

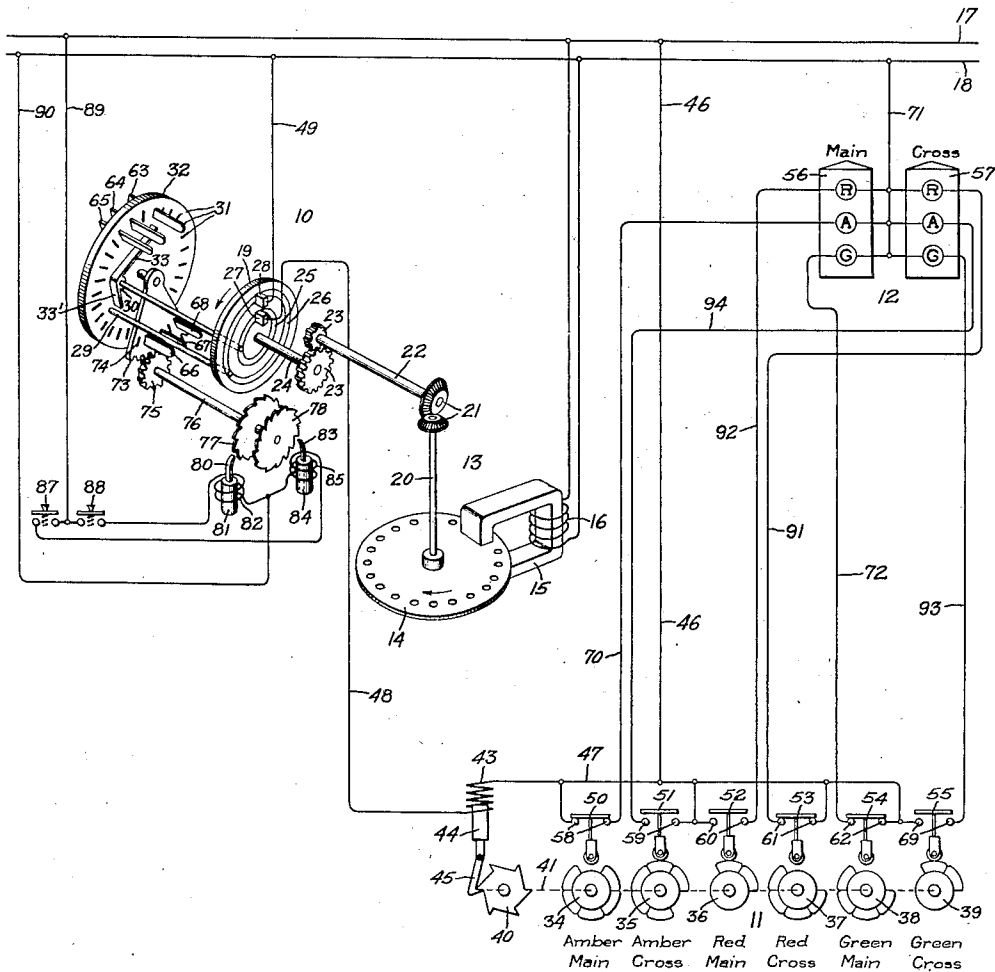
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SIGNALING SYSTEM AND APPARATUS

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SIGNALING SYSTEM AND APPARATUS

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The invention relates to signaling systems and apparatus and more particularly to signaling systems and apparatus for use in controlling street traffic.

5 The main object of the invention is to provide an improved control circuit and controller where-by the signal periods within a signaling cycle may be adjusted from a distant point, such as, for ex-ample, a central traffic control station.

10 The invention will be better understood from the following description when taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

The single figure in the drawing illustrates dia-grammatically a traffic control system and ap-15 paratus embodying the invention. It illustrates an impulse transmitter 10, an impulse receiver 11 and a signaling unit 12. The transmitter 10 is provided with a suitable driving motor 13, which is illustrated as a synchronous disc motor comprising a disc 14, shaded pole magnets 15, of20 which only one is shown, and an operating coil 16 which is energized from the supply conductors 17 and 18. This may be a motor such as that shown in the patent to Hall 1,668,365, dated May 1, 1928.

The motor 13 is arranged to drive a contact disc 19 through its shaft 20, bevel gears 21, shaft 22, gears 23 and shaft 24 upon which disc 19 is30 mounted. The disc 19 is made of insulating material and carries two concentric contact rings 25 and 26 which are engaged by brushes 27 and 28 respectively. The disc 19 is also provided with a contact 29 and a pivoted bell crank contact35 member 30 connected to the rings 26 and 25 respectively. When disc 19 rotates, one arm of the bell crank contact engages keys inserted in slots 31 of a stationary face plate 32 and causes an intermittent closing of an electric circuit through40 the brushes 27 and 28 as will be hereinafter explained in detail.

The impulse receiver 11 comprises a rotating drum controller provided with cams 34, 35, 36, 37,38, 39 and a ratchet wheel 40, all mounted on a common shaft 41. The controller is rotated step45 by step upon each energization of an operating coil 43 which operates a core 44 to which a pawl 45 is pivotally attached and arranged to engage the teeth of the ratchet wheel 40. The circuit50 for the coil 43 may be traced from supply conductor 17, conductor 46 and 47, coil 43, conductor 48, brushes 27 and 28, conductor 49 back to supply line 18. The cams 34, 35, 36, 37, 38 and 39 are arranged to raise, and lower, contacts 50, 51,52, 53, 54 and 55, respectively, in such manner55 that the proper signaling sequence or cycle is obtained on the unit 12.

The signal unit 12 comprises two sets of signal lamps 56 and 57; 56 being arranged to control main street traffic, and 57 to control cross street

traffic. Each set of signals comprises three lamps colored red indicating "stop", amber indi-cating "caution", and green indicating "go" and marked "R", "A" and "G", respectively, on the6 drawing. The circuits for the lamps are con-trolled by the cams of the drum controller through stationary contacts 58, 59, 60, 61, 62 and69, as will be hereinafter explained in detail.

The rotation of the disc 19, and bell-crank contact 30, causes the arm 33 to engage keys in10 the faceplate 32 and move the arm 33' of the bell-crank against contact 29 thereby closing an electric circuit between the concentric contact rings 25 and 26 and consequently brushes 27 and28. The faceplate 32 is provided with a series of15 equally spaced radial slots 31 arranged annularly about the center of the faceplate, into which keys may be inserted in a manner necessary to obtain the desired sequence of operation of the bell20 crank 30.

Considering now the positions of the various parts of the apparatus as illustrated it will be noted that there are six keys, 63 to 68, arranged in faceplate 32. The arm 33 has just passed key63 and the position of the controller cams is such25 that contacts 50, 53 and 54 are lowered, there-by closing the circuits of lamps "A" and "G" on the main street lights, and "R" on the cross street. The circuits may be traced as follows: conduc-tors 17, 46, 47, contacts 50 and 58, conductor 70,30 lamp "A", conductors 71 and 18. For the lamp "G" of the main street signal, the circuit is as follows: conductors 17, 46, 47, contacts 54 and62, conductor 72, lamp "G" and conductors 71 and18. The circuit for the cross street "R" is as35 follows: conductor 17, 46, 47, contacts 53 and 61, conductor 91, lamp "R", conductors 71 and 18.

As the disc 19 progresses in the direction of the arrow, the arm 33 engages key 64 and causes40 another operation of the pawl 45 and another advance of the controller cams. It will be noted that the ratchet wheel 40 is provided with six teeth. Each operation of the pawl 45 is ar-ranged to move the controller cams $\frac{1}{6}$ of a revo-lution and, of course, six operations constitute45 one complete cycle of operation. The cam seg-ments are accordingly so arranged that when the arm 33 engages key 64 the controller closes contacts 52 and 55 and opens 50, 53 and 54,50 causing only lamp "R" on the main street and "G" on the cross street to be lit. The circuit for lamp "R" on the main street may be traced as follows: conductors 17, 46, 47, contacts 52 and 60,55 conductor 92, lamp "R", conductors 71 and 18. The circuit for the cross street "G" lamp is: conductors 17, 46, 47, contacts 55 and 69, con-ductor 93, lamp "G", conductors 71 and 18.

In the arrangement of the cam segments illus-trated the signals will remain the same for the60 next two operations of the controller, correspond-

ing to the engagement of arm 33 with keys 65 and 66. Upon engagement of arm 33 with key 67, however, the controller cams cause the closing of contact 51 which controls the amber light on the cross street. This circuit is through conductors 17, 46, 47, contacts 51 and 59, conductor 94, lamp "A", conductors 71 and 18. Upon engagement of the arm 33 with key 68 the cross street "A" and "G" and main street "R" are extinguished and the "R", cross street, and "G" main street, are lit. Upon the following engagement of arm 33 with key 63 the controller is again in the position illustrated and a full cycle of operation has been completed.

It will be evident from the above explanation that the length of a cycle of operation is dependent upon the speed at which disc 19 makes a complete revolution. It will also be evident that the changes in the signal combinations during a revolution are determined by the spacing of the keys in faceplate 32.

It has been found desirable at certain street intersections to change the respective time allowance, for traffic progress, at different hours of the day. Thus, for example, it may be desirable to lengthen the green light period on the main street during the early morning and evening rush hours, yet during the middle of the day the green light periods for the main and cross streets should be equal since the number of vehicles on the cross street approximately equals that on the main street. In order to accomplish such settings it has been heretofore necessary to manually adjust the positions of the keys in faceplate 32 of each individual transmitter.

In accordance with the invention such an adjustment may be made from any desired point, remote from the transmitter as for example a central traffic control station, by means of apparatus which shall now be described.

In accordance with the preceding explanation, the respective spacing of keys 63, 64, 65, 66, 67 and 68 determines the lengths of the various signal periods. Thus, key 63 initiates the caution "A" signal on the main street when the main street "G" and the cross street "R" are showing. Key 64 causes the extinguishment of main street "A" and "G", the cross street "R" and lights the main street "R" and the cross street "G". Keys 65 and 66 cause a progress of the controller drum, but with the cam arrangement shown, no change of signals occurs. Key 67 initiates the "A" on the cross street and key 68 extinguishes the cross street "A" and reverses the "R" and "G" signals to "R" cross street and "G" main street. It is therefore evident that the time of the main street "G" is determined by the distance between keys 68 and 63 and the time of the cross street "G" is determined by the distance between keys 64 and 67 for any predetermined speed of disk 19. The distances between keys 63—64 and 67—68 respectively determine only the lengths of the caution, or amber, periods. Keys 65 and 66 may be used for other signal combinations.

In order to adjust or control the respective distances between keys 68—63 and 64—67 from a remote point, there is provided a disk sector 73 pivoted at its axis to rotate about the center of plate 32. The sector 73 is provided with radial slots 74, corresponding to slots 31 in plate 32 and with gear teeth on its periphery. The keys 66,

67 and 68 are mounted and arranged within the sector slots 74 as desired. The position of the sector itself is determined by a gear wheel 75 mounted on shaft 76 and arranged to engage the gear teeth on the sector. The shaft 76 is controlled by two ratchet wheels 77 and 78, the teeth of which are oppositely arranged. The wheel 77 may be actuated by a pawl 80 mounted on a plunger 81 and operated by a coil 82. The wheel 78 may be actuated by a pawl 83 mounted on a plunger 84 and operated by a coil 85. The coil circuits are respectively closed by push buttons 87 and 88 and energized from the supply lines 17 and 18 through conductors 89 and 90.

If it is desired to decrease the green light period of the cross street traffic, the push button 87 may be repeatedly depressed whereupon the sector 73 is moved clockwise and the keys 66, 67 and 68 are advanced toward keys 63—64—65. The green period for the cross street is thereby correspondingly decreased. If a longer green period for the cross street should be desired, push button 88 can be operated and the sector thereby moved counter clockwise to increase the arc distance between keys 65 and 66 and correspondingly decrease the arc distance between keys 63 and 68. The principles of the invention may be applied to any traffic signaling system, but are particularly adapted to the system described which is the subject of a pending patent application, Serial No. 519,198, filed February 28, 1931, by Arthur B. Campbell and Claude F. Beyer.

What is claimed as new and desired to secure by Letters Patent of the United States, is:

1. In a traffic signal controller provided with a rotating switch, a drum controller, a step-by-step operating mechanism for operating the controller responsive to intermittent closures of said switch, the combination of means for regulating the timing of the step-by-step mechanism including a stationary dial, keys placed therein in the path of said rotating switch for closing said switch at predetermined intervals during its rotation, a movable dial sector movable about the center of said stationary dial and provided with keys also arranged to intermittently close said switch, and means for moving said dial sector whereby the spacing of the actuating keys is changed and the timing of said drum controller is correspondingly changed.

2. In a traffic signal controller provided with a rotating switch, a drum controller, a step-by-step operating mechanism for operating the controller responsive to intermittent closures of said switch, the combination of means for regulating the timing of the step-by-step mechanism including a stationary dial, keys placed therein in the path of said rotating switch for closing said switch at predetermined intervals during its rotation, a movable dial sector movable about the center of said stationary dial and provided with keys also arranged to intermittently close said switch, and a ratchet mechanism operable from a central control station for moving said dial sector whereby the spacing of the actuating keys is changed and the timing of said drum controller is correspondingly changed.

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