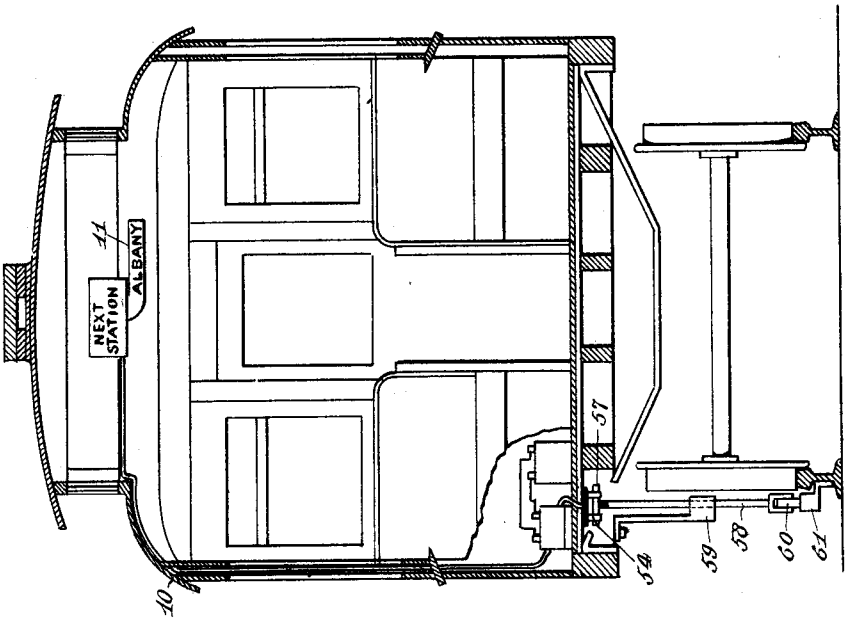
Oct. 29, 1929. J. S. MORANOR 1,733,817

INDICATING APPARATUS

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Fig. 1.



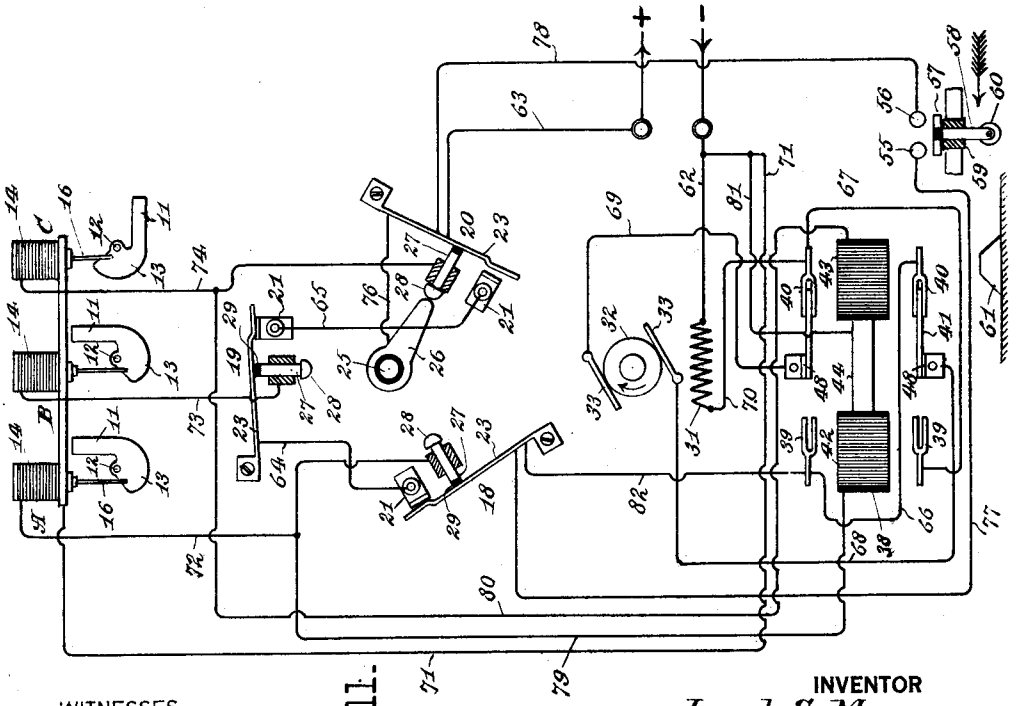


Fig. 11.

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INDICATING APPARATUS

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Fig. 2.

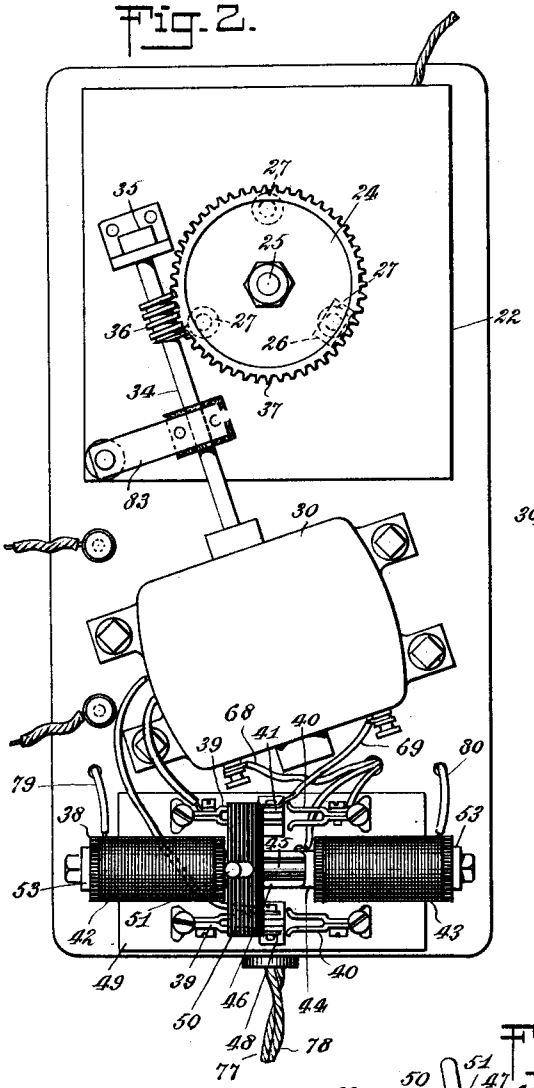


Fig. 3.

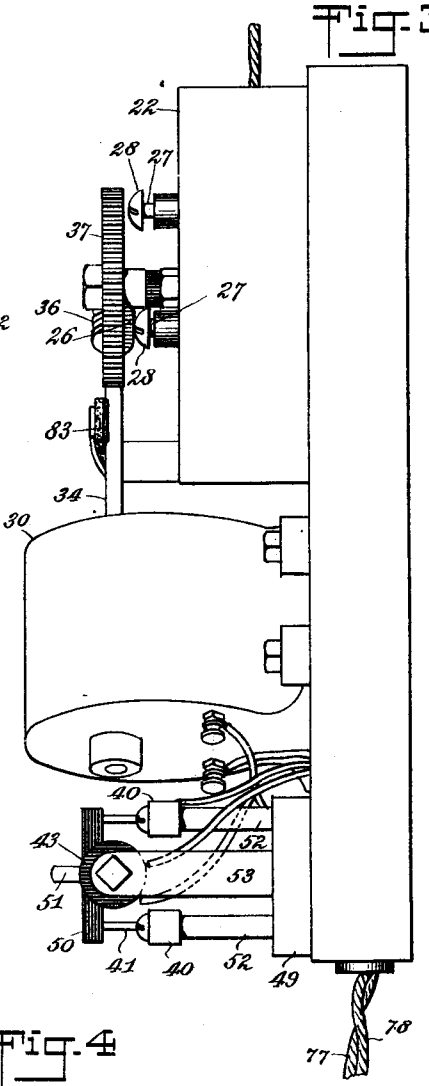
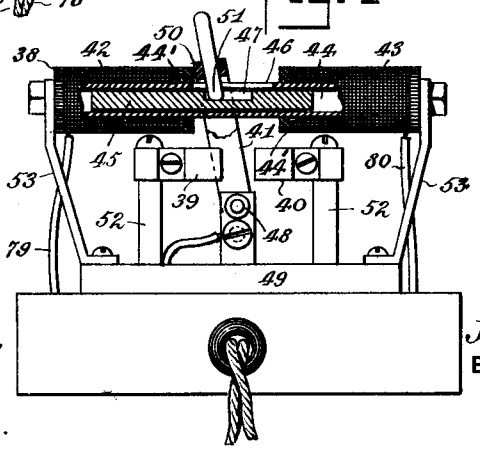


Fig. 4



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INDICATING APPARATUS

Filed April 7, 1927 4 Sheets-Sheet 3

Fig. 5.

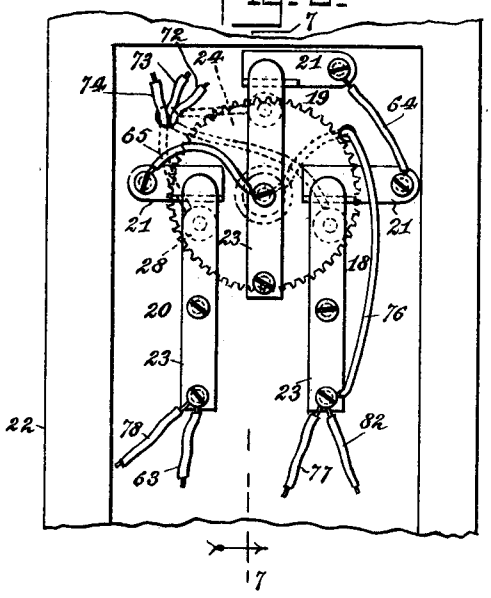


Fig. 6.

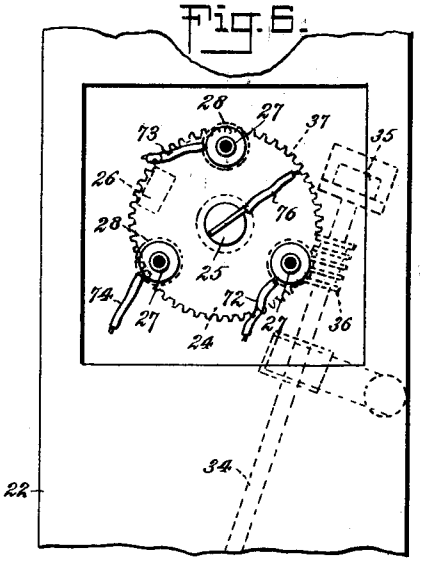


Fig. 7.

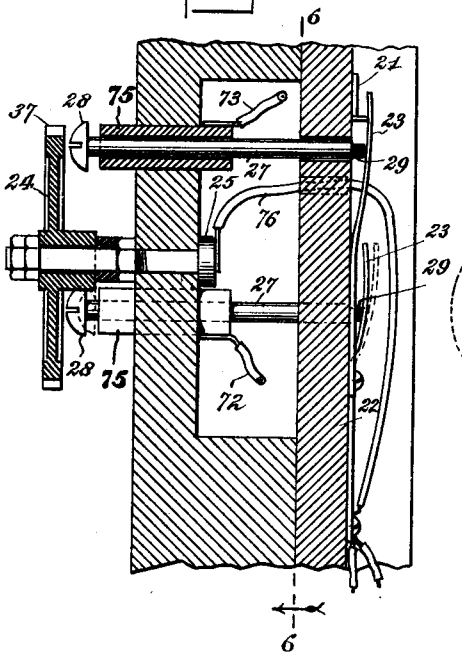
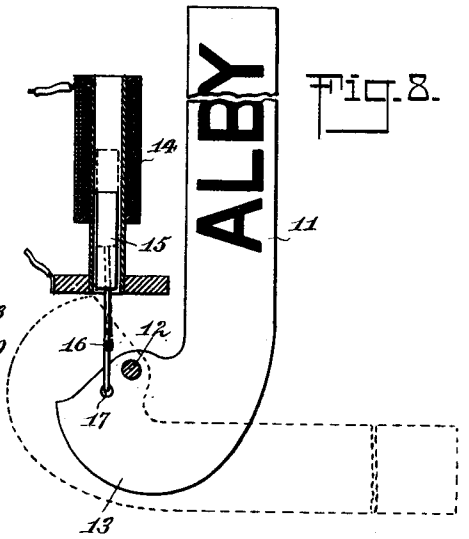


Fig. 8.



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INDICATING APPARATUS

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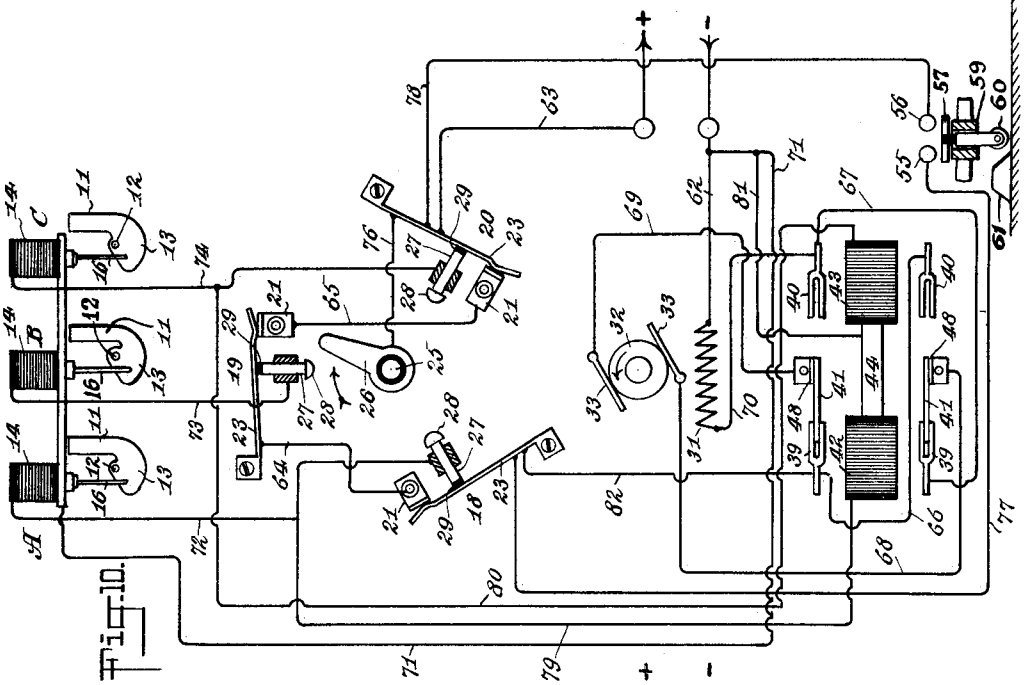


Fig. 10.

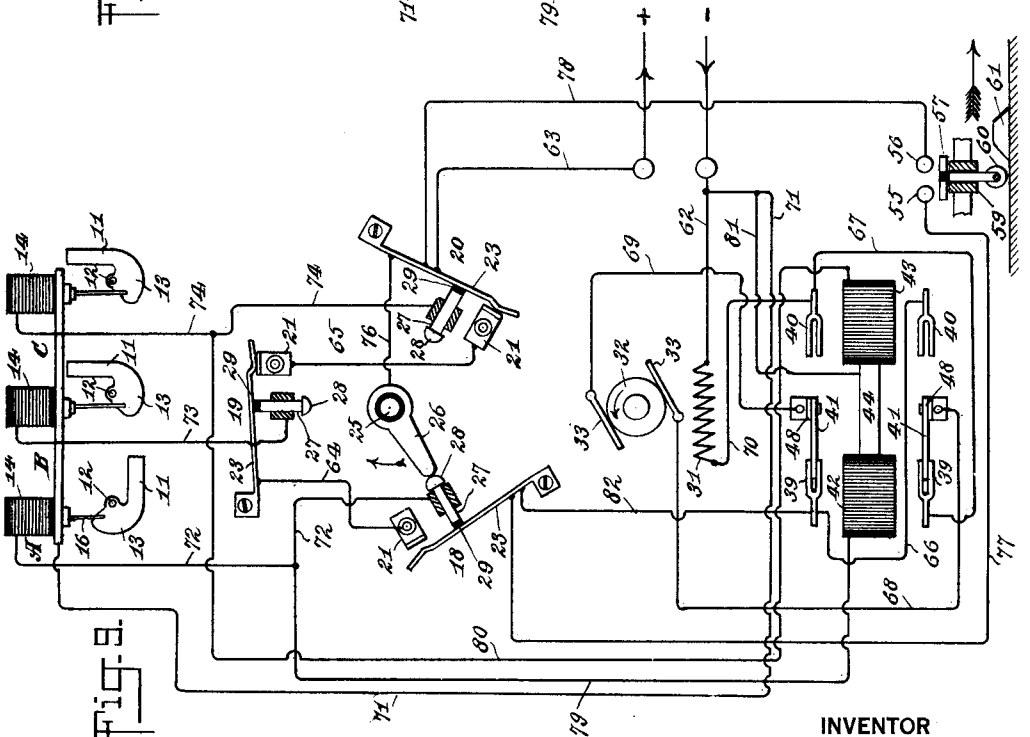


Fig. 9.

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UNITED STATES PATENT OFFICE

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INDICATING APPARATUS

Application filed April 7, 1927. Serial No. 181,779.

This invention relates to indicating apparatuses and closely analogous apparatuses.

The principal object of the present invention is an improved apparatus which is useful and reliable in operation for indicating, annunciating, or displaying, for the benefit of persons, divers information.

Another important object of the present invention is the provision in an apparatus of the character mentioned, indicia bearing elements which are displayed and concealed successively in numerical order, or in other words, consecutively, as the result of the actuation or manipulation of a single controlling device or actuator and for displaying and concealing the indicia bearing elements consecutively in a reverse order.

With the foregoing and other objects in view, the invention resides in the particular provision, combination and operation of the elements constituting the indicating apparatus hereinafter fully described and illustrated in the accompanying drawings, in which—

Figure 1 is a transverse sectional view through a railroad or railway car having the apparatus of the present invention.

Fig. 2 is a plan view illustrating certain features of the apparatus for controlling the indicia bearing elements of the apparatus.

Fig. 3 is a side elevation of the appurtenances shown in Fig. 2.

Fig. 4 is a sectional elevation of the means for reversing the electric motor forming a part of the apparatus and for operating the multiple switch which functions in controlling the movement of the indicia bearing elements of the apparatus.

Fig. 5 is a view of a switch assemblage for controlling the energization and deenergization of the solenoids which operate the indicia bearing elements.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 7, and looking in the direction indicated by the arrow.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 5.

Fig. 8 is an enlarged sectional elevation illustrating one of the indicia bearing elements, and the solenoid which operates to move the indicia bearing element to its indicating position.

Fig. 9 is a diagrammatic view illustrating the condition of the apparatus immediately prior to its operation for moving the first indicia bearing element to its non-indicating position and the movement of the second indicia bearing element to its indicating position.

Fig. 10 is a diagrammatic view illustrating the condition of the apparatus prior to its operation for moving the last indicia bearing element to its indicating position, and for reversing the flow of current through the windings of the motor for the operation of the indicia bearing elements consecutively in a reverse order.

Fig. 11 is a diagrammatic view illustrating the condition of the apparatus immediately prior to its operation for moving the last indicia bearing element to its non-indicating position and for moving the next to the last or second indicia bearing element to its indicating position.

In the present instance the indicating apparatus embodying the present invention is shown in conjunction with a railroad or railway car, but this is not to be deemed a limitation of its use. The invention may be diversely formulated so as to produce indicating apparatuses for other uses than the one disclosed which will be obvious to those versed in the art to which this invention relates.

On reference to Fig. 1 of the drawing it will be seen that there is shown a railroad or railway car 10 on which the apparatus embodying the present invention is arranged in its entirety.

In the illustrated embodiment, the apparatus of the present invention includes indicia bearing elements 11, any suitable number of which may be used each having imprinted or otherwise arranged thereon the name of one of the stations along the route traveled. The elements 11 are mounted for pivotal movement on a shaft 12 which will be held against rotation in suitable fixed bearings or the like respectively at opposite ends of the shaft 12. These elements 11 are arranged one behind the other so that only one will be visible at a time. Each of the indicia bearing elements

11 is automatically moved to and is held in its non-indicating position by a weight 13 formed on or connected with the element at one side of its pivot.

Associated with each of the indicia bearing elements 11 is a solenoid consisting of a coil 14 and a core 15. The lower end of the core has loosely connected thereto a member 16 whose lower end is pivotally connected as at 17 with the weighted end of the related element 11. Normally closed electric switches 18, 19 and 20 are employed. These switches are similar in construction, and inasmuch as there are only three indicia bearing elements 11, and three related solenoids shown, there are but three of the mentioned switches. Each of the switches 18, 19 and 20 consists of a fixed contact 21 on an insulator base 22, and a flexible contact 23 secured to the base 22. The flexible contact 23 coacts with the contact 21 and has a normal tendency to engage the contact 21 to close the circuit.

In order to move the flexible contacts 23 to opened positions, consecutively, there is provided a disk 24 which is mounted for rotation on a stub shaft 25 secured to the base 22. The disk 24 has a cam or wiper 26 on the under side thereof. Arranged for sliding movement through the base 22 are plungers 27 of conducting material. These plungers are spaced equidistantly and arranged concentrically with respect to the axis of the shaft 25. The plungers 27 are equal in number to the number of flexible contacts 23. Each plunger has a head 28 at one end, and an insulator 29 on its opposite end. The disk 24 is of conducting material and in the rotation of the disk 24, the wiper 26 will ride on the head 28 of each of the plungers 27 and move the same to cause the related flexible contact 23 to move out of engagement with its related contact 21. An electric motor 30 is employed including the usual winding 31, commutator 32, brushes 33 in contact with the commutator 32, and shaft 34. One end of the shaft is journaled in a bearing 35 secured to the base 22. The shaft 34 has a worm 36 which coacts with a worm gear 37 secured to or formed with the disk 24. It will therefore be understood that when the motor 30 is in operation, that the disk 24 will be rotated.

In order to reverse the motor 30 there is provided an electromagnetic pole changing switch 38 consisting of a pair of spring contacts 39, a pair of spring contacts 40, a double blade bridge element 41 which coacts with the pairs of contacts 39 and 40, coils 42 and 43, a tubular member 44 of conducting material whose opposite ends respectively are arranged in the coils 42 and 43, and a magnetizeable core 45 arranged for sliding movement in the member 44. The member 44 has a slot 46 extending longitudinally thereof between the coils 42 and 43. The core 45 has a recess 47. The bridge element 41 is pivotally mounted as at 48 on an insulator base 49. The connecting member 50 of insulating material between the blades of the bridge element 41 carries a member 51 whose lower end extends through the slot 46 in the member 44, and into the recess 47 of the core 45. Each of the contacts 39 and 40 is mounted on the base 49 by a base 52 which extends through a portion of the base for effecting electrical connection. The coils 42 and 43 are supported respectively by members 53 from the base 49.

In order to control the operation of the apparatus there is provided a single manipulating device or actuator in the form of a circuit make and break switch 54 consisting of fixed contacts 55 and 56 and a bridge contact 57 arranged on one end of a member 58 supported for up and down movement in a bearing 59 carried by a part of the car. The lower end of the member 58 has a roller 60 which rides on a track obstacle or cam 61; there being one obstacle or cam 61 at each station along the route traveled. When the roller 60 rides up on the cam 61 the bridge contact 57 will move into engagement with the contacts 55 and 56 to close the circuit in which the contacts 55 and 56 are electrically connected. When the roller rides down off the cam 61, the circuit will be opened as will be understood.

The devices are electrically connected in series with the circuit make and break switch 54, and electrical energy is supplied for operating the motor and energizing the solenoids associated with the indicia bearing elements 11, and for energizing the coils 42 and 43, to the end that the indicia bearing elements will be operated consecutively beginning with the first indicia bearing element and then reversely beginning with the last, consecutively.

The wiring of the appurtenances is as follows: A conductor 62 leads from the negative side of a source of electrical energy (not shown) to one pole of the winding 31 of the motor. A conductor 63 leads from the positive side of the source of electrical energy to the flexible contact 23 of the switch 20. The fixed contact 21 of the switch 18 is electrically connected with the flexible contact 23 of the switch 19 by a conductor 64, and the fixed contact 21 of the switch 19 is electrically connected with the fixed contact 21 of the switch 20 by a conductor 65. One of the contacts 39 of the pole changing switch is electrically connected with one of the contacts 40 by a conductor 66, and the other contact 39 is electrically connected with the other contact 40 by a conductor 67. One terminal of the bridge element 41 is electrically connected with one of the brushes 33 of the motor by a conductor 68, and the other terminal of the bridge element 41 is electrically connected

with the other brush 33 of the motor by a conductor 69. One contact 40 of the pole changing switch 38 is electrically connected with one pole of the winding 31 of the motor by a conductor 70. Each of the coils 14 of the solenoids is electrically connected with the negative conductor 62 by a conductor 71, and return conductors 72, 73 and 74 lead respectively from the coils to the plungers 27. Electrical connection is made with each of the plungers 27 as shown most clearly in Fig. 7 by virtue of the use of a tubular member 75 of conducting material in contact with which the plunger slides. A conductor 76 is electrically connected at one end with the shaft 25 so that current will pass through the disk 24 and its wiper 26. The opposite end of the conductor 76 is electrically connected with the flexible contact 23 of the switch 20. In the diagrammatic views the conductor 76, for the sake of convenience, is shown connected at one end with the wiper 26. The contact 55 of the switch 54 is electrically connected with the flexible contact 23 of the switch 18 by a conductor 77, and the contact 56 of the switch 54 is electrically connected with the flexible contact 23 of the switch 20 by a conductor 78. A conductor 79 is electrically connected between one end of the coil 42 of the pole changing switch 38 and the conductor 72. A conductor 80 is electrically connected between one end of the coil 43 of the pole changing switch 38 and the conductor 74. A conductor 81 is electrically connected between the tubular member 44 and the conductor 71 which leads to the negative conductor 62 so that the current will flow to the member 44. Current flows to each of the coils 42 and 43 of the pole changing switch from the member 44 at times, by virtue of connections 44′ respectively between the coils 42 and 43 and member 44.

For the sake of convenience the solenoids which operate the indicia bearing elements 11 will be designated A, B and C.

When the apparatus is in the condition illustrated in Fig. 9, current will flow through the motor 30 to cause rotation of the disk 24 and its wiper 26 clockwise. At this time the wiper 26 will be in engagement with the plunger 27 associated with the flexible contact 23 of the switch 18 holding the contact 23 out of engagement with its related fixed contact 21. At this particular time the solenoid A is energized and its indicia bearing element 11 is held in an indicating position and the other indicia bearing elements 11 are in their non-indicating positions. This is true because current is passing from the negative conductor 62, through conductor 71, coil 14 of solenoid A, conductor 72, plunger 27 of switch 18, wiper 26 and disk 24, through the shaft 25, conductor 76, flexible contact 23 of switch 20, and conductor 63 to the positive side of the electrical energy, completing the circuit. When the roller 60 rides up on the cam 61, the bridge contact 57 will move into engagement with the contacts 55 and 56. Current will then flow through the windings 31 of the motor to cause the same to operate, which will cause the wiper 26 to move off of the plunger 27 of the switch 18, allowing its flexible contact 23 to engage its fixed contact 21. Current will be flowing from the negative conductor 62, through the windings 31 of the motor, to the conductor 70, one of the contacts 40, conductor 67, one of the contacts 39, one blade of the bridge element 41, conductor 68, one of the brushes 33, commutator 32, the other brush 33, conductor 69, the other blade of the bridge element 41, the other contact 39, conductor 82, to flexible contact 23 of switch 18, to conductor 77 across the contacts 55, 57 and 56, to conductor 78 and to the flexible contact 23 of the switch 20. The momentary closing of the switch 54 is sufficient to start the motor to cause the wiper 26 to move off of the plunger 27 of the switch 18. The motor will continue to operate because all of the switches 18, 19 and 20 will be closed. When the wiper 26 engages the head 28 of the plunger 27 of the switch 19, the flexible contact 23 will be moved to an open position, and as a consequence the motor will cease operating. When the wiper 26 moves out of engagement with the plunger 27 of the switch 18, the coil 14 of the solenoid A, will be deenergized and as a consequence the indicia bearing element 11 associated therewith will move automatically to a non-indicating position by virtue of its weight 13. When the wiper 26 moves into engagement with the head 28 of the plunger 27 of the switch 19, current will be flowing through the coil 14 of the solenoid B causing energization of the latter, and therefore the movement of its related indicia bearing element 11 to its indicating position as shown in Fig. 10. This action is repeated upon each closing and opening of the switch 54 to operate any number of indicia bearing elements. When the last indicia bearing element, the one associated with the solenoid C in the present instance has been moved to its indicating position, the pole changing switch 38 will have been operated to reverse the flow of current through the winding of the motor, to reverse the rotation of the motor, so that the indicia bearing elements will be actuated consecutively in a reverse order. The pole changing switch is actuated to reverse the motor in a manner presently to be described. Current will flow from the positive conductor 63 to the flexible contact 23 of the switch 20, through conductor 76, through the shaft 25, disk 24 and wiper 26, through the plunger 27 associated with the switch 20, through a lead of the conductor 76, through conductor 80, through coil 43 of the switch 38, current

flowing through the member 44, the current passing from the member 44 to the conductor 81 to a lead of the conductor 71, and thence to the negative conductor 62. When the indicia bearing elements 11 have all been operated in a reverse order, there comes a time when the pole changing switch 38 is again operated to reverse the motor to cause the wiper 26 to travel in a clockwise direction as indicated in Fig. 9. In order to obtain this result the current flows from the negative conductor 62 through a lead of the conductor 71, through conductor 81, to member 44, then through coil 42 of the pole changing switch 38, current flowing from the coil 42, through conductor 79, through the plunger 27 of the switch 18, through the wiper 26, disk 24, shaft 25, conductor 76, flexible contact 23 of the switch 20, and positive conductor 63 completing the circuit. In the pole changing operation, when each of the coils 42 and 43 is energized, the core 45 will be moved in response thereto, and as a result the bridge element 41 will be moved to engage with the pairs of contacts 39 and 40 as the case may be.

From the foregoing it will be understood that provision is made for actuating or moving the indicia bearing elements 11 to indicating and non-indicating positions consecutively, and for reversing the operation thereof by the repeated operation of the switch 54. It will also be understood that each of the indicia bearing elements 11 will be allowed to remain in its indicating position until the switch 54 is closed, which causes one of the indicia bearing elements 11 to move from its indicating position to a non-indicating position succeeded immediately by the movement of the next indicia bearing element 11 from its non-indicating position to its indicating position. The motor 30 is operated only long enough to cause the wiper to move from one plunger 27 to another. The wiper 26 stops in contact with each of the plungers 27 as it travels around its path of movement. A suitable brake 83 is employed in conjunction with the shaft 34 of the motor to prevent the armature from continuing to turn after the current through the motor has been cut off.

It is to be understood that the invention is not restricted to the precise arrangement of parts shown and described, as details of construction may be modified and rearranged without departing from the spirit of the invention, the scope of which is limited only by the terms of the appended claims.

I claim:

1. In an indicating apparatus, a circuit including a source of electrical energy, a motor, and a switch operable to initially energize said motor, a wiper electrically connected in said circuit movable by said motor, contact members in said circuit engageable by said wiper, solenoids in said circuit adapted for energization by engagement of said wiper with said contact members, indicators actuated by energization of said solenoids, and switch members in said circuit operable by said contact members for controlling the duration of energization of said motor.

2. In an indicating apparatus, a circuit including a source of electrical energy, a motor, and a switch operable to initially energize said motor, a wiper electrically connected in said circuit movable by said motor, contact members in said circuit engageable by said wiper, a plurality of indicia bearing elements adapted for actuation consecutively by engagement of said wiper with said contact members, and switch members in said circuit operable by said contact members for controlling the duration of energization of said motor.

3. In an indicating apparatus, a circuit including a source of electrical energy, a motor, and a switch operable to initially energize said motor, a wiper electrically connected in said circuit movable by said motor, contact members in said circuit engageable by said wiper, a plurality of indicia bearing elements adapted for actuation consecutively by engagement of said wiper with said contact members, switch members in said circuit operable by said contact members for controlling the duration of energization of said motor, and an electromagnetic pole changing switch in said circuit adapted for actuation by the engagement of said wiper with a certain one of said contacts to reverse said motor, for the purpose of causing the actuation of said indicia bearing elements consecutively in a reverse order.

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