

July 12, 1932.

W. H. MINIER

1,866,899

TRAFFIC SIGNAL

Filed March 15, 1929

3 Sheets-Sheet 1

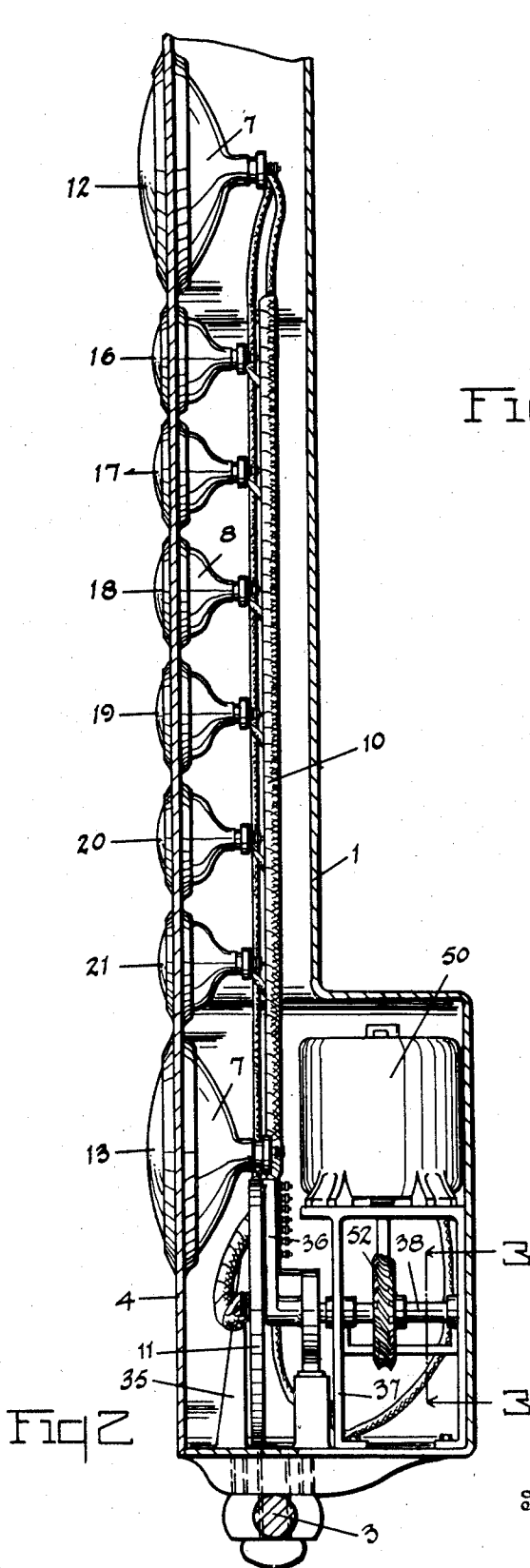


Fig 1

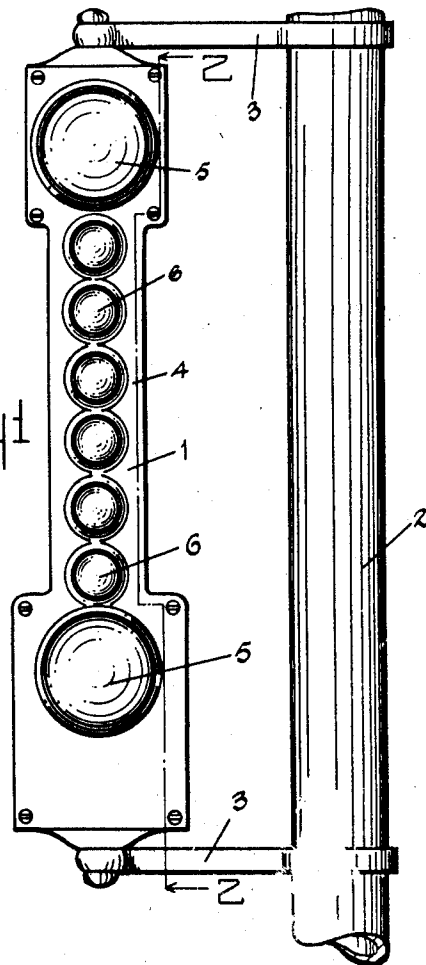
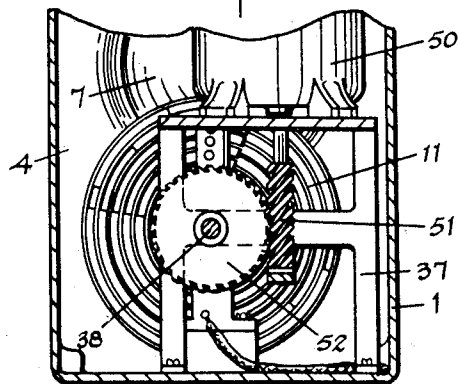


Fig 3



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3 Sheets-Sheet 2

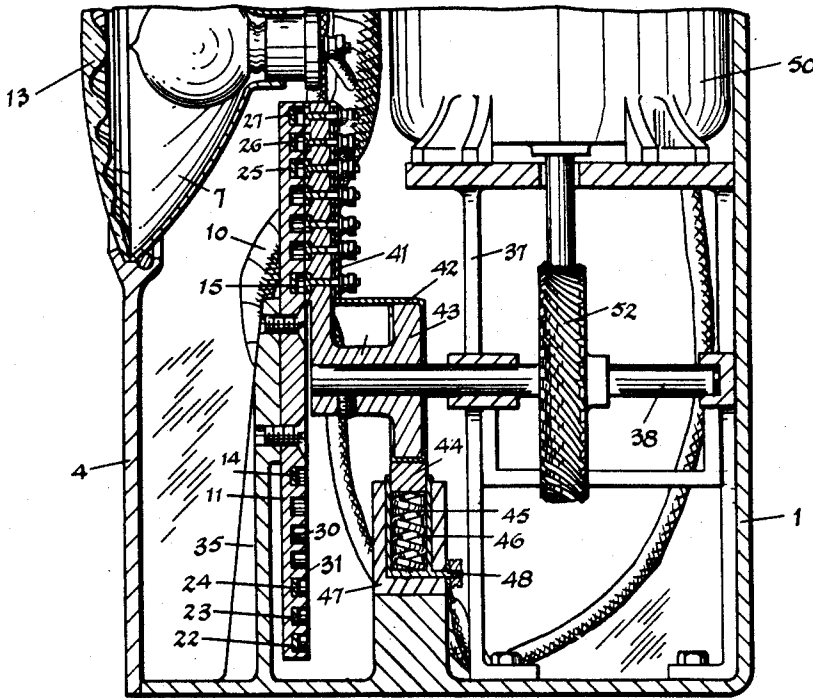


FIG 4

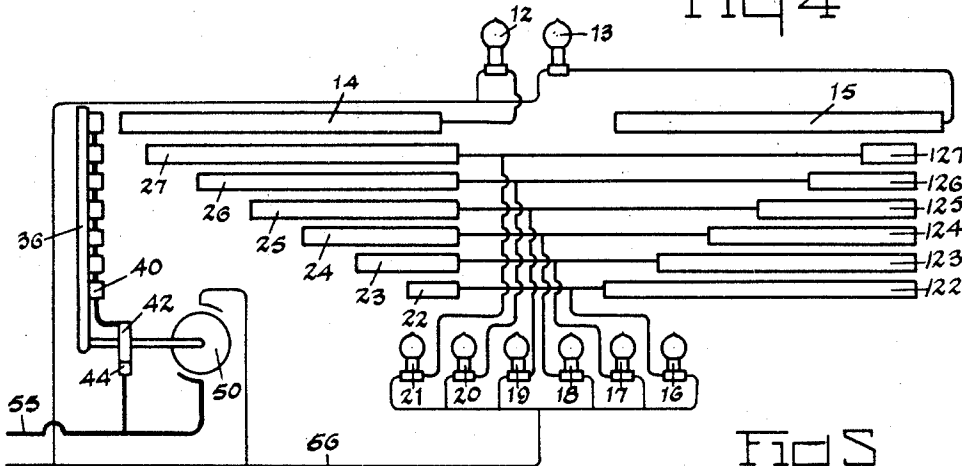


FIG 5

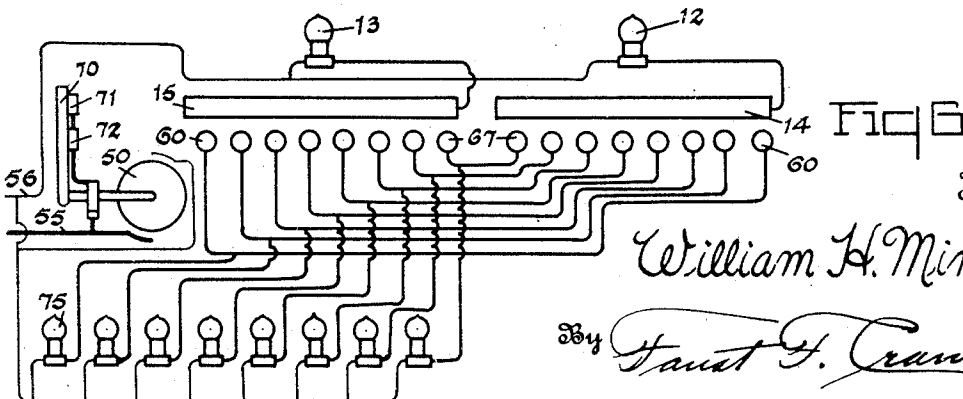


FIG 6

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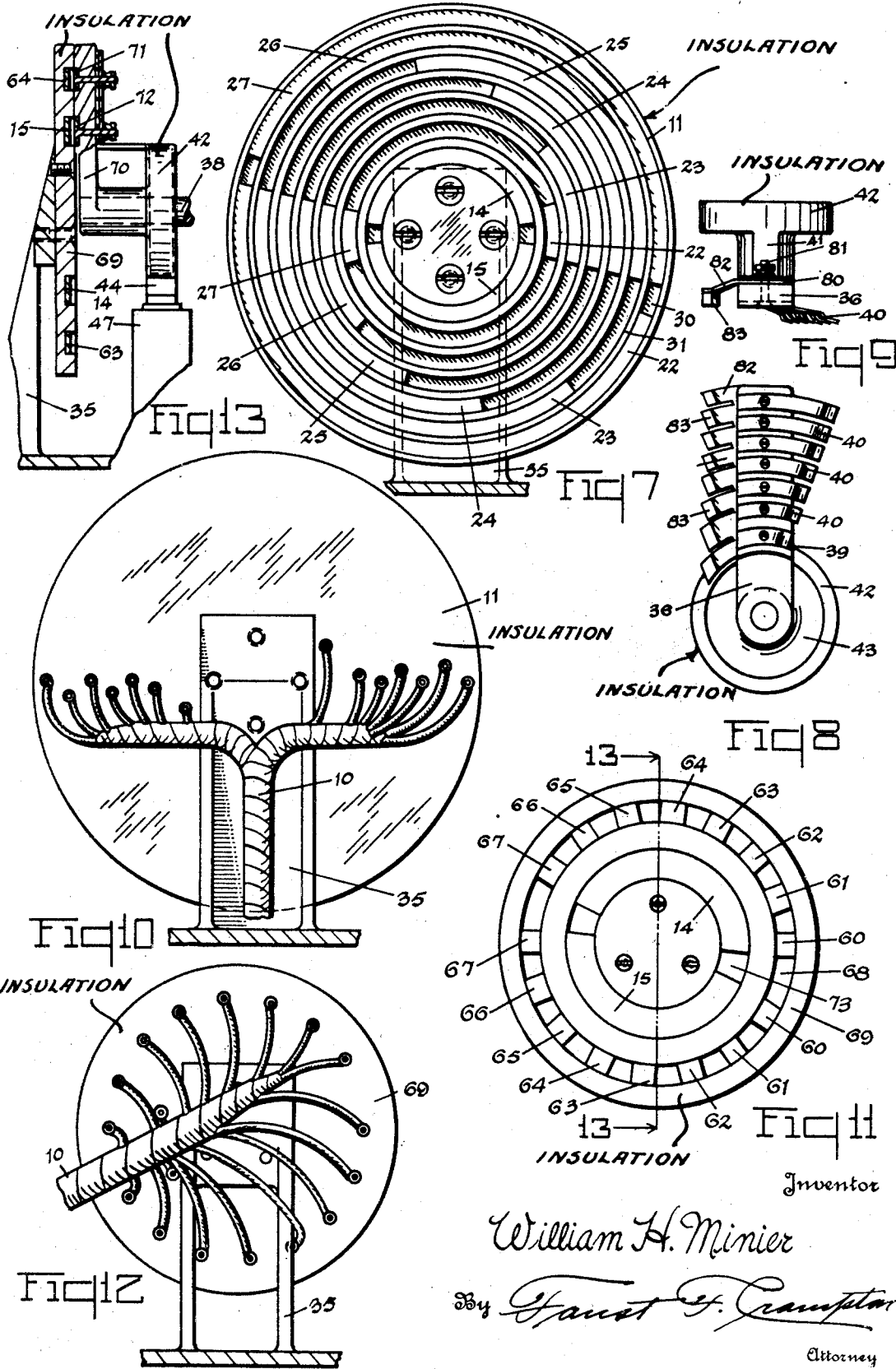
W. H. MINIER

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

WILLIAM H. MINIER, OF TOLEDO, OHIO

TRAFFIC SIGNAL

Application filed March 15, 1929. Serial No. 347,400.

My invention has for its object to provide a means for indicating progressively the elapse of the time interval between the changes of traffic signals, whereby individuals may know whether to start to cross streets or to wait for the subsequent period for crossing and thus avoid the danger of being in the street when the traffic signals change. The invention is also advantageous in that it provides a means for indicating the length of the expired part of the intermission to operators of automobiles approaching a crossing to enable them to regulate the speed of the automobile they are driving to avoid sudden stopping or to enable crossing within the period and thus eliminate undue speeding at the end of the crossing period.

The invention, preferably, provides a plurality of auxiliary signal lamps located intermediate the main signal lamps and a mechanism for maintaining one of the main signal lamps lighted while the auxiliary signal lamps are progressively operated during subdivisions of the intermissions allowed for the crossing of the traffic, whereby indication is given to the traffic of the length of the period yet to expire during which the crossing may be accomplished.

The invention may be contained in structures of different forms and, to illustrate a practical application of the invention, I have selected one of the traffic signals embodying the invention and a modification of one of its parts, and shall describe it hereinafter. The traffic signal selected is shown in the accompanying drawings.

Fig. 1 illustrates a front view of the traffic signal referred to. Fig. 2 is a view of a section taken on the plane of the line 2—2 indicated in Fig. 1. Fig. 3 is a view of a section taken on the plane of the line 3—3 indicated in Fig. 2. Fig. 4 is an enlarged view of a section of a circuit controller. Fig. 5 is a diagram of the connections of parts illustrated in Figs. 1, 2, 3, and 4. Fig. 6 is a diagram of the connections of a modification of the circuit controller. Fig. 7 illustrates a face view of a contact supporting disc. Fig. 8 illustrates a contact arm that coacts with the disc, shown in Fig. 7, for controlling the circuit. Fig. 9 is a top view of the arm shown in Fig. 8. Fig. 10 is a rear view of the disc shown in Fig. 7. Fig. 11 illustrates a contact supporting plate of the modified form of electric controller. Fig. 12 illustrates the rear of the plate shown in Fig. 11. Fig. 13 is a view of a section taken on the plane of the line 13—13 indicated in Fig. 11.

Traffic signals, commonly used to indicate traffic movements at street crossings, are enclosed, in metal casings and mounted on poles in position so that they can be readily observed by the public in the vicinity of the crossings. As shown in Fig. 1, the traffic signal 1 is supported on the pole 2 by means of brackets 3. The casing in which the signal is contained is formed of sheet metal or cast iron. In the particular form shown, it has a cover plate 4. The cover plate is provided with a plurality of openings in which lenses 5 and 6 are located. The lenses 5 are of different colors, usually the lower lens 5 is a red, while the upper lens 5 is a blue or a green lens, and the intermediate lenses 6 are, preferably, similar in size and are yellow in color. Also, a plurality of reflectors form a part of the traffic signal and are mounted on the cover 4. The reflectors 7 are located back of the lenses 5 and the reflectors 8 are located back of the lenses 6. Suitable electric lamps are disposed intermediate the reflectors and the lenses in order to provide a source of light which is colored by the lenses as it is transmitted therethrough.

The electric lamps are connected through a cable 10 to contacts located on the disc 11. The main signals, that is, the top and bottom signals 12 and 13, are connected to two substantially semi-circular contacts 14 and 15 respectively, while the intermediate signals 16, 17, 18, 19, 20, and 21, are connected each to two contacts arcuate in form, and in the form of construction shown in Fig. 7, contacts having different lengths, as measured in radians. Thus the signals 16, 17, 18, 19, 20, and 21, are connected to the pairs of contacts 22, 122, 23, 123, 24, 124, 25, 125, 26, 126, 27, 127, 28, 128, 29, 129, 30, 130, 31, 131, 32, 132, 33, 133, 34, 134, 35, 135, 36, 136, 37, 137, 38, 138, 39, 139, 40, 140, 41, 141, 42, 142, 43, 143, 44, 144, 45, 145, 46, 146, 47, 147, 48, 148, 49, 149, 50, 150, 51, 151, 52, 152, 53, 153, 54, 154, 55, 155, 56, 156, 57, 157, 58, 158, 59, 159, 60, 160, 61, 161, 62, 162, 63, 163, 64, 164, 65, 165, 66, 166, 67, 167, 68, 168, 69, 169, 70, 170, 71, 171, 72, 172, 73, 173, 74, 174, 75, 175, 76, 176, 77, 177, 78, 178, 79, 179, 80, 180, 81, 181, 82, 182, 83, 183, 84, 184, 85, 185, 86, 186, 87, 187, 88, 188, 89, 189, 90, 190, 91, 191, 92, 192, 93, 193, 94, 194, 95, 195, 96, 196, 97, 197, 98, 198, 99, 200.

126, and 27, 127, respectively. Preferably, the contacts 22 to 27 and contacts 122 to 127 are arranged in two sets, one of each pair being in a set. The contacts of the sets have ends located in a common diameter and on opposite sides of the center of the disc. Also, preferably, the ends of the contacts 14 and 15 are located substantially in a diameter that is inclined but slightly to the diameter in which the contacts connected to the auxiliary signal terminate and so that the said common diameter will pass through one end part of each of the contacts 14 and 15, the said ends being positioned in advance of the said common diameter with reference to a clockwise movement over the surface of the disc, whereby a connection may be made, by rotation of the disc or an element relative to the disc, with one of the contacts 14 or 15 in advance of disconnection of one of the sets of contacts 22 to 27, upon a counter-clockwise movement of the disc or a clockwise movement of the element.

The disc 11 is, preferably, formed to have channels 30 in which the arcuate contacts are located and, preferably, the channels are of such a depth that the arcuate contacts are located below the edges of the ridges 31. Thus, the ridges 31 form separating strips beneath the contacts. The disc 11 is formed of insulating material and the arcuate contacts are imbedded beneath the surface of the disc 11 to thoroughly insulate the contacts from each other and prevent short circuiting by reason of the deposition of dust or dirt on the disc.

In the form of construction shown, the plate 11 is fixed and a rotatable member is provided with a plurality of movable contacts that register with the channels 30 and make contact with the arcuate contacts as the member is rotated. The plate 11 is secured to a suitable bracket 35 that may be mounted on the bottom of the case 1 and a rotatable arm 36 is rotatably supported in a frame 37 by means of the shaft 38. The shaft 38 is located at right angles to the face of the disc 11 and the center of the disc is located in the axis of rotation of the shaft 38. The arm 36 is, preferably, formed of insulating material and is provided with a plurality of channels 39 in which a plurality of spring contacts 40 are located and which are so bent as to extend into the channels 30 and elastically press against the arcuate contacts of the disc 11. The arcuate contacts are, preferably, made of sufficient thickness, and the elastic contacts 40 are made of sufficient length, such that the elastic contacts will snap away from the ends of the arcuate contacts as they pass away from the arcuate contacts.

The contacts 40 are connected together by means of a conductor plate 41 which is connected to a contact 42 mounted on a part of the arm 36. Preferably, the arm is provided

with a circular block or disc 43 formed of insulating material and formed integral with the arm and the contact 42 is mounted on the edge of the circular block 43 and thus rotates with the arm. A spring pressed contact 44 is located in contact with the rotatable contact 42 to complete the circuit with the rotatable contact as the arm is rotated and maintain a connection between the contacts 40 and a source of supply of current. The contact 44 may be formed of carbon or other conductive material. It is spring pressed by means of the spring 45 located in the capsule 46 supported in a block of insulating material 47. Suitable connection is made by means of the binding post 48 with a source of supply of current.

The arm 36 and the shaft 38 are rotated by means of an electric motor 50 supported in the lower end of the case of the traffic signal 1 and a suitable speed reducing mechanism is located intermediate the motor 50 and the shaft 38. For convenience of illustration, the shaft of the motor 50 is shown as provided with a worm 51, that operates on the worm wheel 52 which is connected to the shaft 38 with the object of greatly reducing the speed of rotation of the arm 36. In the operation of the traffic signal, the motor 50 is continuously operated and the signal lamps perform their signaling operation in accordance to their connections with the source of supply of current as established through the arcuate contacts of the disc 11 and the spring contacts of the arm 36.

The connection of the arcuate contacts and of the disc 11, and the spring contacts of the arm 36, are shown diagrammatically in Fig. 5 wherein the signal lamps and the contacts are shown connected in parallel circuits. Thus, the movable spring contacts 40 on the arm 36 are shown connected through the rotatable contact 42 with the main line 55 and the arcuate contacts 22 to 27 are connected to the auxiliary signal lamps 16 to 21, and the semi-circular contacts 14 and 15 are connected with the main signal lamps 12 and 13. The signal lamps are connected to the main line 56 so that as the arm 36 is rotated the lamps will be lighted and the signals will be produced according to the length of the arcuate contacts. The arcuate contacts are so located and have lengths such that the blue or green signal 12 will be produced and maintained during the clockwise movement of the arm 36 while the contacts 27, 26, 25, 24, 23, and 22 are sequentially connected to the circuit and by reason of the lengths of the arcuate contacts will be maintained in the circuit until the contact 14 is disconnected which discontinues the green signal and after a short interval of time and, preferably, while maintaining the signaling operation of the auxiliary signals, the contact 15 is connected in the circuit and immediately thereafter the

auxiliary signals discontinue their signaling operation and the other set of contacts 122 to 127 are sequentially connected in the circuit while the red light is maintained through the continued contact of one of the spring contacts of the arm 36 with the semi-circular contact 15. These sequential operations of the auxiliary signal lamps continue until the connection with the red light, through the contact 15, is discontinued and the green light is again established through the connection with the contact 14 and immediately thereafter, the operation of the auxiliary signals is discontinued and again they are operated sequentially but in the reverse order through making sequential contact with the contacts 27, 26, 25, 24, 23, and 22. Thus, in the continuous rotation of the arm 36, there is produced, first the green light main signal, and the auxiliary lamps 21, 20, 19, 18, 17, and 16, are progressively operated sequentially toward the green light whereupon the red signal lamp is lighted and all of the auxiliary lamps go out. Then follows the operation of the auxiliary signal lamps in reverse order as 16, 17, 18, 19, 20, and 21 towards the red light and thereupon the signal lamp 12 is operated and the auxiliary lamps go out and again there is the reversal of the sequential operation of the auxiliary signal lamps, thus by the progressive movement of the arm 36 in its rotation over the semi-circular contacts 14 and 15, there is produced an indication of the progressive expiration of the time interval permitted for traffic to cross in a given direction at a crossing and operators of machines and pedestrians are informed of the length of the unexpired part of the period and enables them to judge whether they still have opportunity to cross during that period.

In the modified circuit controller shown in Figs. 11, 12, and 13, the contacts that control the auxiliary signals are made very much shorter, and are, preferably, located in a single channel. Two sets of contacts 60, 61, 62, 63, 64, 65, 66, and 67 are located in the channel 68 formed in the insulating disc 69 and the associated contacts of the other set are located in the channel 68 but in the reverse order as to clockwise movement. The arm 70, used in conjunction with the disc 69, is provided with a pair of contacts 71 and 72, similar in construction to the contacts 40 on the arm 36 and adapted to make contact with the contacts 60 to 67 sequentially and with the contacts 14 and 15 located in the channel 73 as the arm 70 is rotated. Thus, the auxiliary signal lamps are operated sequentially to produce their signals and become extinguished as the arm 70 is rotated by the operation of the shaft 38. The electric contact 72 is adapted to make contact with the contacts 14 and 15 in sequence and as one or the

other of the sets of contacts 60 to 67 are being sequentially operated.

The contacts 60 to 67 and the contacts 14 and 15 cooperate with the contacts 71 and 72 to connect the auxiliary signal lamps in sequence while one of the contacts 14 or 15 connects one or the other of the main signal lamps with a source of current and then to connect the other of the main auxiliary signal lamps through the other of the lamps 14 and 15 while the auxiliary lamps are operated sequentially but in the reverse order through the other set of contacts 60 to 67.

In Fig. 6 the contacts 71 and 72 are shown connected to the main line 55, while the electric signal lamps 12 and 13 and the auxiliary signal lamps 75 are connected to the main line 56. The main signal lamp 12 is connected to the contact 14 while the main signal lamp 13 is connected to the contact 15 and the contacts 60 to 67 are so located, with reference to the contacts 14 and 15, that while the signal lamp 12 is maintained lighted, the auxiliary signal lamps 75, connected to the contacts 60 to 67, will be sequentially lighted and extinguished progressively towards the green signal of the signal lamp 12 and when the auxiliary lamp 75, located in proximity to the green signal lamp 12, is lighted, the red signal lamp 13 is then operated to signal. As the arm 70 continues in its operation, the red signal is maintained while the auxiliary lamps 75 are sequentially lighted and extinguished progressively towards the red signal light. When the auxiliary signal lamp in proximity to the red signal lamp is lighted, the green signal is then produced. The operation is then again reversed as to the auxiliary signals.

In order to prevent the short circuiting between the contacts, in the form of construction shown in Fig. 7, particularly by reason of the deposit of dust that may be lodged between the arcuate contacts of the disc, I have provided a wiper for wiping the ridges 31. Preferably, the wiper is formed of insulating material which constantly maintains the surfaces clean and prevents short circuiting between the closely disposed arcuate contacts. A plate 80 is located on the arm 36, it being secured in position by the bolts 81 that also secure the elastic contacts 40 in position. The plate 80 is provided with a plurality of elastic fingers 82 to which are secured blocks 83 of insulating material that are so disposed as to rub on the ridges 31 and thus, as the arm 36 is rotated, the ridges are kept clean.

Thus, I have provided a means whereby the public may be apprised of the length of the unexpired period provided intermittently for the crossing of traffic which will operate to eliminate the dangers of crossing, while the signal indicates a crossing period, caused by the expiration of the period while the pe-

destrian or the automobile driver is in the act of crossing.

The connections shown are such as to light first the auxiliary intermediate signal located remote from the lighted main signal, whereby a pedestrian or a driver may be informed approximately the number of intermediate signals yet to be lighted by the distance between the main signal and the nearest of the lighted auxiliary signals. However, the connections may be such as to light the auxiliary signal nearest to the lighted main signal and so on progressively to the unlighted main signal. When the auxiliary signals are all lighted or all have been lighted, the first main signal is extinguished while the second becomes lighted. The order of lighting the auxiliary signals may then be reversed and progressively lighted towards the other main signal.

I claim:

1. In a traffic signal, a pair of electric main signal lamps, a plurality of auxiliary electric lamps located intermediate the main signal lamps, a source of supply of current, a means connecting the source of supply with the main signal lamps during alternate periods and with the auxiliary lamps in succession and progressively from the disconnected main signal lamp towards the connected main signal lamp, and means for maintaining the connected main signal lamp connected to the source of supply of current, while the auxiliary signal lamps are being connected to the source of supply.

2. In a traffic signal, a pair of electric main signal lamps, a plurality of auxiliary electric signal lamps located intermediate the main signal lamps, a source of supply of current, means for connecting the source of supply with the main signal lamps during alternate periods, means for connecting the auxiliary lamps with the source of supply in succession and progressively during each period and from the disconnected main signal lamp towards the connected main signal lamp.

3. In a traffic signal, a pair of electric main signal lamps, a plurality of auxiliary electric signal lamps located intermediate the main signal lamps, a source of supply of current, means for connecting the source of supply with the main signal lamps during alternate periods, means for connecting the auxiliary lamps with the source of supply in succession and progressively during each period and from the disconnected main signal lamp towards the connected main signal lamp, means for maintaining the connection of the auxiliary lamps until all of the auxiliary lamps have been connected.

4. In a traffic signal, a pair of electric main signal lamps, a plurality of auxiliary electric lamps located intermediate the main signal lamps, a source of supply of current, a means for connecting the source of supply with the

main signal lamps during alternate periods, a means for connecting the auxiliary lamps with the said source of supply, the said means operating to change the connection of the auxiliary lamps with the source of supply progressively to indicate subdivision of the time periods between the changes of the connection of the main signal lamps, the auxiliary lamp nearest the disconnected main signal lamp being lighted the longest of the periods in which the auxiliary lamps are lighted.

In witness whereof I have hereunto signed my name to this specification.

WILLIAM H. MINIER.