Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

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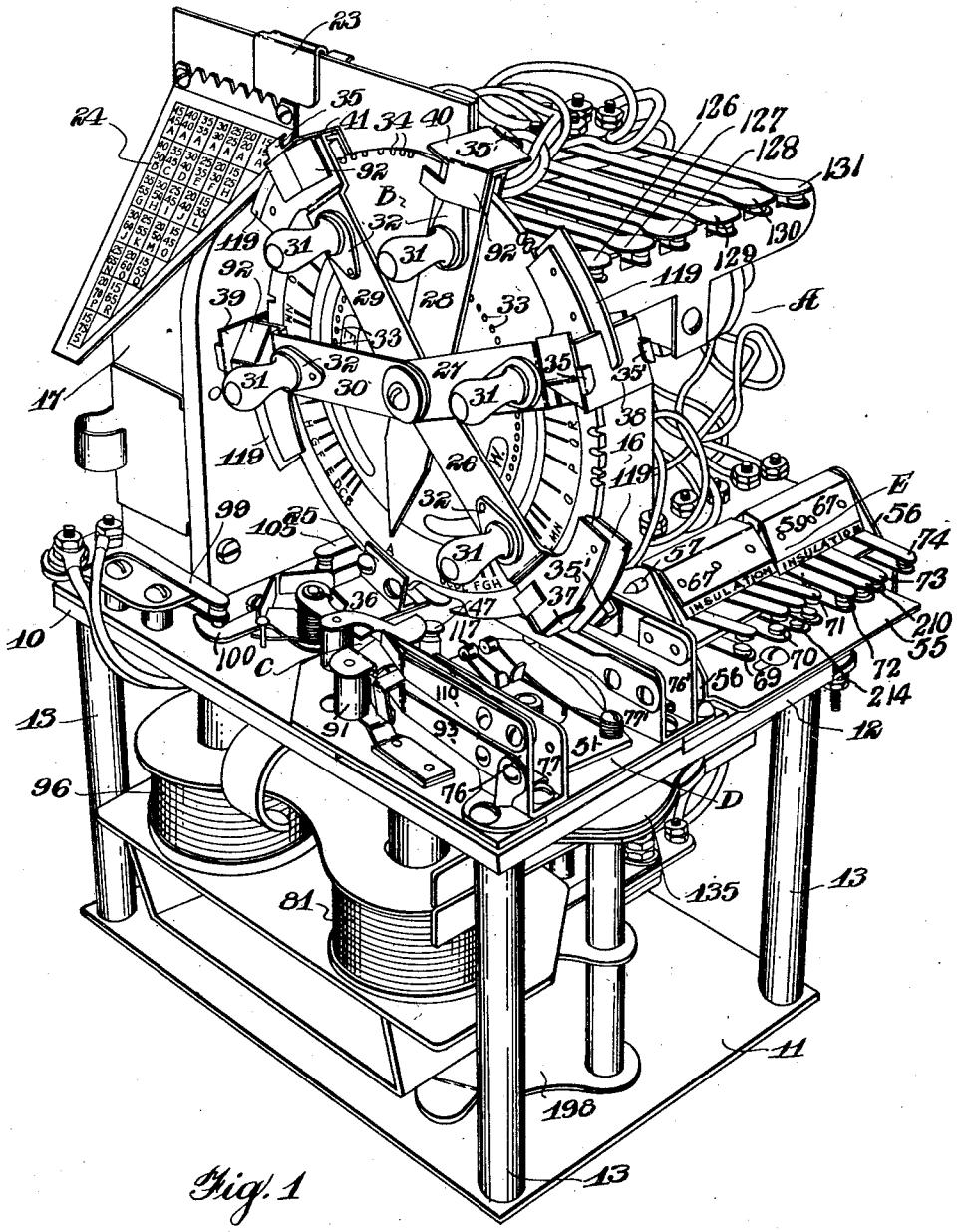


Fig. 1

Inventor
Alvin O. Olafson

By Howard Richey
Attorney

Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

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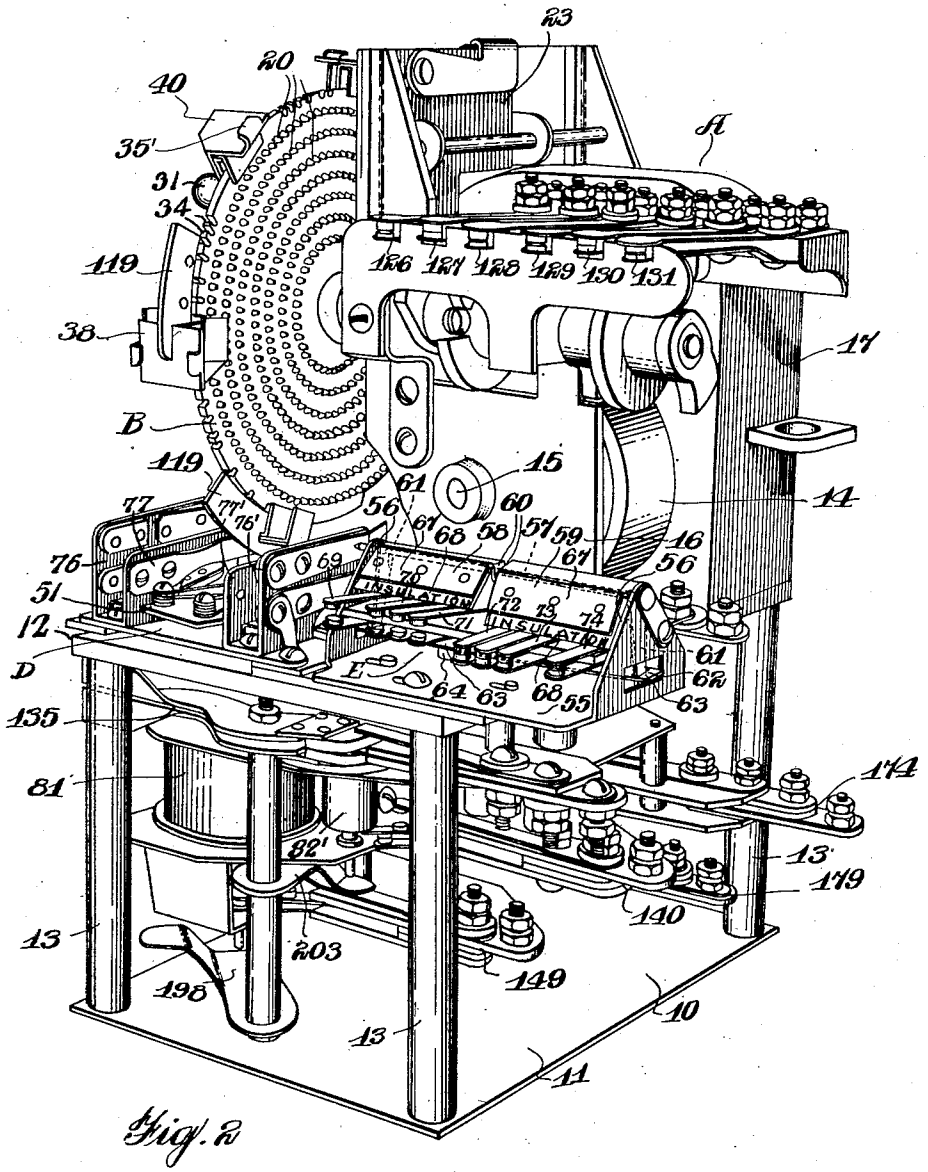


Fig. 2

Inventor

Alvin O. Olafson

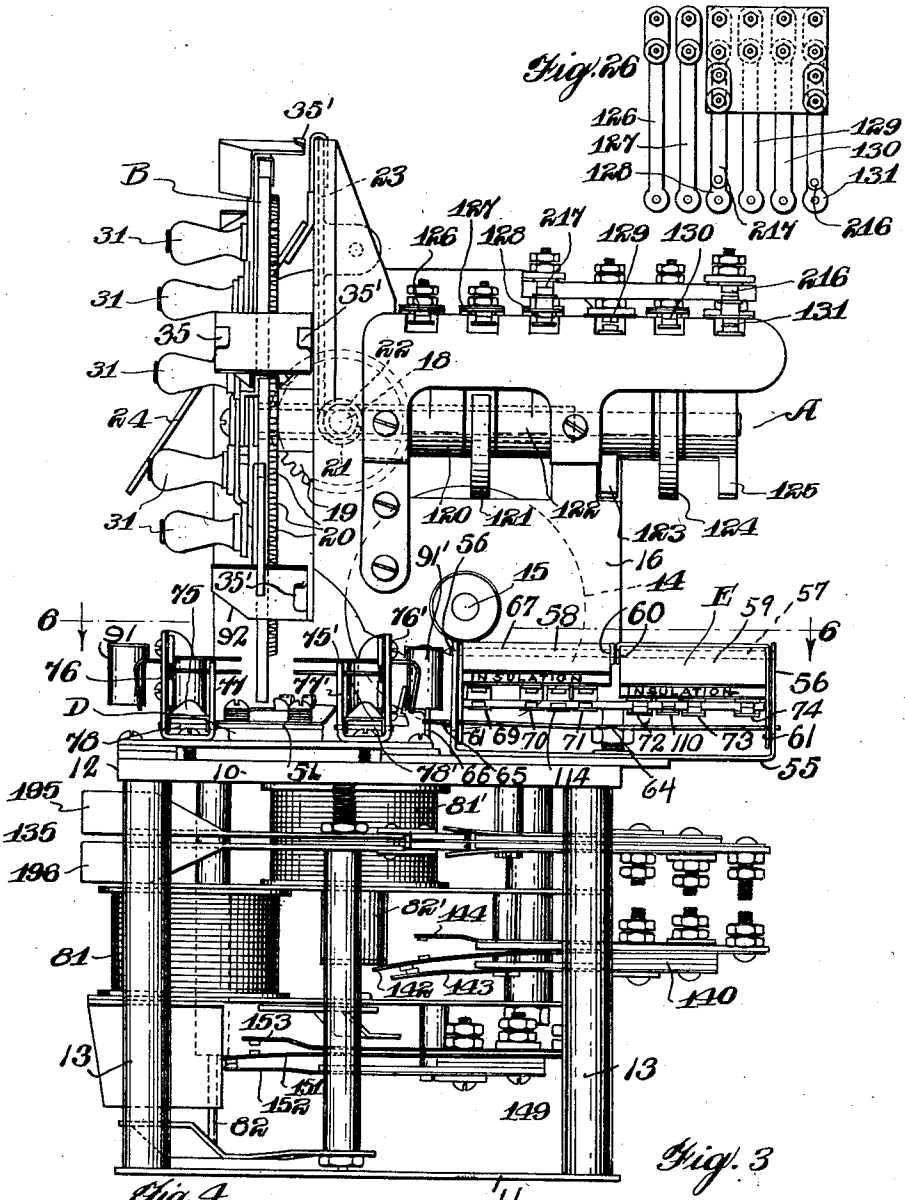
By Horace Ricker

Attorney

Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

Filed May 31, 1933 8 Sheets-Sheet 3



Inventor
Alvin O. Olafson

By Howard Richey
Attorney

Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

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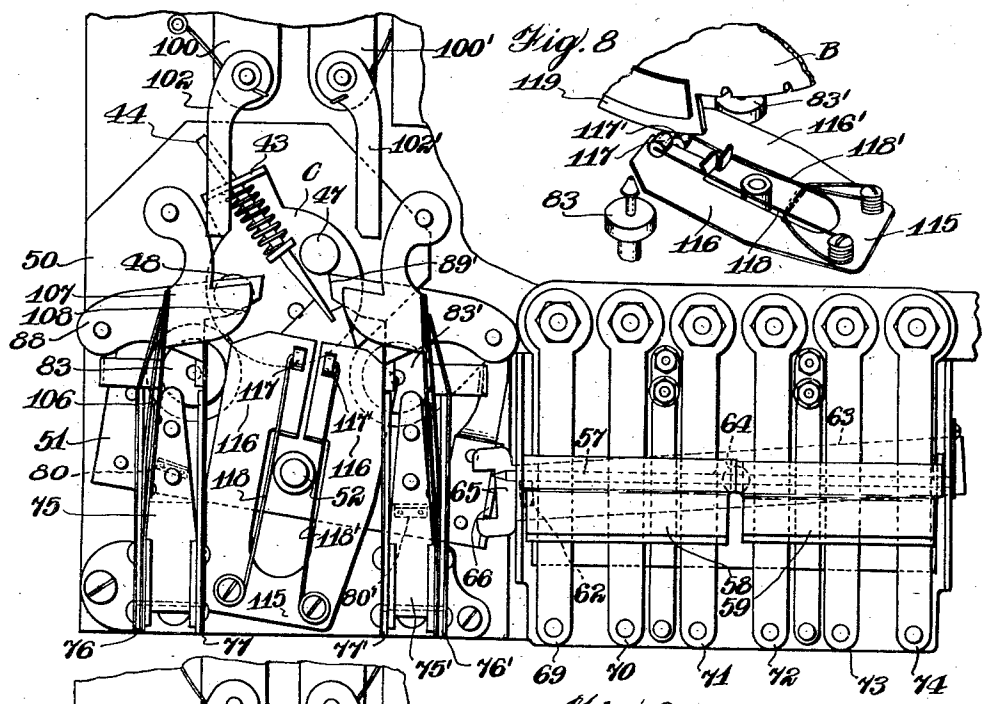


Fig. 6

Fig. 8

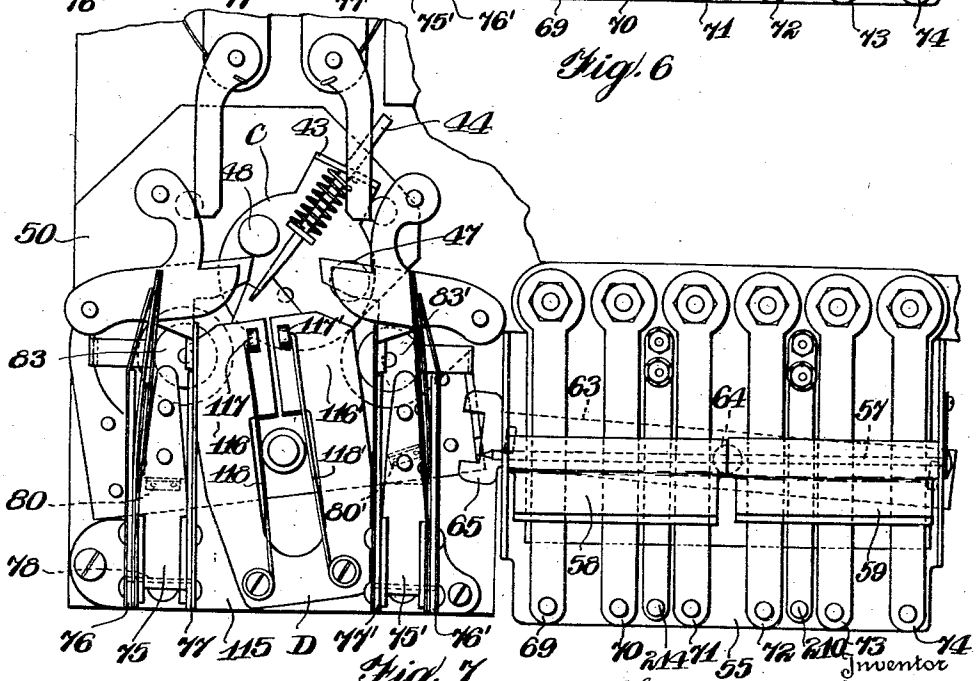


Fig. 7

Inventor
Alvin O. Olafson

By Howard Fisher

Attorney

Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

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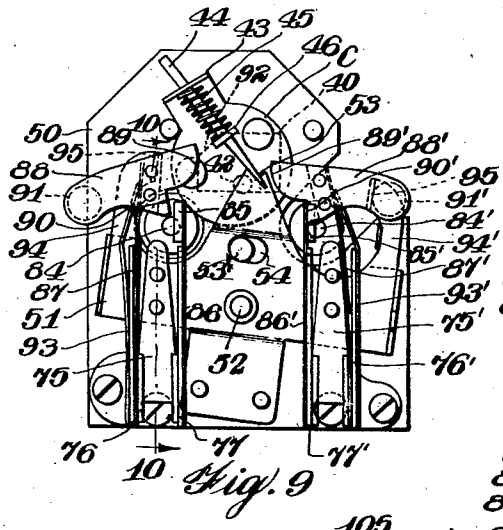


Fig. 9

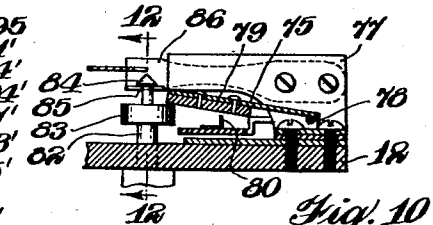


Fig. 10

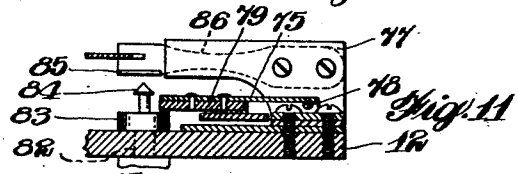


Fig. 11

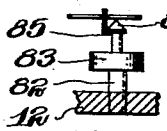


Fig. 12

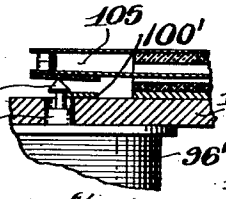


Fig. 14

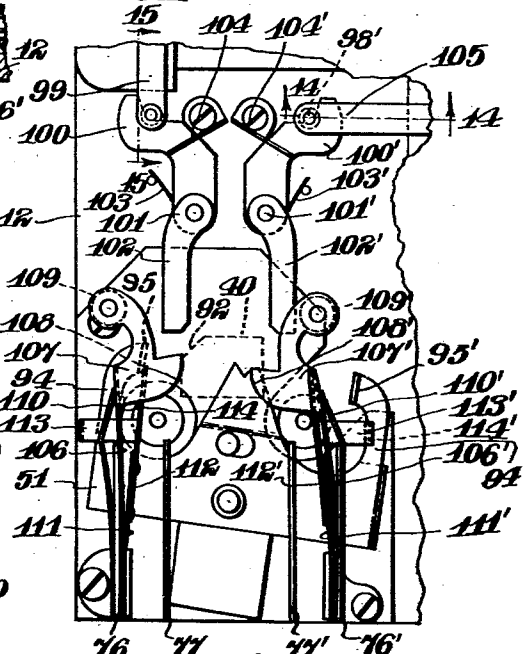


Fig. 13

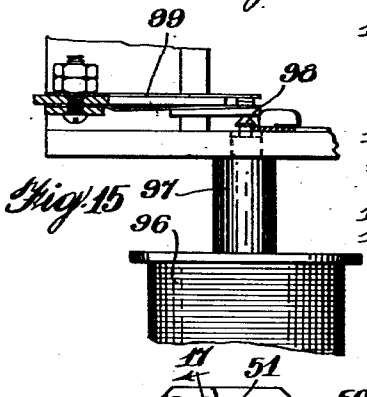


Fig. 15

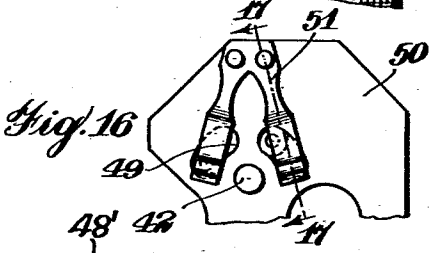


Fig. 16

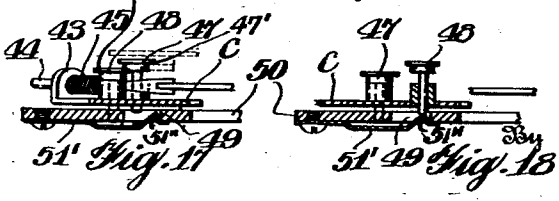


Fig. 17 Fig. 18

Inventor

Alvin O. Olafson

Howard Pierce

Attorney

Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

Filed May 31, 1933 8 Sheets-Sheet 6

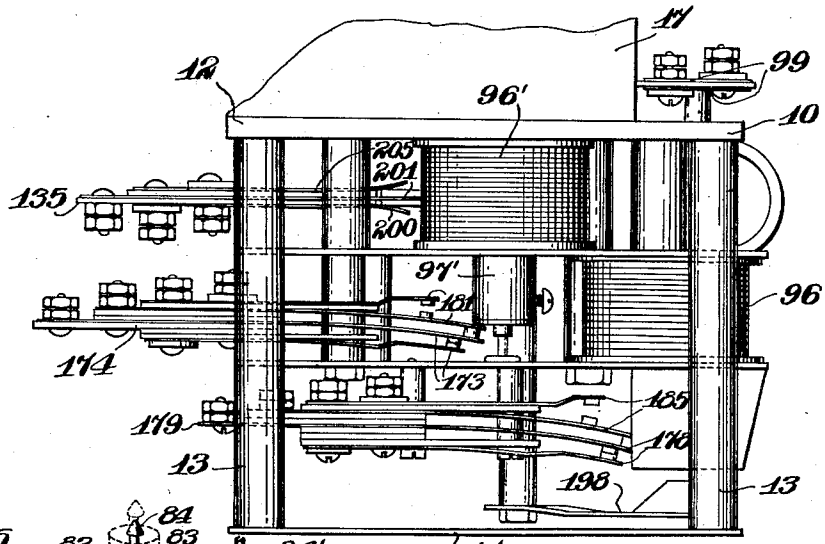


Fig. 19

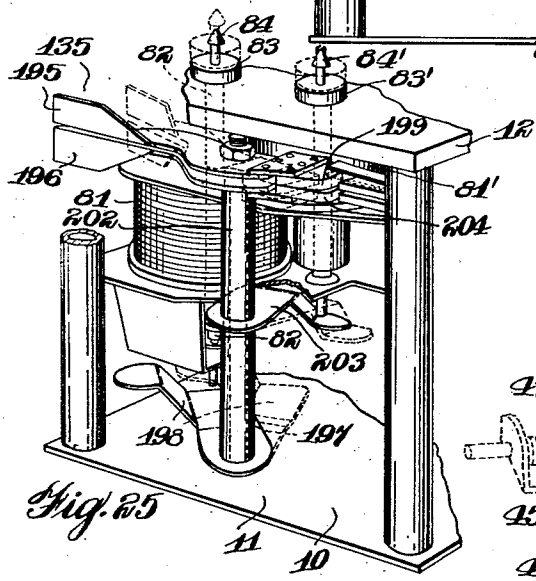


Fig. 25

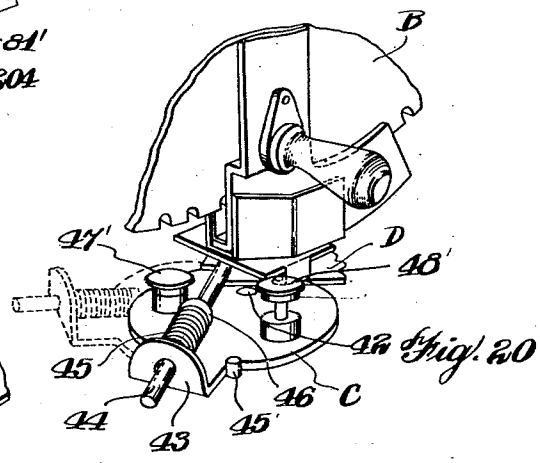


Fig. 20

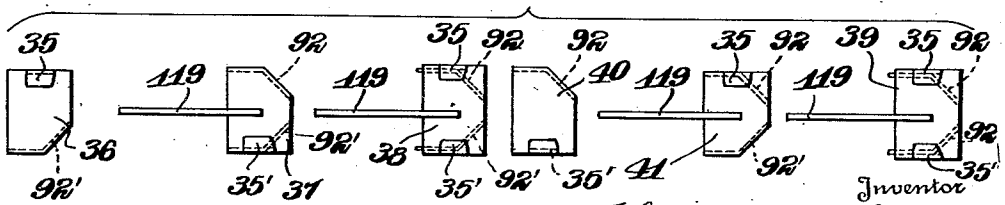


Fig. 21

Inventor

Alvin O. Olafson

By Howard Richey

Attorney

Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

Filed May 31, 1933 8 Sheets-Sheet 7

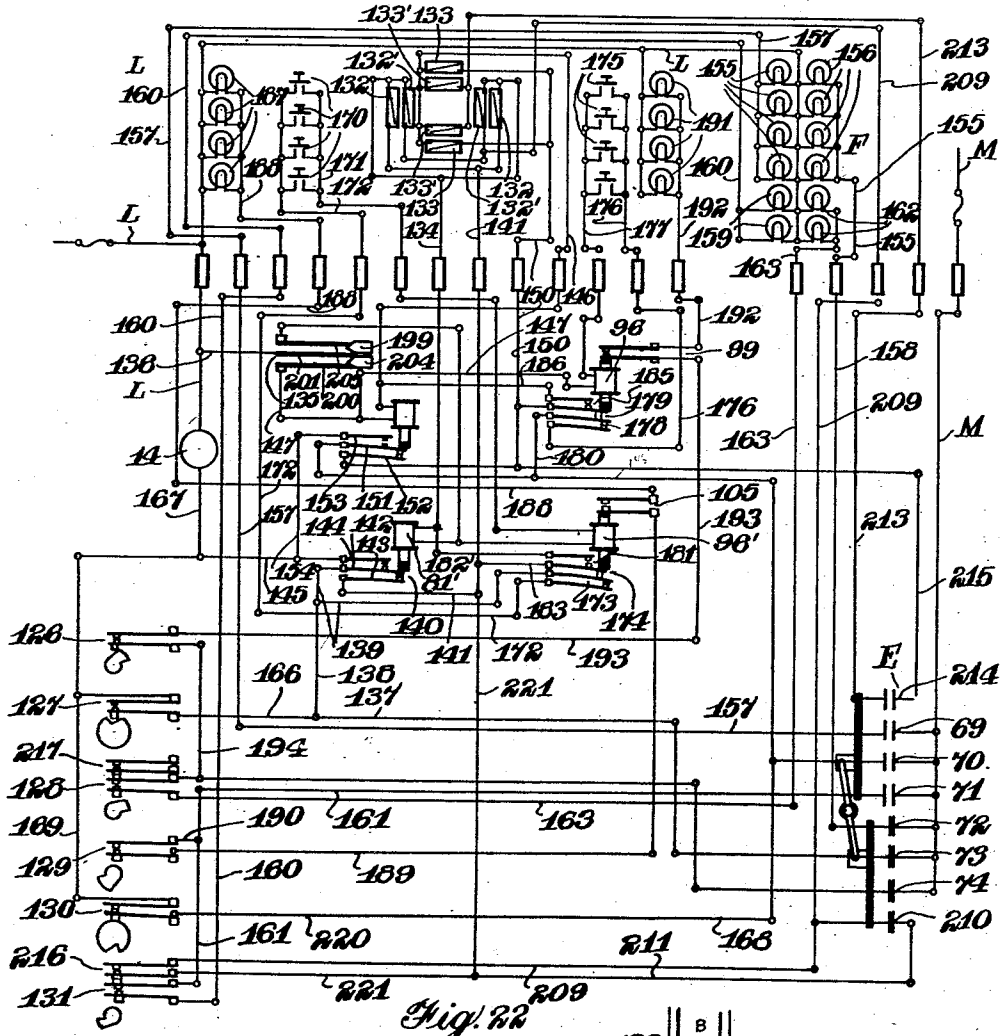


Fig. 22

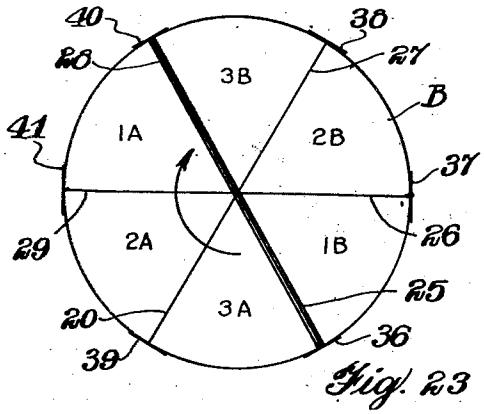


Fig. 23

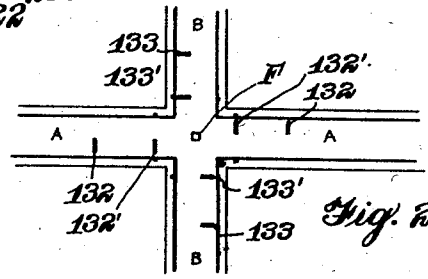


Fig. 24

Inventor
Alvin O. Olafson

By Howard Fisher

Attorney

Aug. 10, 1937. A. O. OLAFSON 2,089,660

TRAFFIC ACTUATED CONTROLLER

Filed May 31, 1933 8 Sheets-Sheet 8

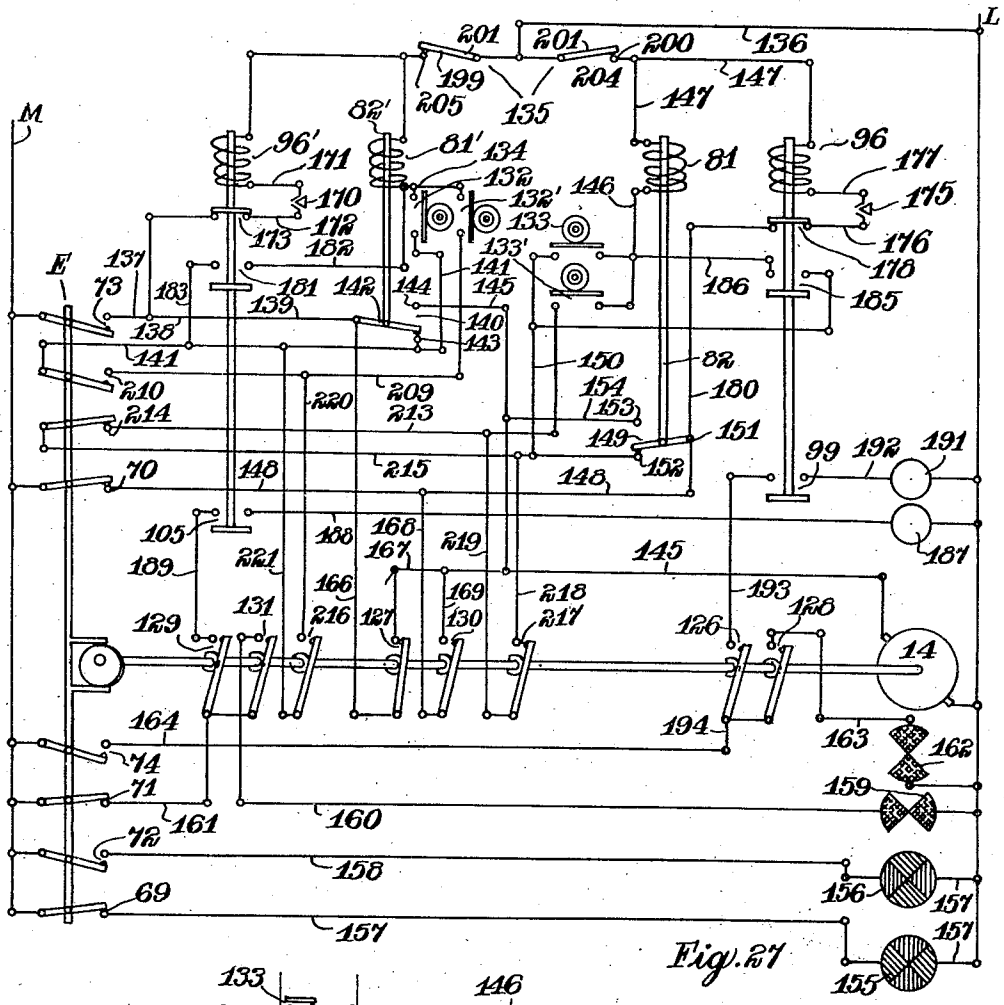


Fig. 27

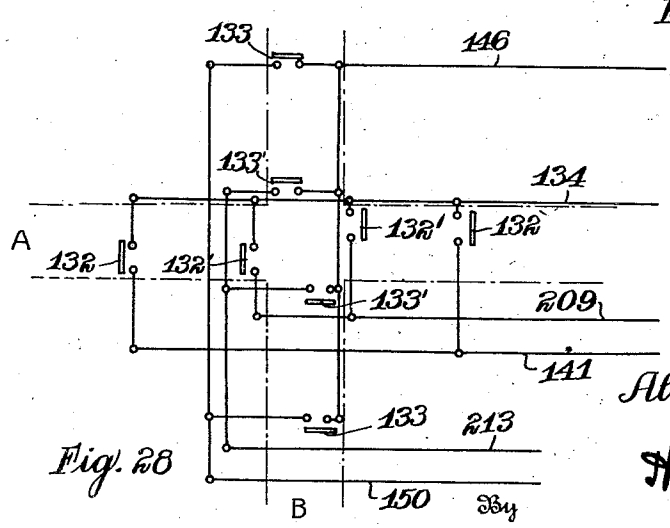


Fig. 28

Inventor
Alvin O. Olafson
By Howard Fischer
Attorney

Patented Aug. 10, 1937 2,089,660

UNITED STATES PATENT OFFICE

2,089,660

TRAFFIC ACTUATED CONTROLLER

Alvin O. Olafson, St. Paul, Minn., assignor to National Traffic Signal Company, St. Paul, Minn., a corporation of Minnesota

Application May 31, 1933, Serial No. 673,694

15 Claims. (Cl. 177—337)

This invention relates to a traffic actuated controller and is provided with means for permitting the extending of time by the flow of traffic along certain highways. With this controller the traffic is more naturally controlled than where arbitrary timers are used which allot an arbitrary predetermined time for the flow of traffic along certain intersecting highways. Thus my controller is desirable and flexible for regulating the movement of traffic at intersecting points.

A feature resides in a controller which has means for operating traffic signals, whether it may be the vehicle traffic or pedestrian traffic, along highways so as to give the right of way in accordance with the movement of the traffic along the respective highways at intersecting points. This permits the heavily travelled highway to take preference over the lesser travelled highway, irrespective of which highway it happens to be, and should the flow of traffic change or increase for any reason from one highway to the other, my controller will automatically transfer the period of time allotted to one highway to the other where the traffic is increasing. Thus with my controller, traffic signals may be switched to move the "go" signal on one highway where the traffic is not continuing, to the highway where the traffic has approached the intersection and wishes to cross the said one highway.

My controller is constructed in a manner to give a plurality of divisions to the unit of time, which is allotted for traffic on the various intersecting highways, and with means for transferring any of these divided portions from one highway to another so as to give the shortest possibe delay of traffic on any respective highway. My controller may be fully traffic actuated for operation, and it may be set to be semi-traffic actuated to a selected highway, or vice versa, or fully automatic to allot arbitrary time to each highway.

It is a feature of my controller to provide means wherein pedestrians may operate the same to receive portions of the unit of time sufficient to permit the pedestrians to cross the highway. Also, the pedestrian traffic may extend the period of time allotted to them by means of my controller where the pedestrian traffic is sufficient to do so, up to a certain limit which is regulated by the controller. This is also true of the vehicle actuated means governed by my controller so that neither pedestrians or vehicle traffic can hold up traffic along any of the highways for an indefinite period of time. My controller has means to allot a longer period of time for a pedestrian than a vehicle in crossing the respective highways, because the vehicle traffic moves faster than pedestrians over the intersections.

My controller is associated with and is adapted to operate the traffic signal which controls the movement of traffic at intersections, and I associate with the same pedestrian operable switches. Adjacent the switches which the pedestrians operate to control the traffic signal, I associate an indicating means which also acts as a signal to the pedestrians to indicate to them whether or not they have sufficient time to cross the highway after they have operated the switch which also controls the traffic signal. When the pedestrian operates the switch it causes the controller to operate to give the pedestrian an opportunity to cross the highway. If the pedestrian does not have sufficient time to cross the highway when they operate the switch the indicating means will advise them to wait a few moments until the traffic signal indicates that they can cross the highway.

My controller includes means whereby either highway at an intersection may be selected as the arterial highway. This means includes a switch mechanism which permits the controller to be set so that one of the intersecting highways can always get the right of way automatically after the intersecting highway has had traffic across the arterial highway. This means in the controller also includes the allotting of more or less time in accordance with the flow of traffic along the intersecting highway which crosses the main selected highway. Thus I provide a controller which by a mere switch mechanism, may be set so as to make either or any intersecting highway the main or arterial highway.

For example, if my controller were set up at the intersection of two highways, and one was termed the "Lincoln" highway and the other the "Jefferson" highway, my controller by this mechanism just set forth, could be set so that the Lincoln highway would always have the right of way automatically regulated by the controller so that the controller would always bring the "go" or green signal back onto the Lincoln highway. It might later develop that it was desirable to make the Jefferson highway the arterial highway instead of the Lincoln highway, and then it is only necessary to operate this switch mechanism within the controller and reverse the situation so that the Jefferson highway would always have

the right of way automatically regulated by the controller. This will illustrate the further flexibility of my controller for controlling traffic signals and directing traffic at intersections.

A further feature of my controller resides in means for controlling the operation of the amber or change light signal. There are times when it is not desirable to have the amber light appear to the traffic having the "go" or green signal, particularly with vehicle actuated signals and when the "go" signal is not going to be prolonged but will be switched to the other highway. My controller has means for accomplishing this result. Further my controller also has means of causing the amber signal light to be shown to the "go" traffic before the "go" signal shuts off and turns on the red when the controller is set to operate as a fully automatic timer. However, when my controller is set to operate as a semi-automatic timer then it operates to cause the amber light to show before the green or "go" light changes on the arterial or preferred highway, because the controller is set to automatically bring the "go" signal back to the arterial highway. However, should the traffic on the secondary highway which crosses the arterial highway be heavy enough to prolong the same to the full time allotted by the controller for the secondary highway, then the amber light would show before the green light of the signal changes to the red light. If my controller is set to be fully car actuated by the switches in the pads in the highway and each highway has a prolonged traffic to take up the full time allotted in the controller to each highway, then the amber or change light in the signal will appear before the green light changes to the red light on either of the highways. Thus it will be apparent that my controller has a further flexible nature in more efficiently and effectively controlling a traffic signalling device or light.

A still further feature of my controller resides in dividing the period of time between certain clearing points in the controller. If vehicles are travelling continuously one after the other on one highway which has the right of way, and the controller is operating to come up to one of the clearing points and the intersecting highway has received traffic just before the controller comes up to the clearing point, the intersecting highway will get the next portion of time in the controller to cross the highway on which the continuous traffic is coming, however, if the traffic on the intersecting highway does not also have a continuous flow of traffic, the time that would be ordinarily allotted to that highway will go back to the highway on which the flow of traffic is travelling and if that traffic is continuous the other intersecting highway will not get the right of travel even though the controller passes through one of the clearing points. This is a material advantage as it provides a controller which virtually humanly handles the traffic in accordance with the flow of the same on the respective highways.

This traffic actuated controller is designed primarily to act for controlling the traffic signals at intersections as an individual controller and not as a progressive timer or controller. It is also a feature to provide a traffic signalling device including the controller herein described, together with vehicle actuated devices embedded in the pavement or highway over which the vehicle passes to actuate the same and to regulate the signal at the intersection through the controller. The system includes pedestrian operated switch means.

My controller is a selectively vehicle or pedestrian actuated controlling device for signals in that it permits the controller to operate the signals at intersections to shift the "go" signals from one street to another, according to the flow of traffic, and one of the primary features of material advantage in this form of controller is that a heavy flow of traffic can prolong the "go" signal where otherwise the heavy flow of traffic would be unnecessarily broken up at an intersection when vehicles had come up to cross the street over which the heavy flow of traffic is passing.

The controller has another advantage which resides in the extending of the time so as to give more of the divisions of time to one highway than to another under such circumstances as follows: If at intersecting highways, traffic comes along one highway and is given the first divided portion of the whole unit of time to cross the intersection, and then the traffic ceases along that particular highway, and in the meantime the traffic starts flowing along the other intersecting highway and continues to flow along the same, the last highway will get the preference through the controller to maintain the right of way even though traffic comes up on the other highway. In this manner my controller extends the period for the flow of traffic along the highway where the traffic increases longer than if there had been continuous or more traffic on the first highway. However, this last highway cannot hold up the traffic on the intersecting highway indefinitely even though it has had a longer period or time for the flow of traffic in accordance with the foregoing circumstances, and thus the intersecting highway will secure the right of way after the highway which secured the longer period has had a number of periods of the whole unit of time allotted to it through the controller, or, should the traffic cease sooner than would be required to use up the time which it might otherwise get and traffic has come up on the intersecting highway, the controller will switch the movement of traffic for the intersecting highway and permit it to cross the other highway. These circumstances just set forth could be reversed as to highways, all of which is automatically regulated by my controller without any manual attention.

With this controller, when it is set to be semi-car actuated, an arbitrary period of time is always allotted to the main highway, however, the main highway can secure a longer period than the arbitrary period allowed if there is no traffic along the other highway, and in fact, the main highway may have all of the time so long as there is no traffic on the intersecting highway. Then if traffic comes along the intersecting highway and such traffic on the intersecting highway is heavy enough, it can take several periods of time or the full allotted time for the intersection, according to the setting of the controller. However, if the intersecting traffic takes the first portion of its period allotted to it and misses the next portion, it cannot again secure a portion of the time until the remaining periods which might have otherwise gone to the intersecting highway have elapsed as well as the arbitrary period set in the controller for the main highway. When the intersecting highway takes the first period of time allotted to it in the controller and there is sufficient traffic on the intersecting highway, it may also take the second period and even the third period of its time.

In the drawings forming part of this specification:

Figure 1 illustrates a perspective front view of my traffic actuated controller removed from the protective housing which it ordinarily is encased in when it is in use at intersecting highways.

Figure 2 is a similar perspective to Figure 1 looking toward the back of the controller.

Figure 3 is a side view looking at the edge of the timer dial.

Figure 4 diagrammatically illustrates a set of cams which are carried on a sleeve which operates with the timer dial.

Figure 5 diagrammatically illustrates a series of cams which are mounted on the shaft which runs through the sleeve which carries the cams of Figure 4.

Figure 6 is a diagrammatic illustration about in the plane of the line 6—6 of Figure 3 and in the direction of the arrows, showing the shifter and the electrical master switch mechanism which it operates.

Figure 7 is a similar view to Figure 6 in the same plane along the line indicated for Figure 6 on Figure 3, showing the parts in a different position.

Figure 8 is a perspective of a detail of a portion of the controller, showing a portion of the timer dial in relation to the spring stop plate and its anti-friction rollers with spring arms, a portion of the stop plate being depressed by the cam of the timer dial.

Figure 9 is a diagrammatic plan view of a portion of the shifter, some of the parts having been removed to more clearly illustrate the remaining parts.

Figure 10 is a section on the line 10—10 of Figure 9.

Figure 11 is a similar section to Figure 10 showing the parts in a different position.

Figure 12 is a section on the line 12—12 of Figure 10.

Figure 13 is a diagrammatic plan of a portion of the shifter and some of the associated mechanism operating therewith.

Figure 14 is a diagrammatic section on the line 14—14 of Figure 13.

Figure 15 is a diagrammatic elevation on the line 15—15 of Figure 13, showing the portion of the solenoid below the top plate of the frame of the controller.

Figure 16 is a bottom diagrammatic detail beneath one end of the shifter mechanism to show the operating leaf spring.

Figure 17 is a diagrammatic section on the line 17—17 of Figure 16 showing the parts in one position.

Figure 18 is a similar section showing the parts in another position.

Figure 19 is a diagrammatic side elevation of a portion of the controller showing the opposite side to Figure 3 and showing the electrical switches which are operated by the pedestrians through the solenoids for operating the same.

Figure 20 is a perspective detail diagrammatically illustrating a portion of the timer dial and cam in relation to the booster which operates the shifter of the master switch, only a portion of the shifter being illustrated.

Figure 21 is a diagrammatic illustration of the series of cams carried by the periphery of the timer dial illustrating them in their respective order in which they are arranged around the timer dial from left to right.

Figure 22 illustrates a wiring diagram of the traffic actuated controller system including the signal lights and traffic actuated switches.

Figure 23 is a diagrammatic illustration of the timer dial to designate the divisions of time represented by the same between the respective cams illustrated in Figure 21.

Figure 24 is a small diagrammatic plan view showing intersecting highways to illustrate the operation of my traffic actuated and selective controller and my signalling system.

Figure 25 is a perspective detail illustrating the manual setting switch and associated parts.

Figure 26 is a diagrammatic plan view of the cam operated switches and the manner in which additional pairs of contacts may be added to energize the auxiliary pads during a portion of the time.

Figure 27 is a wiring diagram of my signalling system.

Figure 28 is a wiring diagram of the vehicle pad arrangement.

My controller A is provided with a frame 10 comprising a bottom plate 11 and an upper plate 12 which are spaced apart by spacing supports 13. The motor 14 is secured upon the upper plate 12 and is provided with a shaft 15 which is journalled at one end in the supporting member 16 forming a part of the frame 10. The other end of the shaft 15 extends into the housing 17. A series of reduction gears are contained within the housing 17, which gears drive the shaft 18, extending out of the housing 17, at a desirable fixed speed. A sprocket gear 19 is slidably keyed upon the shaft 18 and co-operates with one of a number of concentric circles of pins 20 to drive the timer dial B. The gear 19 is held in co-operation with a desired circle of pins by means of a yoke 21 partially encircling a clutch collar 22 secured to the gear 19, which yoke is secured to the indicating apparatus 23 co-operable with an indicating plate 24, in a manner more clearly set forth in my application Serial No. 594,775, filed February 24, 1932. The timer dial B can therefore be driven at one of a number of speeds by the constant speed motor 14.

The timer dial B acts through the booster C to operate the shifter D to throw the master switch E controlling the circuit to the motor and to the signal lights. In order that the dial B may operate the booster C, the dial B is provided with a fixed lug 25 and a series of cam bearing arms 26, 27, 28, 29 and 30, each of which is circumferentially adjustable about the dial B. Each of these various arms is provided with a spring handle 31 to which is secured a small plate 32, bearing a pin which extends through the arm and into one of a number of suitable apertures 33 in the dial B with the exception of the handle secured to the arm 28 which co-operates with one of a series of notches 34 in the periphery of the dial B. By reference to suitable indicia on the dial, these arms may be adjusted at various relative positions upon the dial B.

The lug 25 and each of the above named arms are equipped with a plate-like member extending at right angles to the radially extending lug and arms. Each of these plate members is provided with one or more cam lips 35. Referring also to Figure 21, the plate 36 on the lug 25 is provided with one cam lip 35 on the forward side of the dial B. The plate 37 on the arm 26 is provided with one cam lip 35' on the rear or inner edge of the plate. The plate 38 on the arm 27 is provided with a cam lip 35 or 35' on both sides thereof as is also the plate 39 on the arm 30. The plate 40 on the arm 28 is provided with a single lip 35' on the rear or inside edge of the plate while the

plate 41 on the arm 30 is provided with a single lip 35 on the forward or outer side of the plate. These cam lips operate in a manner which will be hereinafter set forth to move the booster C.

The booster C and its relationship with the dial B may be seen in Figure 20 of the drawings. The booster C is pivoted at 42 virtually centrally beneath the center of the dial B. The booster C comprises a substantially circular plate having an upturned ear 43 projecting on one side thereof. A forked arm 44 extends through the ear 43 and engages a portion of the shifter D in a manner which will be hereinafter more clearly set forth. A spring 45 encircles the shaft 44 and extends between a collar 46 on the shaft 44 and the ear 43 in a manner to force the forked shaft 44 into engagement with the shifter D. Suitable stops 45' limit the pivoting of the booster C.

Oppositely disposed on either side of the center line extending through the center of the ear 43 and the pivot point 42 of the booster C and extending through suitable bosses, are a pair of vertically slidable headed pins 47 and 48. These pins extend through the booster C and through arcuated slots 49 in the base plate 50 of the shifter D and into contact with a double spring 51' secured to the bottom of the plate 50, in the manner illustrated in Figures 16, 17, and 18. Each arm of the double spring 51' is provided with a raised hump 51'' acting to raise the pin 47 or 48 associated therewith at one extreme position of the booster. Thus the humps 51'' on the double spring 51' act to hold one pin 47 or 48 in raised position and to allow the other pin to drop into lowered position. In Figures 6 and 7, the opposite extreme positions of the booster C are illustrated. The ear 43 on the booster C is pivoted to one side or to the other of the center line of the dial B. The spring 51' is so arranged as to support the pin 47 or 48 on the side of the booster C, toward which the ear 43 has been pivoted in raised position. In other words, when the booster C is in the position illustrated in Figure 6, the pin 48 will be in raised position and the pin 47 lowered. In the position of the booster C illustrated in Figure 7, the pin 47 will be raised and the pin 48 will be lowered.

When a pin 47 or 48 is in lowered position, it is dropped out of the path of engagement with the cam lips 35 and 35' on the dial B. However, when one of the pins is in raised position, like in Figures 17 and 18, or in Figure 20, it will be engaged by the cam lips 35 or 35' on one side of the plane of the dial B. The pin 47 which is to the rear of the plane of the dial B, will be engaged by the cam lips 35' on the plates 37 and 40, as well as by the lips 35' on one edge of the plates 38 and 39. The pin 48 is forwardly of the plane of the dial B and will be engaged by the lips 35 on the other edges of the plates 38 and 39 and by the lips on the plates 36 and 41.

The shifter D is provided with a pivotal bed plate 51 pivoted to the base plate 50 at 52 and having a centrally aligned notched end 53 in which the end of the forked shaft 44 engages. The pivoting of the bed plate 51 is limited by the stop pin 53' on the base plate 50 which extend through the slot 54 (Figure 9) in the bed plate 51, thereby limiting the pivoting of the plate 51 to the movement of the stop 53 within the slot 54. The plate 51 is held in one extreme position or the other by the forked shaft 44 of the booster C which engages in the notch 53. It may be seen that when in the operation of the dial B, a cam lip 35 or 35' strikes a raised pin 47 or 48, the booster C is caused to pivot about its pivot point 42 until the shaft 44 comes into alignment with the center line of the pivotal bed plate 51 extending through the pivot point 52 and the center of the notched end 53. A further slight pivoting of the booster C causes the forked shaft 44 to bear against the other side of the notch 53 from that which it has been previously in engagement. This action pivots the bed plate 51 about the point 52, acting to shift the master switch E in a manner which will be hereinafter more clearly described. The circumferential flanges 47' and 48' at the top of the pins 47 and 48 engage over the inturned portions of the lips 35, holding the pins in engagement with the lips 35 until they move out of contact with the pins. This construction is best illustrated in Figure 17.

The master switch E is probably best illustrated in Figures 1, 2, 6, and 7 of the drawings. This master switch is provided with a base plate 55, having an upwardly extending flange 56 on either end thereof to form bearings for a horizontal shaft 57. Upon the shaft 57, are pivotally mounted a pair of angle members 58 and 59, one end of each member having an ear 60 bent down from the top thereof through which the shaft 57 may pivot. On the opposed ends of each of the angle members 58 and 59, are formed arms 61 through which the shaft 57 also extends. The arms 61 extend through apertures 62 in a horizontal lever 63 which is pivoted at 64 centrally of the base plate 55. The lever 63 is provided with a bifurcated end 65 between the ends of which is positioned an upturned lug 66 on the pivotal bed plate 51 of the shifter. When the bed plate 51 is pivoted in the position illustrated in Figure 6, the lever 63 is forcing the arm 61 on the angle member 58 forwardly, tending to tilt the front face 67 of the angle member 58 forwardly and upwardly, this angle member pivoting on the shaft 57. At the same time, the opposite end of the lever 63 on the opposite side of the pivot 64 is forcing the arm 61 on the angle member 59 rearwardly, pivoting this angle member around the shaft 57 and tending to pivot or tilt the front face 67 of the angle member 59 downwardly. The front face 67 of each of the angle members 58 and 59 is provided with an insulating shoulder 68 adapted to bear against the various spring contact switches making up the master switch E. Accordingly, when the plate 51 is in the position illustrated in Figure 6, the angle member 58 has been tilted upwardly to permit the contact points 69, 70 and 71, to spring apart, opening these contacts, while the angle member 59 has been tilted downwardly to close the contact points 72, 73 and 74. The position of these various contacts in the circuit may be seen in the wiring diagram in Figure 22 of the drawings. However, it is believed sufficient to state at this point, that the shifting of the master switch E acts to change the signal lights on the signal F.

From the foregoing description, it would appear that when the cam lip 35 on the plate 36 bears against the pin 48, the master switch E would be shifted in one direction. When the cam lip 35' on the plate 37 comes in contact with the pin 47 which would then be in raised position, the master switch E would be shifted back into its original position and accordingly, each time one of the plates 36 to 41, inclusive, passes the booster C, the master switch E would change position. Various means are provided, however, for preventing the shifting of the bed plate

51 of the shifter D, and unless each of these means for locking the bed plate 51 in one extreme position is released, this plate will not pivot. One of these locking means comprises the pivoted dogs 75 and 75'. A pair of upwardly extending flanges 76 and 77 extend upwardly from the base plate 50 of the shifter and one dog 75 is pivotally mounted on a shaft 78 (Figures 10 and 11) extending between these flanges 76 and 77. The dog 75' is pivoted on a shaft 78' extending between a similar pair of flanges 76' and 77'. The dogs 75 and 75' are formed with a weighted end 79 or 79', respectively, which acts as a shoulder to engage against a stop flange 80 or 80', one of which is mounted on either side of the pivotal bed plate 51. When the plate 51 is in the position illustrated in Figure 6, the flange 80' on the plate 51 on the right side of the center thereof engages the shoulder ends 79' of the locking dog 75' while the shoulder 80 to the left of the center of the plate 51 is released from the shoulder 79 on the dog 75. In the position illustrated in Figure 7, the flange 80 to the left of the center of the pivotal plate 51 is in engagement with the weighted shoulder end 79 of the dogs 75, while the dog 75' is free from engagement with the flange 80' to the right of the center of the plate. Accordingly, when the plate 51 has been pivoted into either extreme position, it is locked in this position by the dog 75 or 75' and cannot be moved by the booster C until the engaging dog is released. Accordingly, when the booster C is engaged by one of the cam lips 35, the booster C pivots about its pivot point 42 and attempts to move the bed plate 51 but failing to do so, returns to its position before engagement by the cam lip 35, as soon as this lip moves out of engagement with the pin 47 or 48.

In order to release the dogs 75 or 75' from engagement with the flanges 80 or 80', it is necessary that the solenoid 81 or 81' be actuated. The solenoids 81 and 81' are provided with slidable cores 82 and 82', respectively, each of which is provided with a cylindrical stop head 83 and 83', respectively. Above the stops 83 and 83', the core is restricted in diameter for a short distance and a cone-shaped head of larger diameter 84 or 84' is formed on the end of each core. This is clearly illustrated in Figure 25 of the drawings. As the shifter D is provided with entirely similar opposite sides or in other words, as the shifter D is entirely symmetrical with respect to the center line or plane of the dial B, it may be understood that their functions are just the same, and in showing one of the core members 82 or 82' in detail, the other core member could just as well have been shown. The primed numbers refer to parts to one side of the plane of the dial B, and the same unprimed numbers refer to similar parts on the other side. Figure 11 of the drawings illustrates the core 82 in lowered position, resting upon the upper plate 12 of the frame 10. Figure 10 illustrates the core in raised position, wherein the cone-shaped head 84 is engaged by a transverse flange 85 on a spring arm 86 secured to the flange 77. This engagement is also clearly illustrated in Figure 12. The position of the flange 85 on the arm 86 and of the flange 85' on the arm 86' with respect to the cone-shaped heads 84 and 84' may be seen in Figure 9 of the drawings. As the heads 84 and 84' are driven upwardly by the solenoids 81 and 81', they bear against the flanges 85 and 85' bending the arms 86 and 86' inwardly. The flanges 85 and 85' then engage beneath the heads 84 and 84' to hold the cores 82 and 82' bearing the cylindrical stops 83 and 83' into the raised position illustrated in Figure 10 of the drawings. As may be seen in Figures 10 and 11, the weighted ends 79 of the dogs 75 and 75' rest upon the upper surface of the stops 83 and 83', lifting the dogs 75 and 75' out of engagement with the flanges 80 on the pivotal bed plate 51, releasing this bed plate and allowing the same to pivot. The means for releasing the cone-shaped heads 84 and 84' from the flanges 85 and 85' is best illustrated in Figure 9 of the drawings. Secured to the flanges 76 and 76', respectively, are spring arms 87 and 87'. Each of the spring arms 87 and 87' bears a hammer head 88 or 88'. These hammer heads are provided with a cam end 89 or 89', a hammer shoulder 90 or 90' which is adapted to strike against the spring arms 86 or 86' and a hammer weight 91 or 91'. Figure 9 illustrates in dotted outline the plate 40, mounted upon the arm 28 of the dial B. Adjacent this plate 40, is positioned a beveled or cam surface 92. A similar surface 92 is formed on each of the plates 37, 38, 39, 40 and 41. In the rotation of the dial B, each of the beveled surfaces 92 bears against the cam surface 89, flexing the spring arm 87 outwardly in the manner illustrated in Figure 9. The spring arm 93 which is also secured to the flange 76 bears against the spring arm 87 to increase the spring tension, forcing this arm inwardly. As soon as the cam surface 89 is released by the cam surface 92, the spring arm 87 flexes inwardly, the hammer shoulder 90 striking sharply against the spring arm 86, flexing the spring arm 86 sufficiently to disengage the flange 85 from the head 84 of the solenoid core, allowing this core to drop. In a similar manner, the cam surfaces 92' on the plates 36, 37, 38, 39 and 41 are engaged by the cam surface 89', flexing the spring arm 87' outwardly against tension of the spring arm 93' and when the cam surface 92' pivots out of engagement with the cam surface 89', the hammer shoulder 90' strikes sharply against the spring arm 86', releasing the flange 85' from engagement with the head 84' of the solenoid core. Thus a releasing means for permitting the solenoid core to drop is provided.

For reasons which will be hereinafter set forth, it is undesirable to release the solenoid core 82 or 82' to permit the same to drop on that side of the shifter D, toward which the notched end 53 of the bed plate 51 is pivoted. In the position illustrated in Figure 9, for example, it is undesirable to release the head 84' from engagement with the flange 85' and when in the opposite pivotal position, it is similarly undesirable to disengage the head 84 from engagement with the flange 85. To prevent such disengagement by the hammer head 88', I provide a pair of arms 94 and 94' extending integrally from the bed plate 51 and provided with upwardly extending stop flanges 95 and 95'. These stop flanges are adapted to engage against the hammer weights 91 and 91' to limit the inward movement of the hammer heads 88 and 88', thereby preventing these heads from striking the spring arms 86 and 86' to release the solenoid cores. In the position illustrated in Figure 9, the stop flange 95' is in engagement with the hammer weight 91' and therefore, the hammer shoulder 90' cannot strike the arm 86' to disengage the flange 85' thereon from the solenoid core 84'. In this position, however, the flange 95 is out of engage-

ment with the hammer weight 91 and the hammer head 88 is free to act upon the arm 86. In the opposite pivotal position of the plate 51, the reverse is true, as the stop flange 95 engages against the hammer weight 91, preventing the operation of the hammer head 88, but the head 88' is free to operate upon the arm 86'.

The solenoids 81 and 81' are operated in a manner which will be described in connection with the wiring diagram by the vehicles passing along the various highways. A second pair of solenoids 96 and 96' are so situated in the circuit as to be operated manually by a pedestrian who wishes to cross at the intersection. Figure 19 illustrates the position of the solenoids 96 and 96', while Figure 15 illustrates the operation thereof when studied in connection with Figure 13. The solenoid 96 is provided with a core 97 provided with a cone-shaped head 98. This head 98 is adapted to bear against a pair of switch contacts 99 in a manner to close these contacts when the core 97 is in raised position. The core 97 is held in raised position by a lever 100 which is pivoted at 101 to the top plate 12 of the frame and which is secured to a lever 102 extending partially over the shifter D. The lever 100 is held in engagement with the core 97 by means of a spring 103, and a stop shoulder 104 limits the pivoting of the lever 100 when this lever is out of engagement with the core 97. The solenoid 96' is provided with a core 97' having a cone-shaped head 98' of larger diameter than the portion of the core 97' adjacent the same and when the core 97' is in raised position, it acts to close the switch contact 105. As illustrated in Figure 13 and in Figure 14, the core 97' is held in raised position by means of a lever 100' pivoted at 101'. A lever 102' pivots with the lever 100'. The lever 100' is held in engagement with the core 97' by means of a spring 103' and a shoulder 104' limits the pivoting when this lever is not in engagement with the core 97'.

The means for releasing the cores 97 and 97' from engagement with the trip levers 100 and 101 is illustrated in Figure 13. Spring arms 106 and 106' are secured to the flanges 76 and 76', respectively. These arms 106 and 106' are equipped with hammer heads 107 and 107'. The hammer heads 107 and 107' are provided with cam surfaces 108 and 108' respectively, which are also engaged by the cam surfaces 92 and 92' on the various plates 36 to 41, inclusive, on the lug 25 and upon the various adjustable arms 26 to 30 inclusive of the dial B. In dotted outline in Figure 13 is illustrated a plate 40 having a cam surface 92 which is in engagement with the cam surface 108 of the spring arm 106. The hammer heads 107 and 107' are also provided with weighted hammers 109 and 109'. The engagement of the cam surface 108 with the cam surface 92 flexes the spring arm 106 outwardly against the tension of this spring arm and a supplementary spring arm 110. When the cam surface 92 moves out of engagement with the surface 108, the arm 106 flexes inwardly causing the weighted hammer 109 to strike sharply against the lever 102, momentarily pivoting the lever 100 about the pivot point 101 and releasing the head 98 of the solenoid core 97. Similarly, the cam surfaces 92' cause the hammer weight 109' to strike the lever 102', releasing the head 98' of the core 97'.

For reasons which will become clear as the description of operation of the device progresses, it is desirable to trip the cores 97 or 97' on but one side at a time, and therefore, the applicant provides a means of rendering the hammer heads 107 or 107' on the side toward which the notched end 44' of the plate 51 is pivoted, inoperative. This is accomplished by securing a spring strip 111 or 111' to each of the flanges 76 and 76' inwardly of the spring arms 106 and 106'. To the flexible arms 111 or 111' are secured more rigid arms 112 or 112', having locking catches 113 or 113' secured integrally thereto. These catches 113 and 113' bear against an upwardly extending stop 114 or 114'. When the bed plate 51 is in the position illustrated in Figure 13, the catch 113' is in contact with the stop 114', thus preventing inward movement of the arm 112'. As this arm 112' is inwardly of the spring arm 106', the hammer head 107' is limited against inward movement and the weighted hammer 109' cannot strike against the lever 102' to release the lever 100' from engagement with the core 97'. When the plate 51 is in the opposite extreme position, the locking catch 113 is in contact with the stop 114 on the arm 94 of the plate 51, and the weighted hammer 109 is prevented from striking against the lever 102. When the catches 113 or 113' are not engaged, the flexible arms 111 and 111' support the rigid arms 112 and 112' in a manner so as not to interfere with the movement of the arms 106 and 106'.

From the foregoing description, it would appear that when the plate 51 was pivoted into the position illustrated in Figure 6, and the solenoid 81' operated to release the dog 75' from engagement with the flange 80' on the plate 51, the plate 51 would then be free to pivot the next time the booster C was actuated to move the shifter into the position illustrated in Figure 7. It is sometimes undesirable in the operation of the device to permit the plate 51 to pivot even though the dog 75 is out of engagement with the stop flange 80. It is usually undesirable to pivot the plate 51 when both of the solenoid cores 82 and 82' are in raised position. For this reason, the spring locking plate illustrated in Figures 6, 7 and 8 is provided. This spring plate 115 is provided with two spring ends 116 and 116' which are separably operable. An antifriction roller 117 or 117' is secured by means of a spring arm 118 or 118' to the plate 115 in a manner to rest upon the ends 116 and 116' respectively. When the plate 51 is pivoted in the position illustrated in Figure 6, a roller 117 is thrown into the plane of the dial B, whereas, in the position illustrated in Figure 7, the roller 117' is in the plane of the dial B. As illustrated in Figure 21, plate cams 119 are secured to and are movable with the plates 37, 38, 39 and 41. The construction of these plate cams 119 is clearly shown in the perspective views of Figures 1 and 2 and Figure 8 of the drawings. In the rotation of the dial B, the plate cams 119 engage the roller 117 or 117' depending upon the position of the plate 51, and depress one end 116 or 116' of the spring plate 115. When one end of the stop plate 115 is depressed, it reaches the level of the stops 83 and 83' and prevents the pivoting of the plate 51 upon which the plate 115 is mounted. In Figure 6, if the end 116 of the stop plate 115 is depressed, the stop 83 is in raised position and the plate 115 will bear against the stop 83 and prevent pivoting of the plate 51. Similarly, in Figure 7, if the end 116' is depressed, it will bear against the stop 83 if this stop is in raised position. It is obvious that

when the end 116 bears against the side of the stop 83, or the end 116' bears against the stop 83', the plate 57 bearing the stop plate 115 cannot pivot.

Figure 5 illustrates diagrammatically a series of cams which are operated simultaneously with the dial B. The cams in Figure 4 are mounted upon a sleeve B'' through which the shaft B' of the dial B extends. The shaft B' is supported by the supporting member 16. The sleeve B'' is secured against turning with respect to the arm 28. Thus, when the dial B is not in rotation and the arm 28 is adjusted about the periphery of the dial, the sleeve B'' and the cams 120, 121 and 122 mounted thereupon, are accordingly adjusted. The cams 123, 124 and 125 are mounted against turning directly upon the dial shaft B'. Therefore, while the cams in Figure 4 operate at the same speed as the cams in Figure 5, the relative positions thereof can be adjusted by moving the lever 28 (Figure 1). The cams 120 to 125, inclusive, are for the purpose of closing the series of contact switches G. The cam 120 operates the contact switch 126. The cam 121 operates the contact switch 127. The contact switches 128, 129, 130 and 131 are similarly operated by cams 122, 123 and 124 and 125, respectively. The cams in Figure 4 are similar to those in Figure 5, but are positioned in the same respective relationship as the fixed lug 25 and the arm 28 on the dial B. When the arm 28 extends directly opposite the lug 25, the cams illustrated in Figure 4 are 180 degrees from the position of the similar cams in Figure 5.

The operation of my signal control can best be obtained by reference to the wiring diagram in Figure 22. In this figure, vehicle actuated contact pads 132 are inserted in the highway A, (Figure 24), for controlling traffic on this highway, and pads 133 which are placed in the highway B for the purpose of controlling traffic on this highway. It is understood that the contact pads 132 and 133 are provided with contact switches therein which are momentarily closed by each vehicle passing over the highway toward the intersection. The pads 132 are connected in parallel. When a vehicle makes contact in one of the pads 132, the circuit is closed to the conductor 134 to the solenoid 81' through the manually operated setting switch 135 and through the conductor 136 to the line wire L. Then from the other line wire M, current passes through the contacts 73 forming a part of the master switch, through the conductor 137 and the conductor 138 and the conductor 139 to the double throw switch 140. From the switch 140, the current passes through the conductor 141 to the pads 132, completing the circuit. The switch 140 is illustrated in Figure 3 of the drawings and is controlled by the core 82' of the solenoid 81'. When the core 82' is in lowered position, as illustrated in Figure 3, the circuit is closed between the center contact 142 and the lower 143, closing the circuit between the pads 132 and the solenoid 81'. When the contact is made in the pads 132, the solenoid 81' is actuated, raising the core 82' breaking contact between the points 142 and 143, and making contact between the points 142 and 144. Thus, the raising of the solenoid core acts to break the circuit to the pad 132 so that further vehicles passing this pad will not close any circuit as long as the solenoid core 82' is held in raised position.

When the core 82' is in raised position, a circuit is closed from the line wire M to the contacts 73 to the conductors 137, 138 and 139 to the switch 140. When the core is raised, contact is formed between the points 142 and 144 through the conductor 145 to the motor 14. The motor 14 is connected directly to the line wire L, closing the circuit and starting in motion the motor 14. These circuits to the motor and to the solenoid 81' must pass through the master switch contacts 73 and cannot be made if this switch 73 is broken.

When the vehicle passes over one of the pads 133, a circuit is closed through the conductor 146 to the solenoid 81 and from this solenoid through the conductor 147 to the setting switch 135 through the conductor 136 to the line wire L. From the line wire M the circuit is closed to the contacts 70 forming a part of the master switch E through the conductor 148, through the switch 149 and the conductor 150 to the pads 133, closing the circuit. The switch 149 may be seen in Figure 3 of the drawings and is similar to the switch 140. When the core 82 of the solenoid 81 is in lowered position, the circuit is closed through the center contact arm 151 to the lower contact arm 152 closing the above described circuit to the pads 133. When the solenoid 81 has been actuated to raise the core 82 and this core is suspended in raised position, the circuit is closed between the contact 151 and the contact 153. This closes a circuit from the line wire M to the contacts 70 and the conductor 148 through the contacts 151 and 153 and the switch 149, through the conductor 154 and 145 to the motor 14 which is connected with the other line wire L. Therefore, when the solenoid 81 is in raised position, the motor 14 starts to operate.

For the purpose of illustration, I have disclosed a single signal F embodying twelve lights and employing four circuits. One series of lights 155 comprising two red and two green lights, one of which is visible from each side of the signal, acts to display a "go" signal along the highway A, and a "stop" signal along the highway B. A second series of lights 156 comprises two green and two red lights which are adapted to be displayed to provide a "go" signal on the highway B and a "stop" signal on the highway A. Each of the lights in the series 155 is secured in parallel between the one line wire L and a conductor 157 which leads directly to the contacts 69 forming a part of the master switch E. The contacts 69 lead directly to the other line wire M so that when the contacts 69 are closed, the series of lights 155 are illuminated. The series of lights 156 are connected in parallel between the line wire L and a conductor 158 which leads directly to the contacts 72 in the master switch. When the contacts 72 are closed, closing the circuit to the line wire M, the series of lights 156 is illuminated.

One pair of amber lights 159 adapted to indicate a change signal is wired in parallel between the line wire L and the conductor 160 leading to the cam operated switch 131. From the switch 131, the conductor 161 leads to the contacts 71 of the master switch E. When contact is made in the master switch E, the circuit is closed from the two amber lights 159 to the line wire 131 and 132. It will be noted that the contacts 69, 70 and 71 in the master switch E are closed simultaneously, at which time the contacts 72, 73, and 74 are opened. Conversely, when the contacts 72, 73 and 74 are closed, the contacts 69, 70 and 71 are opened. Therefore, it is obvious that the amber lights 159 can only be used when the series of lights 155 are illuminated, as these circuits pass through the contacts 69 and 71. The two

amber lights 162 are connected in parallel between the line wire L and the conductor 163 leading to the cam operated switch 128. From this switch, the conductor 164 leads to the contacts 74 in the master switch E when the circuit is closed to the other line wire M. Accordingly, it may be seen that the amber lights 162 may be used only in conjunction with the series of lights 156 and only during a short period when the contacts 128 are being closed by the cam 122.

I have described the manner in which the motor 14 is started into operation after the operation of one of the solenoids 81 or 81' by closing suitable contacts in the contact switches 140 or 149. A second circuit to the motor is provided in order that this motor will not cease operation as soon as the cores of the solenoids are dropped. This circuit extends from the line wire M to the master switch contact 73 and the conductor 137 through the conductor 166 and the cam operated switch 127 and through the conductor 167 to the motor 14. The other conductor to the motor is connected directly to the opposite line wire L. Another circuit to the motor extends from the line wire M through the contacts 70 and the conductor 168 through the cam operated switch 130 to the conductor 169 which connects with the conductor 167 leading to the motor 14. As has been explained, either the contacts 70 or the contacts 73 are closed at all times, one always remaining open while the other is closed and therefore the motor 14 will continue in operation if the circuit unbroken by the master switch E is broken by the motor cams 121 or 124.

For pedestrians wishing to cross one of the highways, a series of push buttons 170 are provided for pedestrian operation to obtain the right of way. Push buttons 170 are connected in parallel between the conductors 171 and 172. The conductor 171 leads to the solenoid 96', the other wire of which is connected to the setting switch 135 and the conductor 136 to the line wire L. The conductor 172 leads to the contacts 173 of the double contact switch 174. Passing through the contacts 173, the circuit continues through the conductor 138 and the conductor 137 to the contacts 73 of the master switch E through which it is connected to the other line wire M. A double contact switch 174 is illustrated in Figure 19 of the drawings. As may be seen in this figure, when the core 97' of the solenoid 96' is in lowered position, the contacts 173 are closed and the circuit is closed to the solenoid 96' to elevate the core 97'. As soon as the core 97' is in raised position, the contacts 173 of the double contact switch 174 are broken and further actuation of the pedestrian push buttons 170 will have no effect upon the timer until this core has been tripped by the core tripping means which has been described.

A second series of pedestrian push buttons 175 is arranged for pedestrians who wish to cross the intersection in the opposite direction to those operating the push buttons 170. The buttons 175 are connected in parallel between conductors 176 and 177. The conductor 177 leads directly to the solenoid 96. From the solenoid 96, the current passes through the conductor 147 to the setting switch 135 and through the conductor 136 to the line wire L. The conductor 176 leads directly to the contacts 178 of the double contact switch 179. After passing through the contacts 178, the current passes through the conductor 180 to the conductor 148 leading to the contacts 70, forming a part of the master switch, through which the circuit is closed to the line wire M. The switch 179 may be seen in Figure 19 of the drawings. This switch is operated by the raising and lowering of the core 97 of the solenoid 96. Accordingly, when the core 97 of the solenoid 96 is raised, the contacts 178 are broken and subsequent operations of the pedestrian switch buttons 175 will not energize the solenoid 96 until the core 97 thereof has again been lowered by the tripping mechanism heretofore described. The double contact switch 174 has been operated by the raising of the core 97' of the solenoid 96' to close the upper contacts 181 so that a circuit is closed from the line wire L through the conductor 136 and the setting switch 135 to the solenoid 81'. The solenoid 81' is connected by the conductor 182 to the upper contacts 181 through the conductor 183 and the conductor 141 to the contacts 142 and 143 of the switch 140. Then if the core of the solenoid 81' is not already raised, current passes through the conductor 139 and 138 to the conductor 137 which is connected to the contacts 73 in the master switch E. These contacts communicate with the line wire M to close the circuit.

When the solenoid 96 is operated to raise the core 97, the contacts 185 of the double contact switch 179 are closed, thus closing a circuit to raise the core 82 of the solenoid 81 if this core is not already in raised position. The circuit extends from the line wire L through the conductor 136 and the setting switch 135 and through the conductor 147 to the solenoid 81. From the other wire of the solenoid, the circuit passes through the conductor 186 and the contacts 185 of the double contact switch 179 to the conductor 150 leading to the switch 149 operated by the core of the solenoid 81. If this core is in lowered position, the circuit is closed between the contact points 151 and 152 to the conductor 148 leading to the contacts 70 of the master switch E which close the circuit to the line wire M.

A series of pedestrian warning lights 187 are provided one adjacent each push button 170 to warn the pedestrian pressing these buttons 170 so that if there is not sufficient time remaining in the "go" period to enable them to cross the street, these lights will be illuminated, signalling them to wait until the "go" signal returns. The lights 187 are connected in parallel between the line wire L and a conductor 188, leading to the contacts 105 which are operated by the head 98' of the core of the solenoid 96' as illustrated in Figure 14. From the contacts 105, the circuit extends through the conductor 189 to the cam operated switch 129 to the conductor 190 connected with the conductor 161, leading to the contacts 71 forming a part of the master switch E.

A series of pedestrian warning lights 191 are secured one adjacent each push button 175 for warning the pedestrian pressing these buttons that not sufficient time remains to cross the intersection before a change of the signal, when these signal lights 191 come on when they have pressed the pedestrian buttons. The lights 191 are secured in parallel between the line wire L and a conductor 192 leading to the contacts 99 operated by the core 97 of the solenoid 96 in the manner illustrated in Figure 15. The circuit extends from the contacts 99 through the conductor 193 to the cam operated switch 126 which is connected by the conductor 194 to the conductor 164

leading to the contacts 74 forming a part of the master switch E and closing the circuit to the other line wire M.

The various circuits have now been described as well as the various mechanical operations of the device and the co-relation between the mechanical operations and the electrical circuits will now be described.

Say for example, that the signal F is displaying "go" for the highway A and "stop" for the highway B. No car is near the intersection on highway A but a vehicle passes over one of the pads 133 in the highway B. The circuit is closed through the pads 133 to the solenoid 81, raising the core 82 thereof, the head 84 engaging the flange 85 to hold the core in raised position. The locking dog 75 is released from engagement with the flange 80. The shifter D is in the position illustrated in Figure 7. If the motor 14 is not already in operation, the raising of the core 82 makes contact between the points 151 and 153 of the switch 148, closing a circuit to the motor and starting it into operation.

The dial B rotates until one of the cam lips 35' engages the pin 47, pivoting the booster C into its other extreme position. As the locking dog 75 is released by the raising of the core 82, the shifter D pivots into the position illustrated in Figure 6, opening the contacts 69, 70 and 71 and closing the contacts 74, 72 and 73. Simultaneously with the pivoting of the booster C by the cam lip 35', the cam surface 92 has been in engagement with the cam surface 89 of the hammer head 88. Following the shifting of the shifter D by the booster C, the cam surface 89 is disengaged from contact with the cam surface 92, the hammer shoulder 90 striking against the arm 86, disengaging the head 84 of the solenoid 81 from the flange 85 and permitting this solenoid core to drop. When the contacts 72, 73 and 74 are closed, the circuits which have been above described are closed from the contacts 72 to the series of lights 156 operating to display a "go" signal on the highway B, permitting the vehicle actuating the pads 133 to pass the intersection. The circuit is also closed from the contacts 73 through the cam operated contacts 127 to the motor. As has been described, the master switch is operated to close the contacts 73 before the core 82 of the solenoid 81 is dropped. As long as the solenoid core is raised, the circuit is closed through the contact switch 149 to the motor. Therefore, at least one circuit is closed to the motor 14 until the core 82 is dropped. The motor 14 continues to operate on the circuit extending through the cam operated switch 127 until the cam 121 operating the contacts 127 is rotated into position to break the contacts 127, stopping the motor 14. The cam 129 is set with respect to the dial B and the motor 14 will cease rotation shortly after the plate 39 of the arm 30 has passed the booster C or a point of operation, or in the diagram illustrated in Figure 23, the dial B will cease rotation in the section 3—B.

The signal F is now displaying the lights 156, indicating a "go" signal on the highway B and a "stop" signal on the highway A. If no more traffic approaches on the highway B for an interval of time and a car approaches the intersection on the highway A as it passes one of the pads 132, a circuit is closed to the solenoid 81' raising the core of this solenoid, breaking the circuit to the pads 132 and making a circuit through the switch 140 to start the motor 14. The raising of the core 82' releases the locking dog 75' from engagement with the flange 80'. The pin 48 is in raised position and is engaged by the cam lip 35 on the next adjacent plate passing the booster. In case the motor 14 has been stopped, the plates 36 to 41 inclusive will pass the booster C in the order from left to right illustrated in Figure 21. When the cam lip 35 on the plate 36, or on any of the other plates bearing such a cam lip in case the motor 14 has not been stopped, engages the pin 48, the pin 48 acts to pivot the booster C into its other extreme position. As the dog 75' is disengaged, the plate 51 pivots from the position illustrated in Figure 6 back to the position illustrated in Figure 7, closing the contacts 69, 70 and 71 and opening the contacts 72, 73 and 74. Simultaneously with the movement of the booster C by the lip 35, the cam surface 89' of the hammer head 88' has been in engagement with the cam surface 92' on the dial B and immediately after the pivoting of the plate 51 by the booster, the shoulder 90' strikes against the spring arm 86' disengaging the flange 85' from the head 84' of the solenoid core 82'.

The closing of the contacts 69, 70 and 71 in the master switch E, acts to close a circuit to the series of lights 155 and the signal F, which lights illuminate to display a "go" signal on the street A and a "stop" signal on the highway B through the contacts 69. The contacts 70 act to close a circuit to the cam operated switch 130 to the motor 14. The motor 14 operates on this circuit after the dropping of the core 32' and if the pads 133 are not traversed for a short period of time, the motor will operate the dial B until the cam 124 is moved into inoperative position to open the contacts 130 and stopping the motor. The cam 124 is so positioned relative to the dial B, that the dial will always stop when the circuit is broken by this cam shortly after the plate 38 on the arm 27 has passed the booster, while with reference to Figure 23 in the portion 3—A of the dial.

The contacts 71 and 74 control the amber change lights in the signal. When the motor 14 has been stopped after the circuit has been broken by one of the cams 127 and 130, the motor can only be started by cars or pedestrians actuating the pads or push buttons on the highway opposite to that on which the "go" signal is being displayed. Circuits from the pads and push buttons on the other highway are broken by the master switch E. When the motor 14 starts after having been stopped, the cams 122 and 125 are so arranged as to illuminate the amber change signal. The amber change signal is thus only illuminated in the portions 3—A and 3—B of the dial B. The circuits to the amber change lights 159 and 162 extend through the master switch E in a manner to cause the bulbs to be illuminated during the last few seconds of the portions 3—A and 3—B at all times when the signal F is to change at the end of these periods.

The simplest operation of the signal wherein but one automobile at a time approaches the intersection, has been described. Now let us say for example, that the signal F is displaying the lights 155 or is displaying a "go" signal on the highway A. A car approaches on the highway B crossing a pad 133. The motor 14 starts in operation and changes the signal in a manner which has been above described. Before the motor 14 started operation, the dial B was in the position illustrated in Figure 23. When the motor 14 is started into operation, the dial B starts

to rotate in the direction of the arrow and when the lug 25 and plate 36 thereupon passes the booster C, the signal is changed to illuminate the lights 156 and display a "go" signal on the highway B. If a car approaches on the highway A as the dial B is rotating the portion 1—B over the booster C and no further cars approach on the highway B, the signal will be changed by the plate 37 on the arm 26 to provide a "go" signal on the highway A as above described. If, however, during the portion 1—B, a car approaches on the highway A and subsequently during this same period a second car approaches on the highway B, the time of signal on the highway B is prolonged to display during the portion 2—B. The manner in which this is accomplished is as follows: Actuation of the pad 132 in the highway A, acts to raise the core 82' of the solenoid 81'. Contact is made between the points 142 and 144 on the core operated switch 140. If contact is now made in one of the pads 133, a circuit is closed from the line wire L through the conductor 136 and the setting switch 135 and the conductor 147 to a solenoid 81. From the solenoid 81, the circuit extends through the conductor 146, the contact pad 133 and the conductor 150 to the core operated switch 149. As the core is in lowered position, the circuit extends through the points 151 and 152 to the conductor 148 connecting with the contacts 70. The contacts 70 in the master switch are broken but this conductor also leads to the conductor 168 extending to the cam operated motor switch 130 which is always closed during this portion of the rotation. From this switch, the circuit extends through the conductor 169 and 167 to the conductor 145, leading to the switch 140 operated by the core of the solenoid 81'. As this core is in raised position after actuation of the pads 132, contact is made through the points 142 and 144 to the conductor 139, which connects with conductors 138 and 137 to the contacts 73 of the master switch which are closed. Accordingly, after actuation of the pads 132 during the time portion 1—B to raise the core 82' the core of the solenoid 81 may be raised.

The shifter D is now in the position illustrated in Figure 6 of the drawings and both of the cores 82 and 82' are in raised position. At the end of the period 1—B, the plate 37 on the arm 26 comes into lowermost position. This plate, however, is provided with a plate cam 119. This plate cam depresses the spring arm 116 of the spring plate 115, depressing this arm to the level of the raised cylindrical stop 83, and preventing the pivoting of the plate 51 by the booster C. The plate cam 119 extends somewhat to the rear of the plate 37 and holds the spring arm 116 depressed until the cam lip 35 is disengaged from the pins 48 and the booster C snaps back into the position illustrated in Figure 6. During this time, both of the cam surfaces 89 and 89' have been engaged by cam surfaces 92 and 92' adjacent the plate 37. Shortly after the booster C returns to its original position, the hammer heads 88 and 88' are released. The hammer shoulder 90 strikes the arm 86, releasing the head 84 of the solenoid core 82. The flange 95' is in engagement with the hammer weight 91' of the hammer head 88', however, preventing the hammer shoulder 95 from striking the arm 86' so that the core 82' remains in raised position.

In this way, the signal is prolonged during the period 2—B. At the end of the period 2—B, the lip 35 on the plate 38 of the arm 27 pivots the booster C in a manner to pivot the shifter D. The plate cam 119 on the plate 38 again depresses the spring arm 116 but as the cylindrical stop 83 is not raised, the shifter is permitted to pivot.

If a third car approaches on the highway B during the period 2—B, the core 82 is again raised by means of the circuit above described, and movement virtually identical with that described at the end of period 1—B is repeated. The depression of the spring arm 116 by the plate cam 119 and the bearing of this spring plate against the cylindrical stop 83 prevents pivoting of the bed plate 51 and the "go" signal continues to be displayed on the highway B through the period 3—B. If however, a car approaches during the time portion 3—B on the street B, the core 82 of the solenoid 81 is again raised. The next succeeding plate in the rotation of the disc B, however, is not provided with a plate cam 119 so that the raising of the stop 83 to operative position does not prevent pivoting of the shifter operating the master switch E

As there is no cam surface 92' adjacent the plate 40, the core 82' will remain in raised position. During this period 1—A, the signal F will display a "go" signal along the highway A. If no further car approaches during the period 1—A on the highway A and as the stop 83 on the core 82 is in raised position, disengaging the dog 75 from the flange 80, the pin 47 will be engaged by the lip 35 on the plate 41 and the shifter D will be pivoted back into the position illustrated in Figure 6. If during this next period 2—A, a car approaches on the highway A and no car approaches on the highway B, the shifter D will be operated by one of the lips 35 on the plate 39. If, however, a car approaches on the highway B after the car has crossed the pad 132 on the highway A, the cores of both of the solenoids will again be raised. The cam plate 119 on the plate 39 will prevent the pivoting of the shifter plate 51 by pressing the spring arm 116 into engagement with the cylindrical stop 83. The core 83 will be dropped by the plate 39 and unless a car approaches on the highway B during the time period 3—A, the shifter will be pivoted by the cam lip 35 on the plate 36. A car approaching on the highway B, however, acts to again raise the solenoid core 82. As there is no cam lip 35' on the plate 36, the shifter D cannot be shifted from the position illustrated in Figure 6 to the position illustrated in Figure 7 by this plate 36. Therefore, any car approaching during the period 3—A or 1—B, will act to prolong the signal to display "go" on the highway B during the period 2—B. In the manner above described, a car approaching on the highway B during the period 2—B will extend the signalling time to display "go" on the highway B during the period 3—B. At the end of the period 3—B, however, the signal F changes on account of the traffic waiting on highway A to permit the passage of traffic on highway A. In this manner, if the traffic is heavy on the highway B and light on the highway A, the highway B may be permitted five periods of the total of six time periods.

This same procedure can be followed through in a manner to permit the signal to display a "go" signal on the highway A during five of the six periods. It may be seen however, that in order to obtain five consecutive periods of time, it is necessary for traffic to progress quite regularly and frequently along the highway containing

these five periods and that little traffic is found on the other highway, as the time on either highway may be extended in the manner described. If traffic is progressing regularly along both highways, the maximum period of display of the signal F along either highway is three periods. It is obvious that the only time one street is allotted more than three periods, occurs when no traffic approaches on one street and the motor 14 stops, or when the traffic on the other highway is not sufficient to keep the "go" signal on that highway to three periods, and traffic has come along on the other highway. With reference to Figure 23, if traffic is heavy on the highway B and light on the highway A, periods 1—A or periods 1—A and 2—A may be sufficient to take care of all the traffic on the highway A, whereupon continued traffic on highway B may obtain the remaining portions of time, owing to the flexibility of my controller to handle traffic. Similarly, when traffic is heavy on highway A and light on highway B, the portion 1—B or the portions 1—B and 2—B may be granted highway B and continuous traffic on highway A may change the signal to cause this highway to obtain the remaining periods of time.

The circuit through which the solenoid 81' is actuated to prolong the lights 155 exhibiting "go" on the highway A, is as follows: From the line wire L, the circuit extends through the conductor 136, the setting switch 135 to the solenoid 81'. From this solenoid, the circuit extends through the conductor 134 to the pads 132 through which it passes to the conductor 141 leading to the switch 140 controlled by the movement of the core 82'. Passing through this switch to the conductor 139, the circuit extends through the conductors 138 and 166 to the cam operated motor switch contacts 127 which are always closed at this portion of the rotation. From the contacts 127, the circuit passes through the conductors 167 and 145 and 154 to the contacts 149, which are operated by the core of the solenoid 81. As this solenoid has been actuated by a car on the highway B, the contacts 153 and 151 are closed communicating with the conductor 148, leading to the contacts 70 in the master switch E which communicate with the other line wire M. In this way, the solenoid 81' may be actuated even though the contacts 72, 73 and 74 in the master switch are opened.

When a pedestrian on the highway A wishes to cross the highway B, he depresses one of the push buttons 170. This closes a circuit to the solenoid 96' extending through the contacts 173 and the double switch 174 and the contacts 73 in the master switch E. If the contacts 73 are opened, the signal is already displaying a "go" signal on the highway A and no movement of the timer is necessary. The contacts 73 are closed at all times when the "go" signal is being displayed on the highway B. The contacts 173 are always closed unless the core of the solenoid 96' is already in raised position. Raising of the core 97' of the solenoid 96' opens the contacts 173 to prevent repeated actuations of the solenoid and closes contacts 181 in a circuit which has been described to the solenoid 81', acting to raise the core 82' thereof. Unless the signal period on the highway B has been prolonged in the manner which has been heretofore set forth, the raising of the core 82' will release the locking dog 75' from engagement with the flange 80' and permit the shifter D to be pivoted from the position illustrated in Figure 6 to the position illustrated in Figure 7. Immediately after the pivoting of the shifter D, the cam surface 89' is released from contact with the cam surface 92' and the core 82' is dropped. As the core 97' has not yet been released by the trigger lever 100', the dropping of the core 82' immediately closes the circuit by which the core 82' was originally raised, which energizes the solenoid 81' and again raises the core 82'. Immediately thereafter, the cam surface 108' is released by the cam surface 92' and permits the core 98' to drop. The raising of the core 82' acts in the usual manner to provide an additional period for the "go" signal on the highway A and if traffic has approached on the highway B, the signal will change back to "go" on the highway B at the end of the second period unless other traffic has prolonged the "go" period on the highway A.

I have thus provided a device for holding the "go" signal for two periods of the total six when pedestrian desires to cross the highway. A similar action takes place when a pedestrian on the highway B desires to cross the highway A. The depression of one of the push buttons 175 closes a circuit to the solenoid 96 which in raising its core, closes a circuit to the solenoid 81 to elevate the core of the same. In the movement of the dial, the hammer heads 88 and 88' are just sufficiently in advance to hammer heads 107 and 107' to permit the solenoid core 82 to drop to close the circuit and to again raise into elevated position and before the core 96 is released to drop. Elevation of the core 82 after it has been dropped provides an extra portion of time for the pedestrian for it is understood that a pedestrian will require more time to cross a highway than will a vehicle. If the push buttons 170 or 175 are operated during the first portion of time alloted the other street, the time may be extended in a manner similar to that which has been previously described with reference to vehicles.

If the push buttons 170 or 175 are depressed during the time portions 2—A or 2—B, the pedestrians will receive these portions in addition to the portions 3—A and 3—B. Shortly before the end of the maximum period of display of the "go" signal on either street, the cam 120 or 123 closes the contacts 126 or 129. For a short time previous to the engagement of the booster C by the plate 40, the cam 123 is acting to close the contacts 129. Similarly, for a short time before passage of the plate 36 over the booster C, the cam 120 is forcing the contacts 126 into engagement. If the core 97' of the solenoid 96' is in raised position during this last portion of the time before the change of the signal, the contacts 105 will be closed by the head of the core 97' and the lights 187 will be illuminated, warning the pedestrian not to cross the intersection until the signal returns. Similarly, in the last portion of the time during which the cam 120 is in engagement with the contacts 126, the contacts 95 will be closed by the core 97 and the lights 191 will be illuminated.

The manner in which the timer A operates to change the signal F after a short interval, if traffic approaches alternately on one street and then another and the manner in which the display of a signal may be prolonged to several periods, either by pedestrian or vehicles, has been explained. I wish to point out that the setting switch 135 may be operated to make the timer return to one main highway after having been actuated by traffic on the cross street. The setting switch illustrated in Figure 25, will accomplish this purpose. Figure 25 illustrates two con-

tact levers 195 and 196. The lever 195 is secured against turning on the shaft 197 as is also a cam arm 198. Accordingly, when the arm 195 is moved into the dotted position illustrated, the cam arm 198 forces the depending end of the core 82 of the solenoid 81 into raised position and holds the core in this position. Simultaneously, the conductor end 199 of this lever is removed from between the contacts 200 and 201 of the manual control switch 135. The removal of the contacting end 199 from between the contacts 200 and 201 breaks the circuit from the solenoids 96' and 81' and renders the elements inoperable. The raising of the core 82 of the solenoid 81 acts to prevent the pivoting of the plate 51 to display a "go" signal on the highway A until the highway B has had the three periods 1—B, 2—B, and 3—B. The raising of the core 82 also causes the return of the "go" signal to highway B unless it is prolonged by continued traffic on the cross street.

The pivoted lever 196 is secured to the sleeve 202 to which is also secured a cam arm 203. When the lever 196 is moved into the dotted position, the cam arm 203 acts to bear against the depending end of the solenoid core 82', holding the same in raised position. Simultaneously, the contact end 204 of the lever 196 is removed from between the contacts 201 and 205 of the switch, breaking the circuit to the solenoids 96' and 81'. When this lever 196 alone is operated and the lever 195 remains in the full line position of Figure 25, it will make the highway A into a preferred highway through the operation of the controller, causing the signal F to always return to display "go" on this highway after the necessary interval on highway B. Thus the raised core of the solenoid acts to always return the signal to the highway A at the earliest possible moment.

When both of the levers 195 and 196 are placed in the dotted position simultaneously, all of the solenoids will be disconnected and the motor 14 will operate continuously, changing the master switch E each time the plates 36 and 40 pass over the booster C. The plate cams 119 prevent pivoting at other times.

In the diagram illustrating the time selector, Figure 23, I have represented the division of time in the units 1B, 2B and 3B, representing the time units for one highway, and 1A, 2A, and 3A, representing the time units for the intersecting highway. My flexible time selector which operates the signal lights at the intersection has the advantage of operating in a manner so that if one highway selects the period of time represented as 1A and then there is not sufficient traffic to extend the time into the period represented by the segment 2A, the time selector will continue to operate to expend the time for the A street, leaving the selector stopped, ready to be operated by the B street traffic if any traffic comes up, however, if the traffic on A street only uses the time represented by 1A of the selector in this diagram, and does not continue to select the time 2B, and the traffic starts on street B and continues, then even if traffic did come up on street A it cannot take the period of the selector represented as 2A, 3A, 1B, 2B, and 3B. In this manner, if the traffic on street B is heavy enough it can get five periods of time of the selector as represented by this diagram, or vice versa, for the street A.

Another advantage of my time selector in my controller resides in a selecting means which will permit the A street to use up its full time represented by periods 1A, 2A and 3A, and if traffic in the meantime has come up on B street, the B traffic selects 1B, 2B and 3B if it is of a continuous nature, thus the selector may divide the traffic equally. Further, the selector mechanism of my controller operates to permit the traffic movement to be transferred from one highway to the other, such as if the traffic on A street only uses up the period 1A and then traffic comes up on the B street, it can obtain the time represented by 2A. Then if the traffic ceases on B street and the traffic starts on A street, the A street can get the period of 3A and so on.

The time selector has two main change points, as well as the change points between each segment of time, represented by 1A, etc. If the traffic is virtually equally heavy on each highway, then the time selector will change the signal from one street to the other at the two main change points. If the traffic varies on one highway over the other highway, the highway having the heaviest traffic will control or select its own periods of time, even to prolonging the same more than half of the total period allowed for both highways. However, it is not possible for traffic on either of the highways to indefinitely tie up the intersecting traffic because the main change points on the time selector will come into operation and cause the signal lights to be changed at least for a long enough period of time to permit as much intersecting traffic as would be necessary to take up the three periods which are ordinarily allotted to the intersecting traffic to cross the intersection.

It sometimes occurs that vehicles, after crossing a pad, will become stalled between the pad and the intersection or will park between the pad and the intersection sufficiently long so that the period of time allotted by my timer for this vehicle will have elapsed before the car reaches the intersection. As the pads 132 and 133 are at some distance from the intersection, such parking often occurs. When such a car starts up, it would either be necessary for the driver to back the car over the pad 132 or 133, or else to await the approach of other traffic on the same highway.

I have therefore illustrated in Figures 22 and 24 of the drawings, vehicle actuated pads 132' and 133' which are placed in the highway closely adjacent the corner. These pads 132' and 133' contain contacts which are capable of changing the signal F to allow the vehicle passing over the pad 132 or 133' to pass the intersection.

One side of the contacts in the pads 132' connects with the conductor 134 to the solenoid 81' and to the line wire L. The other conductor 209 from the pads 132' is connected through the contacts 210 in the master switch E. From the contact switch 210, the conductor 211 connects with the conductor 141, through the switch 140 to the conductors 139, 138 and 137, passing through the contacts 73 in the master switch E to the ground. The pads 132' are on highway A, and the contacts 210 and 73 in the master switch E are only closed when a "stop" signal is being displayed on highway A. Accordingly, the pads 132' are only live when the "stop" signal is being displayed, as otherwise the vehicle could pass the intersection without changing the signal. This circuit prevents the pads 132' from being used for extension of time periods as is capable of the pads 132. As the circuit extends through the switch 140, energizing the solenoid 81' either pad breaks the circuit until the core 82' thereof is again in lowered position.

Similarly, one side of the pads 133' is connected by the conductor 146 with the solenoid 81, and through the conductor 147 to the line wire L. The

other side of these contacts is connected by the conductor 213 to the contacts 214, and through this switch through the conductor 215 to the conductor 150 and the switch 149. This switch 149 is connected through the conductor 148 and the contacts 78 to the line wire M. The contacts 78 and 214 in the master switch E are only closed during the "stop" signal period on highway B in which the pads 133' are situated. Accordingly, a vehicle on highway B may actuate the timer by the pads 133' only when the signal displays "stop" on highway B, and when no other car has actuated either pad 133 or 133' to change the signal F just previously.

It is sometimes advisable to have the pads 132' and 133' live, or operable, also, during the extreme last portion of time the signal is displaying "go" as well as during the time the signal displays "stop". In other words, a motorist traveling toward the intersection during the extreme last period of time of display of the "go" signal, might stop after crossing the pad 132' or 133' upon seeing the change light or for other reasons. I have therefore provided a pair of contact switches, cam operated, by means of which the pads 132' and 133' may be actuated during this extreme last period of the "go" signal on the respective highways.

In Figures 3, 22 and 26 of the drawings, I have illustrated contact switches 216 and 217 operated in conjunction with the amber or change light controlling cam operated contacts 128 and 131. The contacts 128 are closed to display change of a "go" signal on highway B, whereas contacts 131 when closed indicate a change from the "go" signal on highway A. Conductors 218 and 219 connect the switch 217 in parallel with the switch 214, so that the pads 133' will be live during both the last period of "go" on highway B and the "stop" period on highway B. The conductors 220 and 221 connect the switch 216 in parallel with the switch 210, so that the pads 132' may be actuated both during the last of the "go" period on highway A, and the "stop" period on this highway. The manner is which the contacts 216 and 217 are connected above the contacts 128 and 131 is illustrated in Figures 3 and 26. It is obvious that separate cams could be employed for operating the contacts 216 and 217 if it is desired that the pads 132' and 133' be live during a different period of time.

I claim:

1. A traffic actuated controller for regulating traffic signals at intersections of highways including traffic signals, circuits therefor, switches in said circuits, a timer means adapted to represent a unit of time and having switch operating means to control said switches of the signals at the intersections of highways, means for setting said switches of said timer means to divide the total time represented by said timer means into a series of units representing periods of time, traffic actuated means, means associated with said timer means, operated by said traffic actuated means and cooperable with said switch operating means to allot one or more of the predetermined periods of time represented by the units of time to the highway selecting the same through said traffic actuated means.

2. A traffic actuated selective controller for regulating traffic signals at intersections of highways including changeable traffic signals to display stop and go, circuits to the traffic signals, switches in said circuits, a timer means in said controller representing a whole unit of time for the movement of traffic at the intersections, means in said timer means for dividing the whole unit of time into several lesser time units, means on said dividing means for operating said switches to change the signal, means in said controller for operating said timer means to select one or more of said lesser units of time and allot the same to the highway selecting the same in accordance with the flow of traffic on the highway, and traffic actuated means in the highway for operating said selective means in said controller.

3. A traffic actuated selective controller for regulating traffic signals at intersections of highways including, a timer means adapted to represent a whole unit of time for all of the highways, means for setting said timer means to divide the whole unit of time represented thereby into lesser units of time, traffic actuated means in the respective highways, means in said controller operated by said traffic actuated means to put into operation said timer means, said selective means in said timer including means operated by said traffic actuated means in one highway for selecting one of the lesser units of time for one highway, and then operated by said traffic actuated means in the other highway for transferring the next several lesser units of time to the other highway if traffic ceases to move on the highway which selected the first lesser unit of time before the expiration of that lesser unit of time, whereby a heavy flow of traffic along one of the highways may be allotted a greater number of the lesser units of time from said timing means before the timer means will permit a change of the traffic signal to the highway which selected the first unit of time but did not maintain it by a continuous flow of traffic.

4. A traffic actuated selective controller in combination with traffic signals at intersecting highways, a timer element, means for operating said timer element, adjustable means for dividing said timer element to provide three or more lesser units of time for operating said signals for the control of movement of traffic on said highways for each of two divisions of the total time controlled by said timer element, a selective means for operating said timer element, whereby the lesser units of time in said timer element may be selected individually, collectively or intermittently, and allotted to respective highways for the movement of traffic thereon, and traffic actuated means in each highway for operating said timer operating means, and simultaneously operating said selecting means associated with said timer element to permit selection of said lesser units of time than the whole as needed in accordance with the relative number of operations of the traffic actuated means in each highway to move the traffic by said signals expeditiously.

5. A traffic actuated controller including changeable stop and go signal means for an intersection of highways, means for changing said signal means, a timer representing a complete unit of time, means dividing said timer into a plurality of smaller time units exceeding the number of highways, means on said dividing means for actuating said signal changing means, traffic actuated means for each of said highways, means actuated by said traffic actuated means in one highway to provide a right of way to said traffic on said one highway during one of said smaller time units, and means actuated by said traffic actuated means by traffic in the other highway in the absence of further traffic on said one highway to operate said signal changing means to

display a go signal on said other highway during the next of said smaller time units of said complete unit of time.

6. A traffic actuated selective controller in combination with traffic signals at intersections of highways, a timer element in said controller representing as a unit the whole time which may be divided for the respective highways to control said signals for the orderly movement of traffic in said highways, means on said timer element for setting the same in a manner to divide the whole unit of time into a series of lesser units, the total of which makes up the full unit of time, and traffic actuated means on one highway operable by a single actuation to operate said timer element to select one of said lesser units of time and allot the same to said one highway and operable by more than one actuation to allot more than one unit of said lesser units of time consecutively one after the other, and traffic actuated means on the other highway operable by a single actuation to actuate said timer element to transfer the movement of traffic from said one highway to said other, and operable by more than one actuation for allotting more lesser units of time to the other highway.

7. A traffic actuated selective controller in combination with traffic signals at intersections of highways, a timer element in said controller representing as a unit the whole time which may be divided for the respective highways to control said signals for the orderly movement of traffic in said highways, means on said timer element for setting the same in a manner to divide the whole unit of time into a series of lesser units, the total of which makes up the full unit of time, and traffic actuated means for one highway operable by a single actuation to operate said timer element to select one of said lesser units of time and allot the same for the display of go to the highway, said traffic actuated means operable by more than one traffic actuation for allotting more than one unit of said lesser units of time consecutively one after the other, and traffic actuated means for the other highway operable by a single actuation to transfer the go signal from said one highway to the other, and operable by a plurality of actuations to allot a plurality of said lesser units of time to said other highway, and means in said timer element for preventing an indefinite holding up of traffic on any of the intersecting highways after using up of a predetermined number of the lesser units of time in the timer.

8. In a traffic control system for interfering traffic lanes having right of way control signals and circuits for said lanes, two groups of switch means in said circuits, each movable to one or a second position, one of said switch means displaying said right of way signals to one lane when in one position and not in said second position, the second of said switch means operating similarly for the said right of way signal to the other lane; means for collectively operating said groups together including a shifter, when operated for shifting one group to one position simultaneous with shifting of the other group to the second position and vice versa, a disc, a normally inactive means for rotating said disc at a substantially constant speed, a plurality of cam means, means to mount said cam means in spaced relation circumferentially on said disc, to pass said shifter to operate the same, means actuated by traffic in one lane, control means operable by actuation of the last said means to activate the disc rotating means if the right of way signal is not displayed to last said lane whereby the passage of one of said cam means past the shifter will operate the same to cause a display of right of way to the last said lane.

9. In a traffic control system for interfering traffic lanes having right of way control signals and circuits for said lanes, two groups of switch means in said circuits, each movable to one or a second position, one of said switch means displaying said right of way signals to one lane when in one position and not in said second position, the second of said switch means operating similarly for the said right of way signal to the other lane; means for collectively operating said groups together including a shifter, when operated for shifting one group to one position simultaneous with shifting of the other group to the second position and vice versa, a disc, a normally inactive means for rotating said disc at a substantially constant speed, a plurality of cam means, means to mount said cam means in spaced relation circumferentially on said disc, to pass said shifter to operate the same, means actuated by traffic in one lane, control means operable by actuation of the last said means to activate the disc rotating means if the right of way signal is not displayed to last said lane whereby the passage of one of said cam means past the shifter will operate the same to cause a display of right of way to the last said lane, and means operable by the next cam means past the shifter after said one cam means to render the disc actuating means inactive before said next cam means can again operate the shifter if no further traffic actuations occur.

10. In a traffic control system for interfering traffic lanes having right of way control signals and circuits for said lanes, two groups of switch means in said circuits, each movable to one or a second position, one of said switch means displaying said right of way signals to one lane when in one position and not in said second position, the second of said switch means operating similarly for the said right of way signal to the other lane; means for collectively operating said groups together including a shifter, when operated for shifting one group to one position simultaneous with shifting of the other group to the second position and vice versa, a disc, a normally inactive means for rotating said disc at a substantially constant speed, a plurality of cam means, means to mount said cam means in spaced relation circumferentially on said disc, to pass said shifter to operate the same, means actuated by traffic in one lane, control means operable by actuation of the last said means to activate the disc rotating means if the right of way signal is not displayed to last said lane whereby the passage of one of said cam means past the shifter will operate the same to cause a display of right of way to the last said lane, and means operated by operation of said control means through repeated actuations of said traffic actuated means to continue the activity of said disc rotating means, but to prevent a predetermined number of successive cam means from again operating said shifter means.

11. In a system for the control of traffic at an intersection of interfering lanes, including stop and go signals, a pair of vehicle actuated pads in one lane spaced apart to be actuated by a vehicle approaching the intersection, one pad being

relatively spaced a considerable distance from and the other close to the intersection, means operated by actuation of either of said pads to display go to said one lane and stop to the others, for a minimum period, means to change the said display to remove the last said go signal from the said one lane and to display a stop signal thereto, means operated during the display of said go signals to the said one lane to render said first named means nonresponsive to actuation of the second pad.

12. A traffic control system for an intersection of a plurality of highways comprising, stop and go signals, means when active, to display said signals to said highways for the orderly control of traffic thereover, a series of vehicle actuated devices in each highway including a primary traffic actuated device and a secondary actuated device in the highways in the path of a vehicle approaching the intersection, said primary device being far from and said secondary device being near to the intersection relatively, means when operated, to render the signal display means active for a predetermined number of periods and means to operate said activating means by actuation of said primary means during all said periods, and by actuation of said secondary means only during selected ones of said periods.

13. In a traffic control system for interfering traffic lanes having right of way control signals and circuits for said lanes, two groups of switch means in said circuits, each movable to one or a second position, one of said switch means displaying said right of way signals to one lane when in one position and not in said second position, the second of said switch means operating similarly for the said right of way signal to the other lane; means for collectively operating said groups together including a shifter, when operated for shifting one group to one position simultaneous with the shifting of the other group to the second position and vice versa, a plurality of cam means, means supporting said cam means in spaced relation to move past said shifter in a cycle and operate the same, a normally inactive means for operating said supporting means to move said cam means in a cycle at a substantially constant speed, means actuated by traffic in one lane, control means operable by actuation of the last said means to activate the cam moving means if the right of way signal is not displayed to last said lane whereby the passage of one of said cam means past the shifter will operate the same to cause a display of right of way to the last said lane, and means operable by the next cam means in the cycle to render the cam moving means inactive before said next cam means can again operate the shifter if no further traffic actuations occur.

14. In a traffic control system for interfering traffic lanes having right of way control signals and circuits for said lanes, two groups of switch means in said circuits, each movable to one or a second position, one of said switch means displaying said right of way signals to one lane when in one position and not in said second position, the second of said switch means operating similarly for the said right of way signal to the other lane; means for collectively operating said groups together including a shifter, when operated for shifting one group to one position simultaneous with the shifting of the other group to the second position and vice versa, a plurality of cam means, means supporting said cam means in spaced relation to move past said shifter in a cycle and operate the same, a normally inactive means for operating said supporting means to move said cam means in a cycle at a substantially constant speed, means actuated by traffic in one lane, control means operable by actuation of the last said means to activate the cam moving means if the right of way signal is not displayed to the last said lane whereby the passage of one of said cam means past the shifter will operate the same to cause a display of right of way to the last said lane, and means operated by operation of said control means through repeated actuations of said traffic actuated means to continue the activity of said cam moving means, but to prevent a predetermined number of successive cam means from again operating said shifter means.

15. A traffic actuated selective controller in combination with traffic signals at intersections of highways, a timer element in said controller representing as a unit the whole time which may be used for all of the highways to control said signals for the orderly movement of traffic in said highways, means on said timer element for setting the same in a manner to divide the whole unit of time into a series of lesser units of three or more for each of two divisions of the total period of time represented by the whole time controlled by the timer element, traffic actuated means in each highway and means in said controller operated by said traffic actuated means to operate said timer element, said last named means operable by a single actuation of one traffic actuated means on one highway to select one of said lesser units of time and allot the same to the highway and operable by a plurality of actuations thereof for allotting more than one unit of said lesser units of time consecutively to one highway, one after the other, said means operated by said traffic actuated means operable by a single action of the traffic actuated means in the other highway to transfer the movement of traffic from one highway to the other and operable by a plurality of actuations thereof for allotting such lesser units of time to said other highway, said last named means operable by continuous traffic on both highways to allot one of said two divisions to one highway and the other of said divisions to the other highway.

ALVIN O. OLAFSON.