A. C. RICHHEIMER & P. W. KOCH.

AUTOMATIC STREET INDICATOR.

APPLICATION FILED MAR. 30, 1910.

980,336.

Patented Jan. 3, 1911.

3 SHEETS—SHEET 1.

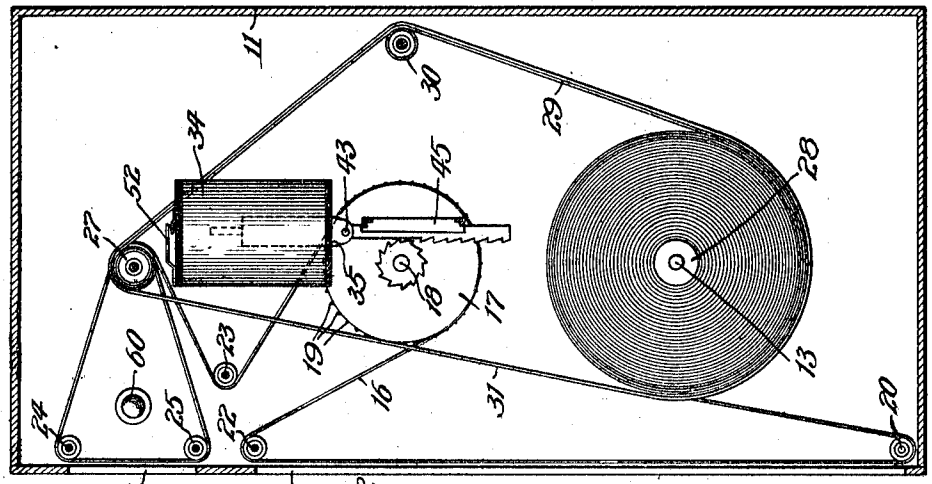

Fig. 2.

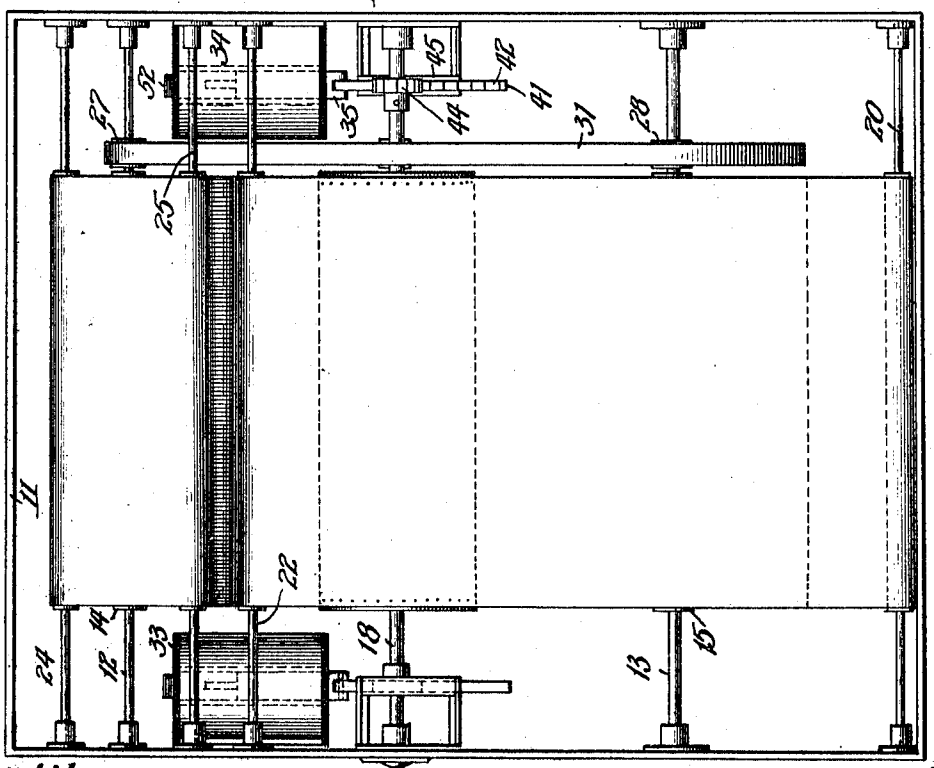

Fig. 1.

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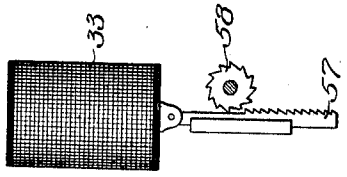
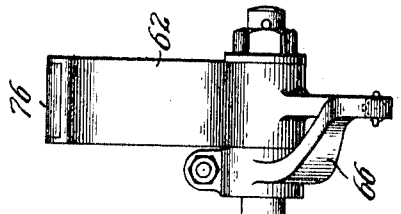


Fig. 6



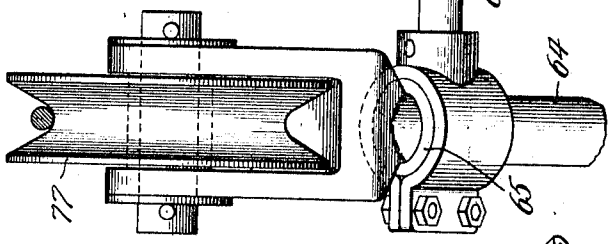


Fig. 5

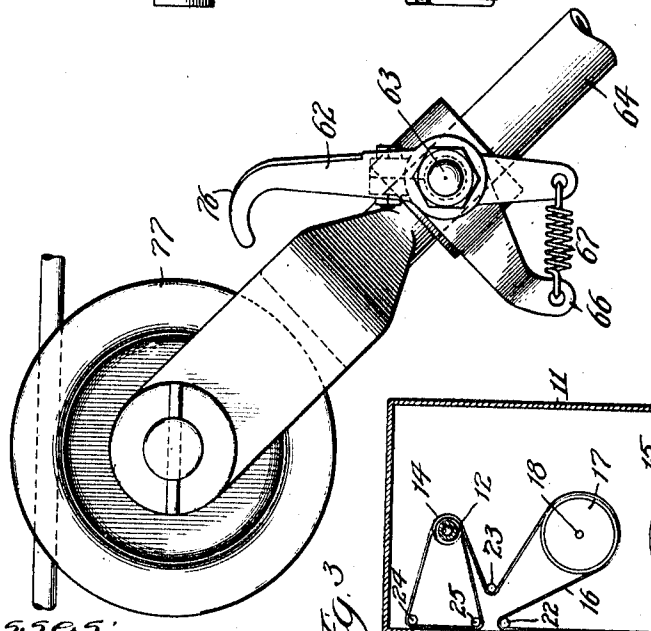


Fig. 4

Fig. 3

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3 SHEETS—SHEET 3.

Fig. 9.

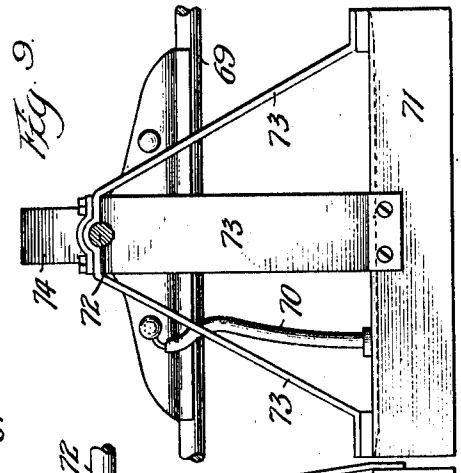
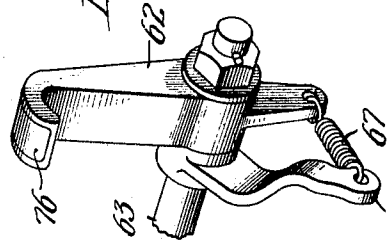


Fig. 7.



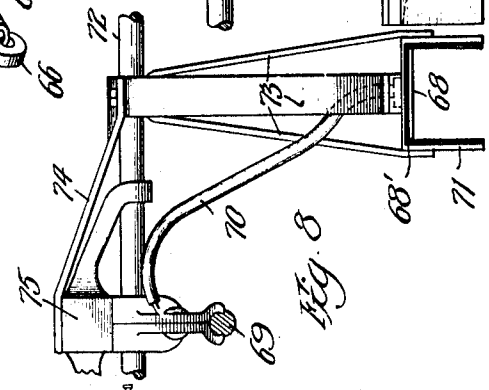


Fig. 8.

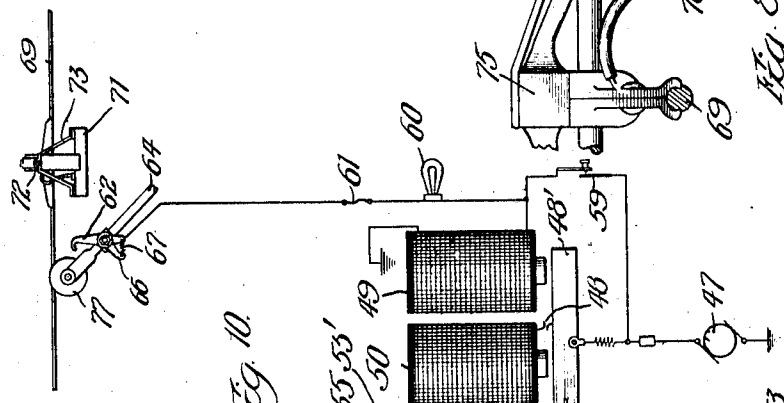
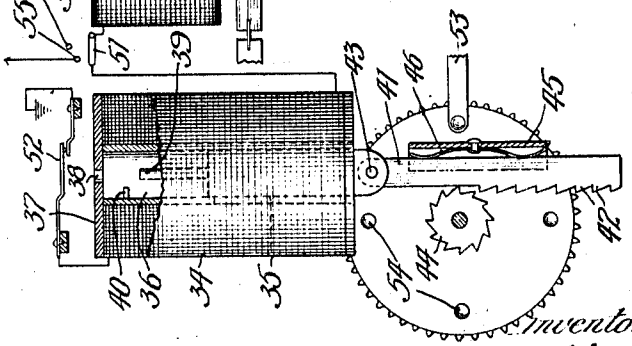


Fig. 10.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC STREET-INDICATOR.

980,336. Specification of Letters Patent. Patented Jan. 3, 1911.

Application filed March 30, 1910. Serial No. 552,404.

To all whom it may concern:

Be it known that we, ALEXANDER C. RICHHEIMER and PAUL W. KOCH, citizens of the United States, and residents of Chicago, county of Cook, and State of Illinois, have jointly invented certain new and useful Improvements in Automatic Street-Indicators, of which the following is a description.

This invention relates to improvements in automatic street indicators for electric cars, and aims particularly to display at predetermined intervals the names of the next succeeding streets or stations so that they may be read by the passengers on the car. It is also adapted to display advertising matter in connection with the display of street names; although this feature is merely auxiliary to the display of street names or stations.

It is an object of our invention to produce a device of this character which shall be as light in construction as is consistent with the strength and efficiency required, since each pound added to the weight of a car increases the cost of transportation.

It is another object of our invention to produce a device of this character which shall be simple in construction, thereby reducing the cost of production and of maintenance.

Still another object of our invention is the provision of a device which shall be certain and positive in its operation irrespective of the speed in which the car may be traveling, also irrespective of sleet, snow, or other unfavorable weather conditions.

The invention comprises a web having suitable inscriptions thereon, the inscriptions on one side being the names of the streets or stations along the route which the car is to travel; and the inscriptions on the other side being in the form of advertising or any other preferred subject matter. The web is adapted to be rolled from one roll onto another, and during its passage both sides of the web are exposed to the view of the passengers on the car.

The web is operated by means of solenoids and the rolls are positively driven at varying speeds to accommodate the variation in size of the rolls as the web is wound from one to the other. The solenoids are actuated intermittently by the automatic closing of a circuit with the line wire by means of a shoe connected with the line wire and a yieldingly mounted arm carried by the trolley-pole on a car.

Our invention will be best understood by reference to the following description when taken in connection with the accompanying drawings illustrating a preferred embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings—Figure 1 is a front elevation of an indicator embodying our invention, the front of the box in which the indicator is mounted, being removed. Fig. 2 is an elevation looking toward the left in Fig. 1. Fig. 3 is an elevation showing the course of the web as it is wound from one roll to the other. Fig. 4 is an enlarged elevation of the upper end of a trolley-pole with our improved contact member attached thereto. Fig. 5 is an elevation looking toward the right in Fig. 4. Fig. 6 is a detail elevation of the solenoid shown at the left in Fig. 1. Fig. 7 is a detail perspective of our improved contact member carried by the trolley-pole. Fig. 8 is an end elevation of our contact shoe attached to a span wire. Fig. 9 is an elevation looking toward the left in Fig. 8, and, Fig. 10 is an elevation of the electrical mechanism for operating the web driving drum.

On the drawings, 11 designates the box or receptacle of any suitable construction adapted to contain the indicating mechanism, and between the sides of which are journaled the web rolling shafts 12 and 13 provided with rolls 14 and 15 upon which the indicating web 16 is adapted to be wound. A driving drum 17 mounted on the shaft 18 is provided with suitable teeth or projections 19 to engage with the edges of the web 16 and feed the web along from one roll to the other. The web as shown in Figs. 2 and 3 is led from the roll 15 around the guide-roll 20 located near the bottom of the box; thence, upwardly across the opening 21 in the front of the box through which the advertising or other inscriptions with which the web is provided, may be seen; then over the guide-roll 22, down and around the driving drum 17, over the guide-roll 23, around the roll 14, over the guide-roll 24, beneath the guide-roll 25, and back to the roll 14 upon which it is wound. The location of

the various guide-rolls and the openings through the walls of the box, however, may be changed from the position shown, if desired, so that the web will travel past openings which may be made in the rear of the box as well as the front, so that the inscription on the web can be read from either the front or the rear.

An opening 26 is provided in the front of the box above the opening 21 and through which the names of the streets can be seen by the passengers. It will be noted that the reverse side of the web is seen through the opening 26 from that seen through the opening 21; hence, it will be evident that the names of the streets may be printed upon one side of the web and that the other side may be used for advertising matter or any other form of inscription that is desired to be placed thereon. The openings 21 and 26 are preferably covered with glass in order to exclude dirt and dust from the interior of the mechanism.

It will be evident that as the web is wound from the roll 15 onto the roll 14, the diameter of the two rolls will continually vary, *i. e.*, the size of the roll of web upon the roll 15 decreases, while that upon the roll 14 increases. In order to drive the rolls so that the web may be wound slowly from one onto the other without either wrinkling the web by feeding it faster than it is wound, or tearing the web by winding it faster than it is fed, we have provided an improved driving device whereby the two rolls are connected together so as to be driven one from the other at the desired relative rates of speed.

On the shaft 12 at one end of the roll 14, there is secured a short roll 27 of substantially the same diameter as the roll 14. Upon the shaft 13 in alinement with the roll 27 is secured a corresponding roll 28. A ribbon 29 of substantially the same thickness and texture as the indicating web, is led from the roll 28 over a guide-roll 30 and wound upon the roll 27, so that the ribbon is all on the roll 27 when the web is all on the roll 14. An elastic belt 31 encircles the rolls 27, 28, and 30, outside the tape 29. It will be evident that as the indicating web and the ribbon or tape 29 are wound from one roll onto the other simultaneously, the sizes of the roll of web and tape upon the rolls 14, 27, 15, and 28, will increase and decrease in unison.

Assuming that the indicating web and the ribbon are both wound upon the rolls on the shaft 13, if the drum 17 is turned in a counter-clockwise direction looking at Fig. 2, the web will be unwound by the drum from the roll 15. As the web unwinds the ribbon 29 also unwinds proportionately from the roll 28. The elastic belt 31 will be carried around by the roll of ribbon on the roll 28, and will operate the roll 27 to wind the tape thereon and to wind the web on the roll 14. Since the elastic belt travels around the peripheries of the ribbon rolls which are gradually changing in size, it will be obvious that the linear speed of the two rolls will be maintained constant regardless of the size of the rolls, and consequently the ribbon and the web will both be wound up as fast as they are unwound by the driving drum 17. It will be obvious, furthermore, that the web and ribbon may be wound alternately from one roll to the other, and that the same tension will be maintained upon the web at all times in its travel.

The shaft 18 upon which the driving drum 17 is secured, is mounted in the sides of the box or receptacle, as shown in Fig. 1, and has one end extending outside the box to which there is secured a knob or operating handle 32. By means of this knob the mechanism may be operated manually to wind the web upon either one of the rolls previous to starting out on a trip with the car, or it may be used for adjusting the web or for changing its position in case the car should be switched onto another track. It is not intended, however, that the device shall be operated manually to indicate each street or station on the route, as are some of the indicators heretofore employed.

Our invention is adapted to be operated automatically and at predetermined intervals by a plurality of solenoids 33 and 34. The solenoids may be of usual construction and composed of a sufficient number of windings to give the required movement to the cores.

Referring particularly to Figs. 2 and 10 in which the solenoid 34 is shown, it will be seen that the core 35 fits snugly within the core casing 36 in the center of the core. The top of the core is covered by a plate 37 provided with a small opening 38 of sufficient size to permit the passage therethrough of the reduced end 39 of the core. The plate 37 having the small opening 38, is employed for the purpose of providing a dash-pot in which the core works, so that when the solenoid is energized, the core will not be jerked upwardly with sufficient rapidity to tear the web or injure the mechanism of the device. The movement of the core is limited by a stop 40 which may be located in the core casing 36 in a position longitudinally thereof to permit the required movement of the core.

A rack-bar 41 provided with inclined teeth 42 is pivotally attached to the lower end of the core at 43, and is adapted to operatively engage a ratchet-wheel 44 secured upon the shaft 18. The rack is guided in its longitudinal movement in a guide 45 and is yieldingly held against the ratchet-wheel by a spring 46. When the core is in its normal

inoperative position, as shown on the drawings, the rack-bar is lowered so that its teeth are out of engagement with the ratchet-wheel, and the shaft 18 is permitted to be rotated in a direction opposite to the direction of rotation imparted by the rack-bar 41.

The solenoid 34 is energized from the motor circuit of the car, the motor being designated in Fig. 10 by 47. The solenoid circuit is closed by the contacts 48, one of which is mounted on the member 48′ adapted to be actuated by the magnet 49, as will be hereinafter described. The circuit is maintained closed by the magnet 50 through which the current flows before passing through the windings of the solenoid 34, the switch 51, and eventually to ground through the normally closed contact 52. When the solenoid is energized the core 35 will be drawn upwardly, carrying with it the rack-bar 41, the teeth of which engage with the ratchet-bar 44 and rotate the driving drum 17 in a counter-clockwise direction, looking at Figs. 2 and 10. As the core reaches the limit of its upward movement, the end of the reduced portion 39 engages and lifts the contact member 52, thus breaking the circuit at this point. The core will now drop under the influence of gravity to its normal position, the teeth 42 sliding over the inclined teeth of the ratchet 44 during the downward movement of the rack-bar. The spring 46 is designed to maintain the rack-bar 42 in engagement with the ratchet-wheel during the upward movement of the bar, but will permit the bar to yield sufficiently to resume its normal inoperative position under the influence of gravity. The upward movement of the core and rack-bar is designed to impart a quarter turn to the driving drum, and in order that the drum may not be turned backwardly due to the frictional engagement of the teeth 42 with the ratchet-wheel 44 upon the downward movement of the rack-bar, we have provided a spring 53 secured at one end upon the frame of the indicator, and provided at its other end with a slight projection adapted to seat in the depressions 54 with which the end of the drum is provided. Each rotation of the drum a quarter turn will bring the next depression 54 under the spring 53 which will snap into the depression and hold the drum against backward rotation, the friction between the drum and spring, however, not being sufficient to materially resist the movement of the drum by the rack-bar during its operative movement.

The actuation of the drum by the solenoid 34 is repeated at predetermined intervals until the car has reached the limit of its run and the indicating web is substantially all wound upon the roll 14. When the car returns over the same route it is necessary to reverse the direction of rotation of the drum 17 to wind the web back onto the roll 15. In order to produce this reverse movement of the drum, the switch 51 is turned from the contact closing the circuit around through the solenoid 34 to the contact point 55, which closes the circuit through the solenoid 33. If, for any reason, it becomes desirable to cut out the indicator, the switch 51 may be thrown onto the point 55′. This solenoid and its connection to the drum 17 is similar in all respects to the solenoid 34 and its connections previously described, except that, as shown in Fig. 6, the rack-bar 57 is located on the opposite side of the shaft 18 and is adapted to engage with a ratchet 58 mounted on the shaft to rotate the drum in a clockwise direction, looking at Figs. 2, 6, and 10. Rotation of the drum in this direction will feed the web from the roll 14 back onto the roll 15.

The magnet 49 which closes the solenoid circuit may be energized by closing the hand-switch 59, but in the ordinary automatic operation of the device, the magnet is energized from the line circuit, as shown in Fig. 10. A circuit is established from the winding of the magnet through a resistance lamp 60, preferably positioned behind the web opposite the opening 26 to illuminate the inscription on the web, and the fuse 61 to the contact member 62, pivotally mounted upon an arm 63 projecting laterally from a trolley-pole 64. The arm 63 is insulated from the pole by an insulating ring 65. Secured upon the arm adjacent the contact member 62, is a stationary arm 66 which is connected with the contact member by a spring 67 which yieldingly retains the contact member in a position to make contact with a plate 68 connected with the line wire 69 by a connection 70. The plate 68 is insulated by insulation 68′ from the channel-shoe 71 in which it is secured, the shoe being supported upon the span wire 72 by means of the frame members 73. The frame carrying the channel-shoe is maintained in position on the span wire and prevented from becoming displaced by a brace 74 secured to the top of the frame and attached to the connection 75 between the span and line wires. The downwardly projecting flanges of the channel-shoe protect the contact plate 68 from an accumulation of ice or snow, also afford a guide for the contact member 62 to insure a perfect contact between its upper end and the plate. The end 76 of the contact member is preferably made of carbon in order to prevent burning away of the member by the sparks when the contact is broken as the member leaves the shoe. The magnet 49 is designed to be operated by a very small amount of current; a momentary contact between the arm 62 and the contact plate 68, such as

would be produced when the car is running at high speed, being sufficient to close the solenoid circuit at the contact 48.

The contact shoe, as shown in the drawings, is located at one side of and in a plane below the line wire so as not to interfere with the ordinary trolley-wheel 77 carried upon the end of the trolley-pole. The arm 66 may be adjusted on the arm 63 to bring the contact member 62 into the required position relative to the pole, and it is preferably so positioned that the contact member shall not extend above the pole when the pole is lowered, so that it will not be struck and broken off by overhanging obstacles or when passing beneath low bridges or culverts. The arms 63 and 66 are preferably covered with insulating material to prevent the establishment of a circuit and the accidental operation of the indicating web in case the trolley should jump the wire and the arm 63 should fly up and strike the line wire.

While we have shown and described a preferred embodiment of our invention, it will be obvious that changes in the minor mechanical details may be resorted to within the scope of the claims without departing from the spirit of the invention or sacrificing any of the material advantages thereof.

What we claim is:

1. In an automatic street indicator, the combination of a plurality of rolls, a web having suitable inscriptions thereon adapted to wind upon said rolls, a drum provided with means to positively engage said web, a ratchet wheel secured upon each end of the drum with the teeth thereof facing in opposite directions, a solenoid disposed adjacent each of said ratchet wheels and at opposite sides of the drum, means for alternatively energizing said solenoids at predetermined intervals, a rack connected to the core of each solenoid and adapted to engage and turn its adjacent ratchet wheel when moved longitudinally in one direction and to slide idly over said ratchet wheel when moved in the other direction, said rack having a smooth surface which is opposed to its ratchet wheel when in normal position whereby to permit said wheel to turn independently of said rack, means for yieldingly urging said rack toward said wheel, means for retarding the operative stroke of said rack, and a stop for limiting the operative movement of the rack.

2. In an automatic street indicator, the combination of a plurality of rolls, a web having suitable inscriptions thereon adapted to wind upon said rolls, a drum provided with means to positively engage said web, a ratchet wheel secured upon each end of the drum with the teeth thereof facing in opposite directions, a solenoid disposed adjacent each of said ratchet wheels, means for alternatively energizing said solenoids at predetermined intervals, a rack connected to the core of each solenoid at opposite sides of the drum and adapted to engage and turn its adjacent ratchet wheel when moved longitudinally in one direction and to slide idly over said ratchet wheel when moved in the other direction, said rack having a smooth surface which permits its ratchet wheel to rotate independently of the rack when said rack is in normal inoperative position, means for limiting the operative stroke of the core of each solenoid, and a device carried by each core for breaking the solenoid energizing circuit when said core has reached the limit of its operative movement.

3. In an automatic street indicator, the combination of a plurality of rolls, a web having suitable inscriptions thereon adapted to wind upon said rolls, a drum provided with means to positively engage said web, a ratchet wheel secured upon each end of the drum with the teeth thereof facing in opposite directions, a solenoid disposed adjacent each of said ratchet wheels, a rack pivotally connected to the core of each solenoid, said racks being disengaged from their ratchets when in normal position and mounted at opposite sides of the drum, electric circuits for energizing said solenoids at predetermined intervals comprising a primary circuit including an electro-magnet, a secondary circuit including said solenoid and adapted to be closed by said electro-magnet, a contact included in said secondary circuit, and means carried by the core of each solenoid for actuating said contact to break the secondary circuit when said core has reached the limit of its operative movement.

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