 13 is part of the present invention. It should be understood that the temporary controller 13 operates such that the temporary control is given up (assuming that the need for the temporary control has passed) only when the normal controller is in its state of trying to illuminate the green lights facing the major highway. This mode of operation is normal only for my temporary controller, and only when used with this restoration circuitry. Further it should be noted that while the normal controller 11 shows controls for only two directions; i.e., north-south, east-west, the normal controller could control three or even four directions.

With the foregoing in mind it should be noted that the normal controller 11 provides the sources of energy for the various traffic lights and that as this energy is transmitted through the temporary controller 13 it can be interrupted or rerouted to accommodate the needs of the temporary controller, by way of example see my U.S. Pat. No. 3,638,179. It will be further noted that the light energy sources are further connected through the restoration circuit to the traffic light lamps. As will be described in detail below, the energy lines can be interrupted or supplemented in the restoration circuitry to accomplish its purpose.

Referring now to FIG. 2 which is a schematic wiring diagram of the present invention, when a temporary controller means seizes control of a traffic light control system, there is an activate signal generated which places the circuits in the temporary controller means in control of the electrical power being transmitted from the energy sources in the normal system to the traffic light lamps. This activate signal may be generated in different ways and/or to initially start different steps in different temporary controllers, but in each of the various temporary controllers which may be employed there is an activate signal which initiates the action of the temporary controller.

The activate means 31 is shown in the temporary controller 13 in FIG. 1 and the activate signal is transmitted therefrom on line 33 shown in both FIGS. 1 and 2.

In FIG. 2 there are shown two other power lines that are connected to the temporary controller; i.e., the neutral line 35, or ground return, and the 120 volt a.c. power line 37. Actually these last two power lines need not be connected to the temporary controller but could be connected to power or reference sources located at the restoration system.

Continuing with our consideration of FIG. 2, we find that when an activate signal is transmitted on line 33 it passes along line 39, through the coil 41, and along line 43 to the return line 35 thereby energizing the relay 45. At the same time the activate signal continues along line 33, down along line 34, through closed points 47 and 49, along line 51, down along line 53 to the right along line 54, up and to the left along line 55, through coil 56, along line 57, up along line 58, to the left along line 59, up along line 60, to the left along line 61, down along line 62, to terminal 63 down and to the left therefrom along line 35. The activate signal passing along said last described path energizes relay 65. Accordingly then the presence of an activate signal energizes both relays 45 and 65.

For the purpose of this discussion, let us assume that the normal control system was providing green signals along the major highway; i.e., the north south road. Accordingly, immediately prior to the activate signal, there would be signal energy provided on lines 67 and 68 (FIGS. 1 and 2) which energy was being directed to illuminate lamps 69 and 70. Now, further assume for purposes of this discussion that the temporary controller is a 1-3 system; i.e., when it seizes control only one direction out of four at an intersection is green. Hence the designation a 1-3 system meaning one green light and three red lights when the system is under temporary control. Assume, by way of example, that the temporary system has seized control and that under its control the traffic light facing the East at our discussion intersection is rendered green while the traffic lights facing West, North and South are rendered red. Referring to FIGS. 1 and 2, we would find that the lamp 71 would be green, while the lamps 72, 73 and 74 would be rendered red. The accomplishment of these changes of lamp colors just described is accomplished by the temporary controller and not the present invention. It should be noted in that regard that although the lamp 69, which is north green, is shown connected through transfer point 75 to power source 67, in FIG. 2 and at the same time lamp 73, which is north red is shown connected to power source 76, both of these last-mentioned power sources are located on the restoration circuit side of the temporary controller. Accordingly, there may or may not be power to terminals 76 and 67 depending upon how the temporary controller is operating. In our example when the temporary controller seized control, it intended that the north red lamp 73 would be illuminated, and therefore there would be power furnished through the temporary controller to terminal 76 in FIG. 2. On the other hand, at that point in time, there would not be any power furnished to terminal 67 since the north green should not be illuminated. The same ground rule applies to all of the other lamps depicted in FIG. 2.

Returning to our example we find that the east green lamp 71 is illuminated and therefore the temporary controller is supplying power to terminal 79. Bear in mind that since the west green lamp 81 is not to be illuminated under this seizure, there will be no power supplied to terminal 82 at this time.

If we consider in more detail now the operation of the restoration circuit we find that with power supplied to terminal 79 there will be electrical current flow through the transfer point 83, along the line 84, down along line 85, to the right through the energized relay 45, in particular through the transfer point 86, along

line 87, through relay coil 88, up along line 89 to terminal 63, down and to the left along line 35 to the neutral or ground reference. Hence when the east green light is turned on in conjunction with the presence of an activate signal, relay 90 is energized. In accordance with the energization of relay 90, the transfer points 92 and 93 are transferred. Relay 91 is not energized because there is, at this time, no power supplied to terminal 82. The activation of transfer point 92 provides the control signal to turn on the silicon-controlled rectifier 94, but we should first consider the voltages applied thereto before discussing its turn-on operation and the function thereof.

In considering the voltages applied to the SCR 94 note that the 120 V a.c. line applies that positive potential from terminal 95 up along line 96, to the right along line 97, downward through diode 98 and resistor 99, along line 100, to the left along line 101, through the transfer strap 103 of relay 102, to the left and down along line 104, to the left along line 105, to terminal 106, down along line 107, through coil 108, to the anode 109 of SCR 94. The cathode 110 of SCR 94 is connected via terminal 111, along lines 61, 62 and 35 to neutral reference. Hence SCR 94 is ready to conduct as long as relay 102 is not energized. Accordingly when relay 90 is energized, a positive potential is applied from line 37, through transfer diode 112 and resistor 113 to the gate element 114 of SCR 94. In response to the positive potential on the gate 114, the SCR 94 conducts thereby energizing the relay coil 108.

When the relay coil 108 is energized each of the transfer straps 115 through 118 is transferred. It should be noted that SCR 119 was not turned on because relay 91 was not energized, as discussed earlier, therefore relay coil 120 was not energized. Accordingly, the transfer straps 121, 122, 123 and 83 remain as shown in FIG. 2.

Now when transfer strap 115 was picked up, it connected terminals 124 and 125. The connection of terminal 124 to terminal 125 provides an electrical path to energize both relay coils 126 and 127. Note that 120 V A.C. power is applied along line 37 to terminal 128, up along line 129, to the right along line 130 to terminal 131, down along line 132, from terminal 124 through strap 115 to terminal 125, to the right along line 133, through relay coil 126, up line 60 and through lines 61, 62 and 35, as described earlier, to the neutral reference. A parallel circuit from terminal 137, up along line 134 to terminal 135, to the right through terminal 136 and down through relay coil 127 to lines 60, 61, 62 and 35 serves to energize relay coil 127. Hence when relay 108 is energized, both relays 126 and 127 become energized. In response to energizing relays 126 and 127, the transfer straps 137 through 143, as well as strap 75, are all transferred.

Before we consider the operation of the remaining relays in the restoration circuit, let us consider what results from the energization of relays 108, 126 and 127. We have studied one result of the energization of relay 108; i.e., the energization of relays 126 and 127. Further when relay 108 is energized we find that terminals 144 and 145 are connected through strap 116. Lamp 146 is the east yellow lamp and the circuit can be traced from terminal 145 to the right and up along line 147, to terminal 148, to the right along line 149, up along line 217 and to the left through transfer strap 150 of relay 151, to the left along line 152, up and through

transfer strap 153, to the left and down along line 154 to terminal 155. If relay 90 were not energized the path would continue through transfer strap 93, up and to the right along line 156 to terminal 157 on line 134. Now from the discussion above, it should be apparent that if SCR 94 is conducting, relay strap 115 will be transferred and there will be potential at terminal 157. Hence we find that if relay 90 becomes de-energized while SCR 94 is still conducting, the east yellow light will be illuminated by the restoration circuit and not from its normal source of power 158.

In addition it should be noted that when transfer straps 142 and 143 are transferred, there is power from the 120 V a.c. source to illuminate the north red lamp 73 and the south red lamp 74 whether or not power is supplied from the normal sources 76 and 160. The transfer of straps 140 and 141 eliminates any possibility of the north beacon light 161 or the south beacon light 162 being illuminated. The transfer of straps 138 and 139 enable the east beacon light 163 and the west beacon light 164 to be illuminated. The transfer of straps 75 and 137 eliminates the possibility of the north green light 69 or the south green light 70 from being illuminated. The transfer of strap 118 eliminates the possibility of the east red light 165 being illuminated and the transfer of strap 117 eliminates the possibility of the west green lamp 81 being illuminated.

Now let us examine the operation of the remaining relays in the restoration circuit. It will be recalled that with the appearance of the activate signal on line 33, both relays 45 and 65 were immediately energized. When relay 65 was energized, the transfer strap 167 was transferred. An examination of the circuit of relay 168 will reveal that prior to the energization of relay 65, the terminals 169 and 170 of relay 168 were connected through transfer strap 167 and terminals 171 and 172 of relay 65. When relay 65 was energized, terminal 173 of relay 168 was connected to terminal 169 and this connection energizes relay 168 causing transfer straps 174 and 175 to be transferred. It should be noted, that terminals 176 and 177 were connected through terminals 178 and 179 by transfer strap 174 prior to the energization of relay 168. When relay 168 is energized and for as long as it is energized the terminals 176 and 177 are not connected.

Terminals 176 and 177 are connected to the synchronizing circuit in the normal control circuit 11. Terminals 176, 177, 178, 179 and strap 174 are represented in FIG. 1 by the synchronizing switch 21. It becomes apparent then that almost as soon as the activate signal is received the relay 168 will be energized and the synchronizing circuit will be opened. It will be recalled that when the synchronizing circuit is open, the semi-actuated, normal controller will remain in a state where it will try, or be ready, to illuminate the green lights along the major highway. In our example, the major highway is the north-south highway. Accordingly then when the temporary controller is ready to give up its control, the normal controller will be in a state, or condition, whereby the temporary controller will hand over control immediately.

Returning to relay 168 we find that when it is energized, transfer strap 175 picks up to connect terminals 181 and 182. It will be recalled that we traced the 120 V a.c. power along to terminal 131. Now if we continue therefrom we find electrical current passing to the right along line 130, down and to the right along line 183,

down along line 184, to the right along line 185, up through terminals 186 and 181, through straps 175 and terminal 182, up along line 187, through relay coil 188, back along lines 59, 60, 61, 62 and 35 to the neutral reference. Hence relay 189 becomes energized in response to the energization of relay 168. At the same time the capacitor 190 commences charging. It should be noted that when relay 189 is energized the straps 190, 191 and 192 are transferred.

Prior to the energization of relay 189, terminals 193 and 194 were connected through terminals 195 and 196 as well as transfer strap 190 (all said last-mentioned elements being located in relay 189). Likewise before the energization of relay 189, terminals 197 and 198 were connected through transfer strap 191 and terminals 199 and 200 or relay 189. When relay 189 is energized transfer strap 191 picks up to connect outside terminals 198 and 201. In a semi-actuated system as used in our example, terminals 193 and 194 are connected to the normal controller in such a way that all events which cause the traffic lights to turn green in the east-west direction have their circuit paths through terminals 193 and 195, transfer strap 190, and terminals 196 and 194. In other words if there is a trap in the east road, at our hypothetical intersection, the signal that would result from the depression thereof would be eventually transmitted through terminals 193 and 195, transfer strap 190, as well as terminals 196 and 194. It should be apparent that if relay 189 is energized the path from terminal 193 to 194 will be open and no signals will pass. It should be borne in mind that one of the major purposes of the restoration circuit is to hold the normal controller circuit in a position where it is attempting to display the green lights to the major highway. By opening the circuit path between terminals 193 and 194, the restoration system insures that there will be no demands on the normal controller system whereby it is asked to illuminate the east-west green lights. Terminals 193 and 194 can be found in switch 25 in FIG. 1.

Terminals 197, 198 and 201 are not used with a semi-actuated system and their role with a fully actuated system will be explained hereinafter.

It should be noted that relay coil 202 of relay 203 can be energized through relay strap 192 of relay 189. However, at the time that power is provided on line 187 to energize relay coil 188, the capacitor 190 "short circuits" relay coil 202 and before capacitor 190 becomes charged, transfer strap 192 is picked up, thereby eliminating any opportunity to energize relay coil 202. It becomes apparent then that relay coil 202 will not be energized until relay 189 "falls out" or is de-energized.

The outside terminals 204 through 209 provide means for initiating "calls" or demands on the normal controller to display green lights in particular directions. These terminals are found in switch 29 in FIG. 1. In our example, we have employed a semi-actuated system and we have hypothesized that the temporary controller is demanding an east-green light. Further we have eliminated the effect of any calls or demands from a vehicle coming to the intersection from the west. Such a vehicle would see a red light because of the temporary controller. In other words even though there would be a trap in the west road near the intersection, the depression of that trap would not provide a signal to which the normal controller would be responsive since such a signal would be terminated by the opening

of the circuit between terminals 193 and 194. Now if no further steps are taken, the west traffic might remain facing a red light when the system returned to normal unless by chance one of the cars on the west street was sitting or had stopped on the trap. The present system would not want to rely on such a "happenstance" procedure and so it provides a "mock" demand to insure that after the system has returned to the normal controller, it will go through a complete cycle by which all roads at the intersection get an opportunity to face a green light. In the present system, terminals 204 and 205 are connected to a signal generator which provides a signal requesting that the east-west green lights be illuminated. However that "mock" demand occurs only after relay 189 drops out; i.e., after the traffic system has been returned to the normal controller. Terminals 206 and 207 as well as 208 and 209 can be connected to effect "mock" calls for other directions if the intersection should have more than four streets or other forms of demand sources.

Thus far, we have found that upon activation of the restoration system: the north red light 73, south red light 74 have been assured of being on; the synchronization means of the normal controller has been held inactive by opening the circuit between terminals 176 and 177 to insure that the semi-actuated normal controller will return to a north-south green light status; any demands by east-west events will be ignored because of the interruption of the circuit between terminals 193 and 194; and when the system returns to the normal controller there will be a "mock" demand for an east-west green light initiated through terminals 204 and 205.

Let us consider now what happens upon release. When the temporary controller gives up control it terminates the activate signal. When there is no longer a signal on line 33, relays 45 and 65 will drop out. Since relay 45 is de-energized, transfer strap 86 will return to its normally open position thus causing relay 90 to fall out. Bear in mind that when the temporary controller gives up control, the normal control takes over and attempts to illuminate the north-south green lights because the restoration circuit has disabled the synchronizing circuit and therefore the normal controller wants to launch into the north-south green light step. However, since relay 126 is energized, transfer straps 75 and 137 are picked up and the north green light 69 and south green light 70 cannot yet come on. At the same time, even though the normal controller is not providing power to terminals 76 and 160 to keep the north-south red lights 73 and 74 illuminated, these red lights are in fact still showing red because relay 127 is still energized and power to red lights 73 and 74 is provided through transfer strap 143 and 142. It follows then that the restoration system must operate quickly to de-energize relays 126 and 127 and this procedure started with the de-energization of relay 90.

When relay 90 was de-energized, the control signal to SCR 94 was terminated. In order to have SCR 94 terminate its conduction, either its anode or cathode must be disabled. The disablement of the anode of SCR 94 is accomplished by energizing relay 102 and that is accomplished by energizing relay 151. The energization of relay 151 is accomplished in the following manner. When relay 90 was de-energized, transfer strap 93 returned to be connected to terminal 155. Bearing in mind that at this point in time relay 108 is still ener-

gized, we find that there is power applied from the 120 V a.c. source, along line 37 to terminal 128, up along line 129, to the right along line 130 to terminal 131, downward along line 132, through terminal 124, transfer strap 115 and terminal 125 to terminal 137, up along line 134 to terminal 157, to the left along line 156, downward through terminal 211, through transfer strap 93 and terminal 155, to the left and up along line 154, through terminal 212 and transfer strap 153, along line 152 to terminal 213. From terminal 213 the electrical current follows two paths and accomplishes two things. First the current passes around along line 214 to start the timer of relay 151. The return circuit from the timer being along line 215, to lines 60, 61, 62 and 35 as described earlier. Before relay 151 "times out," that is transfers momentarily, the current from terminal 213 passes along line 216, through transfer strap 150, along lines 217, 149 and 147 to illuminate the east amber light 146 as described earlier. Hence when the release starts the east light which had been green, turns amber for a pre-determined time (predetermined by the timer of relay 151).

When the relay 151 has timed out, transfer strap 150 will be momentarily picked up to be connected to terminal 218, which will provide current from terminal 213 (as just described) through terminal 218, along line 219 to energize relay coil 220 of relay 102.

When relay coil 220 is energized, transfer strap 103 will be picked up thereby terminating the current to the anode of SCR 94. When SCR 94 stops conducting, relay 108 drops out which permits transfer strap 115 to return to its normally open point which in turn causes relays 126 and 127 to drop out. As suggested earlier when relays 126 and 127 drop out, transfer straps 75 and 137 return to their normally closed points to illuminate the north-south green lights 69 and 70. At the same time transfer straps 143 and 142 return to their normally open points to extinguish the north-south red lights 73 and 74.

The restoration system need only accomplish two more things; i.e., put the synchronizer back in operation and provide mock demands where necessary.

When relay 65 was de-energized, the relay strap 167 returned to terminal 172 which effectively connected terminals 169 and 170 of relay 168. The connection of terminals 169 and 170 started relay 168 "timing out." It should be noted that relay 168 started "timing out" almost immediately upon the termination of the activate signal. The time out periods of both relays 151 and 168 are adjustable. The time that would be considered adequate to clear up the traffic which accumulates along the major highway is determined by the adjustment of relay 168 only. Relay 189 is an ordinary relay which de-energizes the instant relay 168 de-energizes. When relay 168 has "timed out," the relay straps 174 and 175 return to their de-energized positions. The return of strap 174 closes the circuit path from terminal 176 to 177 and hence the synchronizing circuit of the normal controller is in operation. The return of strap terminal disables the energizing circuit to relay 189, hence relay 189 falls out.

When relay 189 falls out, capacitor 190 discharges through strap 192 to energize relay coil 202 and provide the "mock" demand signal from terminals 204 and 205 as described earlier.

In the event of a fully activated normal controller: terminals 176 and 177 would disable the east-west re-

ception of demand signals; terminals 193 and 194 would disable the fifth-sixth direction demand signals; terminals 197 and 198 would disable the north-south demand signals; terminals 204 and 205 would provide "mock" demands for the east-west terminals 206 and 207 would provide "mock" demands for the fifth-sixth directions; and terminals 208 and 209 would provide "mock" demands for the north-south directions.

Relays 151 and 168 which are the timing relays can be respectively model number CHB-38-70001 manufactured by Potter & Brumfield and model number CHB-38-70013 manufactured by Potter & Brumfield.

In the event that the temporary controller has seized control, as in our hypothetical case, for the east direction and thereafter there is a second seizure for the western direction, the second seizure is called a handover. In the event of a handover the activate signal remains present and therefore the initial action of relays 45, 65, 168 and 189 remains the same. The restoration system of course must enable the green light 81 to be turned on and must therefore de-energize relay 108. The operation which occurs is as described above except that the de-energization of relay 90 is accomplished because the temporary controller ceases to provide power to terminal 79. Once relay 90 drops out, relay 151 will start timing out and relay 102 will be de-energized to drop out relay 108 as described above. Immediately upon the dropping out of relay 108, transfer strap 117 will connect to source 82 to not only light the west lamp 81 but to energize relay 91. The energization of relay 91 provides a control signal to SCR 119. Immediately upon the de-energization of relay 102 the SCR 119 will be "fired" or turned on and the operation will repeat itself as before.

I claim:

1. Restoration circuitry to be used with a traffic control system which employs both temporary and normal control means and which distinguishes between a major highway and secondary highways at an intersection and wherein said normal control means has reset means to insure that it will always start a cycle related to said major highway, comprising in combination

activate signal receiving means to receive an activate signal indicating that said traffic control system has been seized by said temporary control means;

first switching means connected to said activate signal receiving means to provide a plurality of control signals in response to receiving said activate signal;

second switching means connected to said first switching means and to said reset means of said normal control means to receive one of said plurality of control signals and in response thereto operate with said reset means to insure that said normal control means will start a cycle related to said major highway upon the termination of said activate signal.

2. Restoration circuitry according to claim 1 wherein

said second switching means includes a timing means which starts timing for a predetermined time after said activate signal has terminated and continues to operate with said reset means for said predetermined time.

3. Restoration circuitry means according to claim 2 wherein

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there is inclined third switching means connected to said second switching means and to said normal control means, said third switching means formed to switch in response to switching activity by said second switching means whereby said connection to said normal control means acts to aid said reset means in causing said normal control means to always start in a cycle related to said major highway.

4. Restoration circuitry means according to claim 2 wherein

third switching means is included connected to said second switching means and said normal control means, said third switching means formed to be responsive to said second switching means after said predetermined time to operate with said normal control means to insure a cycle related to said secondary highways.

5. Restoration circuitry means according to claim 2 wherein

third switching means is included and wherein said

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third switching means is connected to said first switching means and has a timing means therein and wherein there is further included a caution light as part of said traffic control system connected to said third switching means and wherein said caution light is illuminated for a predetermined period of time in response to said last mentioned timing means being activated in response to a switching of said first switching means.

6. Restoration circuitry means according to claim 5 wherein

said third switching means further includes stop light means connected to said normal control means and which will act to illuminate stop lights to said major highway when said temporary controller has provided a go-ahead light to one of said secondary highways and wherein said third switching means will return the control of said red lights to said normal control at the end of said predetermined time of said timing means of said third switching means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,840,847 Dated October 17, 1974

Inventor(s) Edward T. Coll

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading, the names of the assignees should appear as Martha H. Egly, Michael J. Manchester, and Rad-O-Lite of Philadelphia, Inc., all of Philadelphia, Pa., part interest to each.

Column 6,

Line 34, before "relay", "or" should be - of -

Column 7,

Line 16, after "200", "or" should be - of -.

Column 11, (Claim 3)

Line 1, after "is", "inclined" should be - included -

Signed and sealed this 17th day of December 1974.

(SEAL)

Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents