Apru 14, 1931. F. R. STREHL 1,800,913

CHANGEABLE SIGN

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Fig. 1.

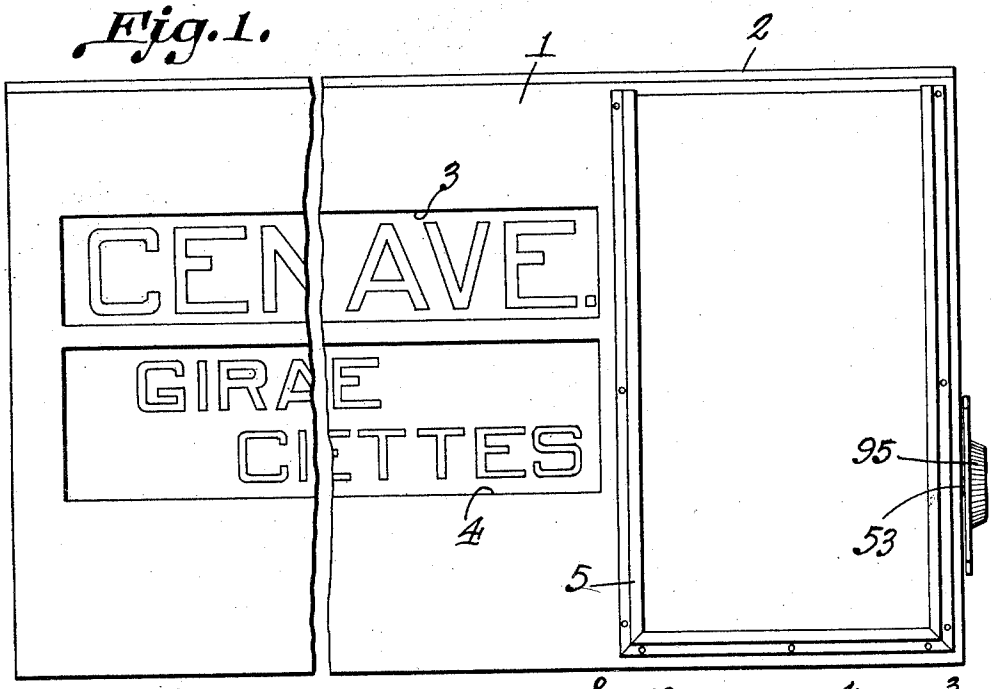
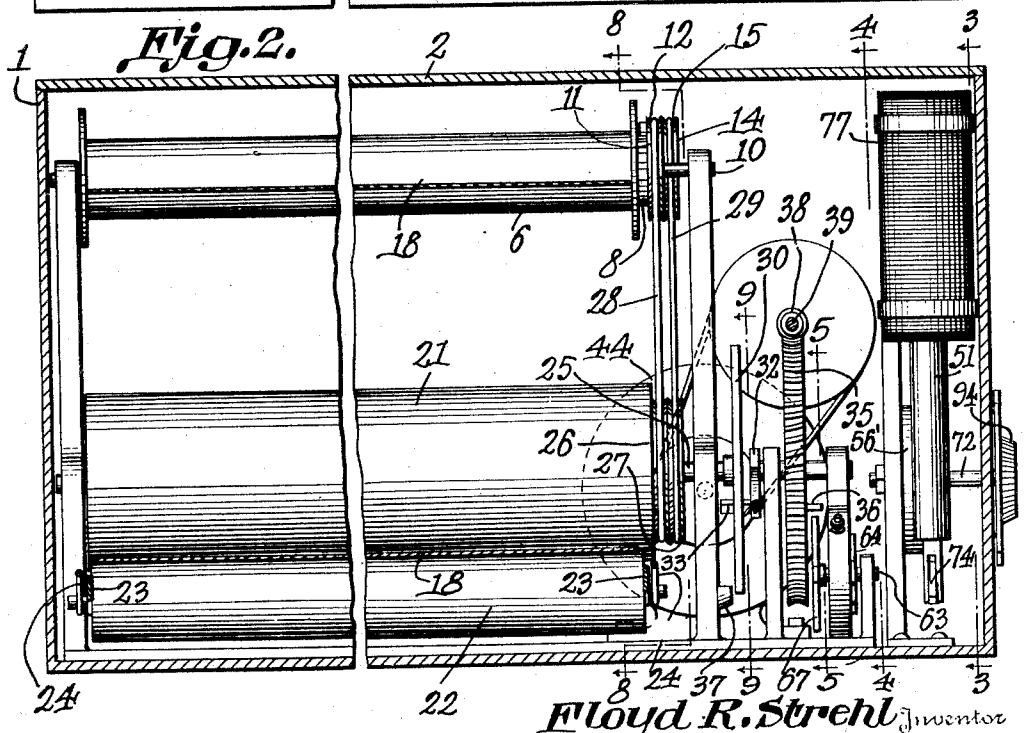


Fig. 2.



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Fig. 3.

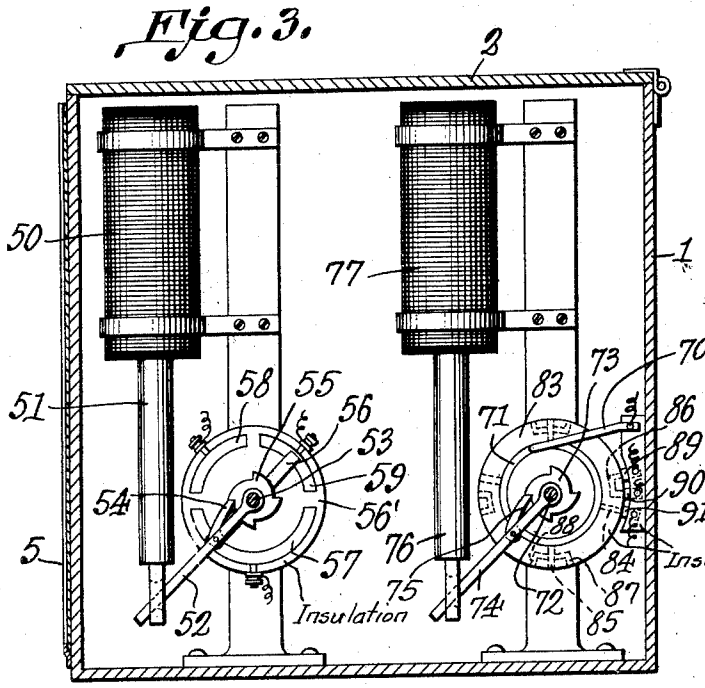


Fig. 5.

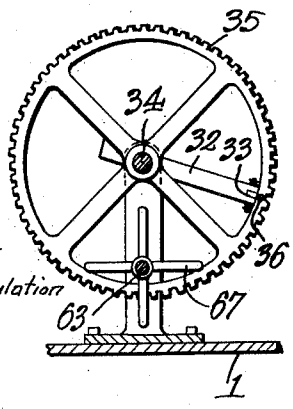
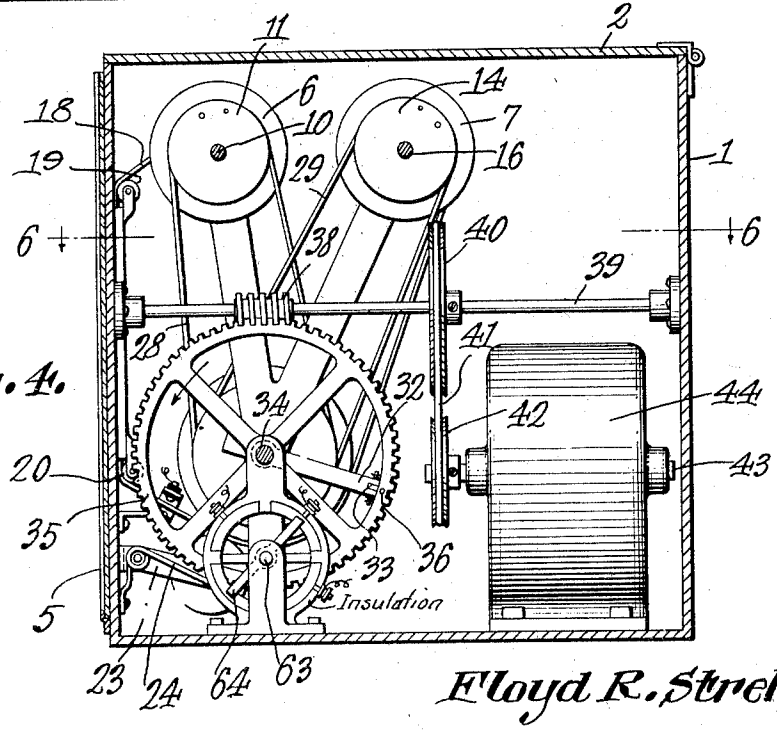


Fig. 4.



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Fig. 6.

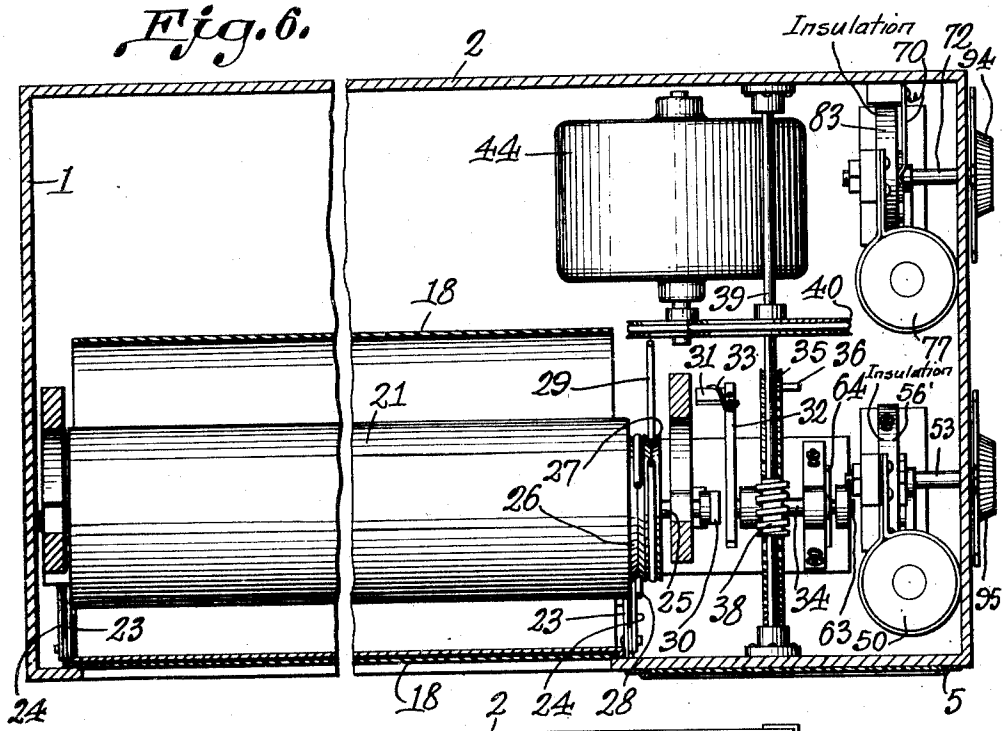
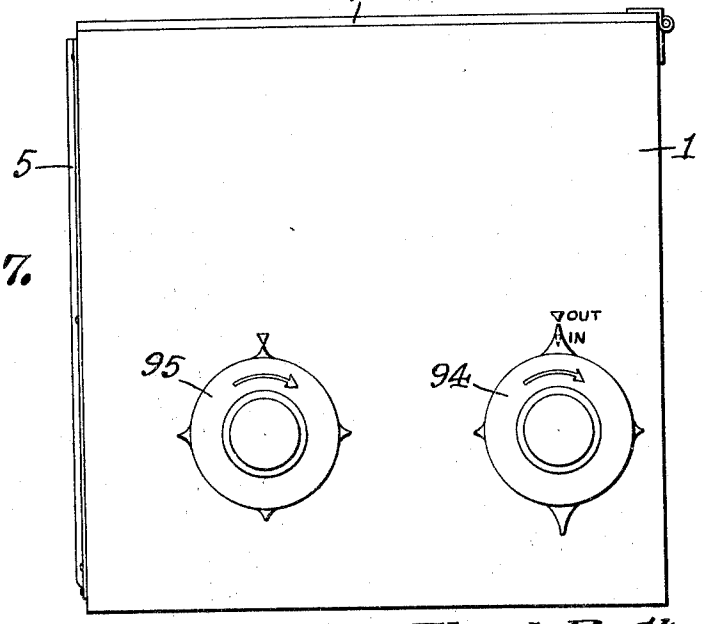


Fig. 7.



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Fig. 8.

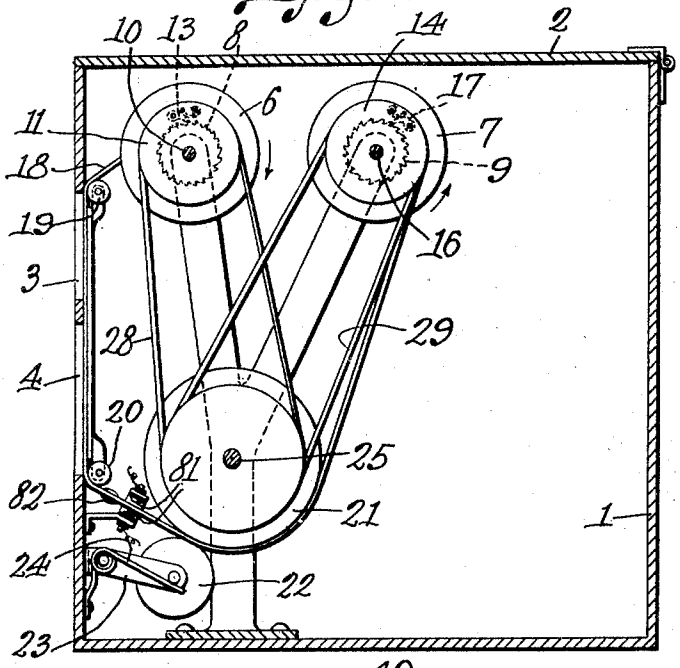


Fig. 9.

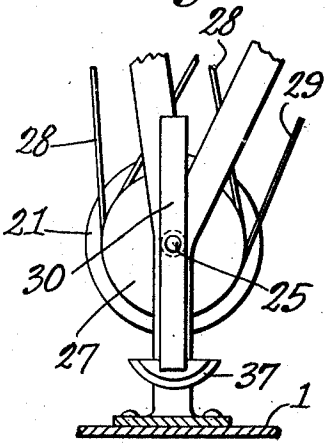


Fig. 11.

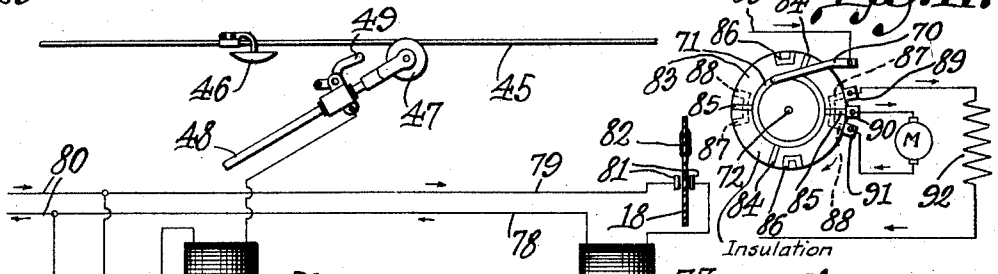
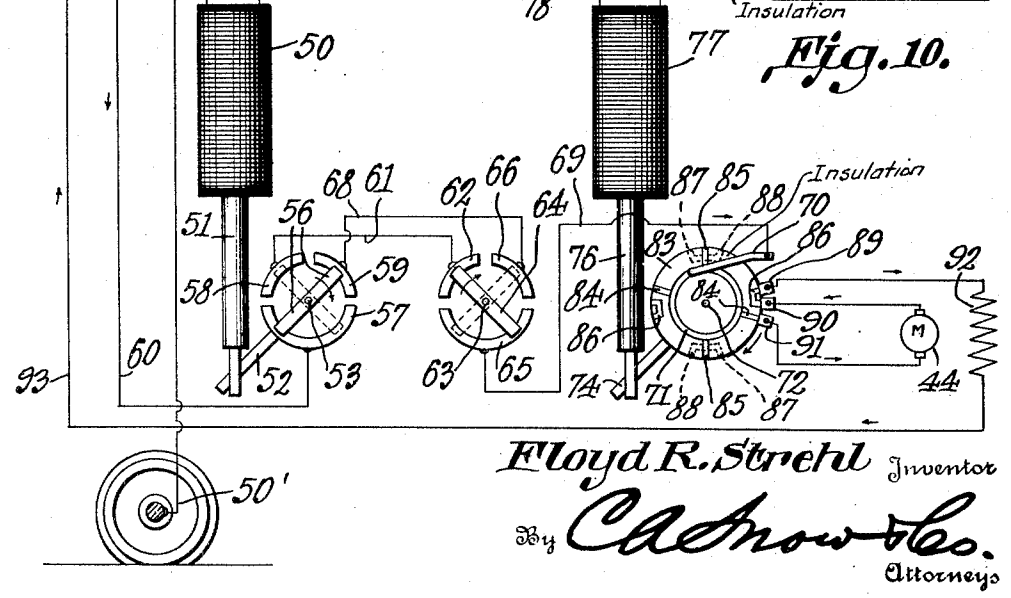


Fig. 10.



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Patented Apr. 14, 1931 1,800,913

UNITED STATES PATENT OFFICE

FLOYD R. STREHL, OF LOS ANGELES, CALIFORNIA

CHANGEABLE SIGN

Application filed August 29, 1928. Serial No. 302,837.

This invention relates to a sign designed primarily for use on street cars and other vehicles designed for carrying passengers.

One of the objects of the invention is to provide a sign which will operate, automatically, to make different displays at predetermined intervals. For example, after every street crossing has been passed, the sign can be changed automatically to display the name of the next street being approached.

Another object is to provide a sign the mechanism of which is simple and efficient, means being provided whereby, when the end of the route is reached, the mechanism will be reversed automatically so that the signs will be successively displayed in proper rotation during the return trip.

A still further object is to provide means whereby the sign can be set so as to begin its operation with the display of any selected portion thereof and thereafter display the different portions of the sign in proper succession during the movement of the vehicle in either direction.

Another object is to provide a device of this type which can be installed readily and will operate to accurately display the signs at the proper times and places.

With the foregoing and other objects in view which will appear as the description proceeds the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings,

Figure 1 is a front elevation of the sign housing, a portion thereof being broken away.

Figure 2 is a vertical transverse section through the front portion of the housing of the sign, the interior mechanism being shown in elevation and the sign strip or web being shown in section.

Figure 3 is a section on line 3—3, Figure 2.

Figure 4 is a section on line 4—4, Figure 2.

Figure 5 is a section on line 5—5, Figure 2.

Figure 6 is a section on line 6—6, Figure 4.

Figure 7 is a side elevation of the housing of the sign.

Figure 8 is a section on line 8—8, Figure 2.

Figure 9 is a section on line 9—9, Figure 2.

Figure 10 is a view showing, in diagram, the means for automatically reversing the motor which operates the sign.

Figure 11 is a view in diagram of the motor reversing switch showing the position thereof after it has been shifted from the position shown in Figure 10.

Referring to the figures by characters of reference 1 designates a box-like housing of any suitable proportions provided preferably with a movable lid 2 whereby access can be had readily to the mechanism contained within the housing. This housing is adapted to be located at a point where it can be seen readily by the passengers in the vehicle and formed in one of the exposed walls of the housing are superposed windows 3 and 4. It is to be understood, however, that if preferred one of these windows can be dispensed with or additional windows can be used. In the present structure the window 3 is adapted to display the names of streets crossed by the vehicle while the window 4 is adapted to display advertising matter or the like changeable as the vehicle proceeds along its route. Other spaces on the exposed face of the housing can be utilized for holding signs which are not changeable. For example a card holder 5 may be arranged on the front face of the housing as shown particularly in Figure 1.

Journaled within the upper portion of the housing are spaced take-up rolls 6 and 7 each of which has a ratchet wheel rotatable therewith, these wheels being indicated at 8 and 9 respectively. Mounted for rotation on the shaft 10 of the roll 6 is a pulley 11 having a groove 12 in the periphery thereof and carried by one side of the pulley is a spring restrained pawl 13 engaging the ratchet wheel 8 so that when the pulley is rotated in one direction motion will be transmitted therefrom through the pawl 13 and the ratchet wheel 8 to the shaft 10 and to the roll 6 where-

by said roll is driven in a clockwise direction as shown by the arrow in Figure 8.

A pulley 14 having a peripheral groove 15 is mounted for rotation on the shaft 16 of the roll 7 and carried by this pulley is a spring-pressed pawl 17 which engages the ratchet wheel 9 for the purpose of driving the roll 7 in a counter-clockwise direction as indicated by the arrow in Figure 8. One end of an elongated sign strip or web 18 is secured to the roll 6 while the other end thereof is secured to the roll 7. This web is extended past guide rollers 19 and 20 located adjacent the top of the upper window 3 and adjacent the bottom of the lower window 4 respectively. From the guide roller 20 the web is extended under a drive roll 21 against which the web is pressed tightly by an idler roll 22 journaled in pivoted arms 23 which are yieldingly supported by springs 24. Thus whenever the roll 21 is actuated, the web 18 will be moved longitudinally thereby so as to be unwound from one or the other of the rolls 6 and 7, according to the direction of rotation of the roll 21.

The shaft 25 of the roll 21 has separate pulleys 26 and 27 rotatable therewith. A belt 28 is mounted in the peripheral groove of the pulley 26 and within the groove 12 in pulley 11 while another belt 29 is seated in the peripheral groove in pulley 27 and within the groove 15 in pulley 14. These belts constitute means for transmitting motion from shaft 25 to the respective pulleys 11 and 14. The belts are adapted to drive only when the resistance is not excessive. Where excessive resistance is encountered the belts will slip on the pulleys.

One end of the shaft 25 has arms 30 extending in opposite directions therefrom into the path of a tripping finger 31 normally extending at right angles from a sweep 32, it being held in this normal position by a spring 33. The sweep rotates with a shaft 34 to which is secured a worm wheel 35. A tripping pin 36 is extended laterally from the peripheral portion of the worm wheel at a point preferably in line with the tripping finger 31, this pin being extended oppositely to the finger as shown particularly in Figure 6. Securely mounted at a point in the path of the tripping finger 31 is a tripping cam 37 against which said finger will press once during each complete rotation of the worm wheel 35. This finger is adapted to ride under the cam so as to be pressed downwardly and laterally thereby out of the path of the arm 30.

The worm wheel 35 meshes with a worm 38 carried by and rotatable with a shaft 39 to which is secured a pulley 40 having a peripheral groove. This pulley is adapted to receive motion through a belt 41 from a pulley 42 carried by the shaft 43 of an electric motor 44 located in the housing 1.

Any suitable means may be provided for intermittently energizing the motor for the purpose of intermittently actuating the web 18 and for reversing the motor at the proper time during the actuation of the web. In Figures 10 and 11 this mechanism has been illustrated in diagram. In Figure 10 the overhead wire or conductor of a trolley car has been indicated at 45 and it is designed to secure to this wire at the far side of each street crossing, a tripping member 46 which will not interfere with the travel of the trolley wheel 47 along the conductor.

Arranged on the trolley pole 48 is a contact 49 adapted to come against the tripping member or contact 46 to close a circuit from the wire 45 through a solenoid 50 to the ground as shown at 50'. The core or armature 51 of the solenoid engages an arm 52 mounted for oscillation on a shaft 53. As shown particularly in Figure 3 this arm or lever 52 has a pawl 54 adapted to engage a ratchet wheel 55 secured to the shaft 53 and provided with oppositely extending contact arms 56. Supported adjacent to the contact arms 56 is a disk 56' in which is arranged an arcuate contact 57 extending through approximately 180 degrees while spaced from this contact and from each other are two additional arcuate contacts 58 and 59 each extending through slightly less than 90 degrees. One of the arms 56 is in engagement with the arcuate contact 57 while the other arm is adapted to engage either of the contacts 58 and 59. As shown in Figure 10 the contact 57 is electrically connected as at 60 to a circuit in the car which can be fed from the motor circuit or the lighting circuit. The contact 58 is electrically connected as at 61 to another arcuate contact 62 extending through somewhat less than 90 degrees and concentric with a shaft 63 on which are mounted oppositely extending contact arms 64. One of the arms 64 is in engagement with an arcuate contact 65 extending through approximately 180 degrees while another arcuate contact 66 extending through somewhat less than 90 degrees is adapted to be engaged by the other arm 64. All of these contacts are spaced from each other and, like the contacts 57, 58, and 59, are insulated from each other. The shaft 63 which carries the arms 64 has preferably four fingers radiating therefrom as shown particularly in Figure 5. These fingers, 67, are disposed where they will be successively engaged by pin 36 as the wheel 35 rotates, four revolutions of the wheel 35 being necessary to make one complete revolution of the shaft 63, as will be obvious.

The contact 59 is electrically connected, as at 68 to the contact 66 while the contact 65 is electrically connected, as at 69 to the brush 70 of a reversing switch. This brush constantly engages a conductor ring 71 secured

to a shaft 72 provided with a ratchet wheel 73. A lever 74 is mounted to oscillate on the shaft 72 and carries a pawl 75 for engaging and actuating the ratchet wheel. This lever 74 engages and is actuated by the core or armature 76 of a solenoid 77 electrically connected by leads 78 and 79 to the circuit 80 of the car from which the electrical connection 60 is extended. The lead 79 is normally broken and includes normally spaced contacts 81. These contacts are located at opposite sides of one edge portion of the web 18 but this web is provided, near each end, with a contact 82 so located that when the unwinding of the web in either direction is completed, the contact 82 will come against the contacts 81 and close the circuit therethrough so as to energize the solenoid 77.

The conductor ring 71 forming a part of the reversing switch is rotatable with a disk 83 of insulating material and extending radially within this disk 83 are four regularly spaced contacts two of which are oppositely disposed and indicated at 84 while the other two are diametrically opposed and indicated at 85. These contacts extend to the periphery of the disk.

Adjacent each of the contacts 84 is another contact 86 insulated from the contacts 84 and from the ring 71. Each contact 85 is extended between spaced electrically connected contacts 87 and 88 which, however, are insulated from the contact 85 and from the ring 71. Three stationary contacts 89, 90 and 91 firmly engage the periphery of the disk 83. Contacts 90 and 91 are connected to the respective brushes of the motor M while the contact 89 is electrically connected to the field coil 92 of the motor and thence to the circuit indicated at 80 through the conductor 93.

The web 18 is provided, at regular intervals, with data to be displayed through the windows 3 and 4. In the structure illustrated this data is arranged in regularly spaced groups, each group including an upper line giving the name of a street and a lower line or lines constituting an advertisement. Where only one window 3 is utilized the advertising matter will be eliminated. The data is so spaced that every time motion is imparted to the web 18 the display through the window 3 or through the windows 3 and 4 will be changed. The data is arranged in proper succession on the web for the purpose of displaying in proper succession the names of the successive street crossings.

Assuming that the web is completely wound on the roll 6 and that the first street crossing is displayed through the window 3 prior to the beginning of a trip, the parts of the electrical apparatus may then be positioned as shown in diagram in Figure 10. Immediately after the first street crossing has been passed, the trip 46 will come against the contact 49 with the result that solenoid 50 will be energized and the lever 52 will be pulled upwardly to swing the arms 56 to the positions indicated by broken lines. Thus the current from the conductor 60 will pass through the contact 57 and arms 56 to the contact 58 and thence through the conductor 61 to the contact 62, arms 64 and contact 65, thence through the conductor 69 to the brush 70, ring 71, contacts 84 and 91, and through the motor by way of contacts 90, 86, 89, and conductor 93 back to the supply circuit. This will result in actuation of the motor which will dirve the worm 38 and cause the worm wheel 35 to rotate. Thus motion will be transmitted to the roll 21 which will pull the web downwardly from the roll 6, motion at the same time being transmitted through the pulley and belt to the roll 7 which will take up the web. As before explained any variations in the movements of the belt, web, etc., will be compensated for by the slip connections between the belts and their pulleys. It might be added that as the wheel 35 rotates the finger 31 movable therewith comes against one of the arms 30 in the path thereof and thus insures rotation of said arm and the roll 21 through 180 degrees. On the completion of this movement the finger 31 comes against the cam 37 and is shifted laterally out of engagement with the arm 30. Thus accurate movement of roll 21 through exactly 180 degrees is insured. Simultaneously with the disengagement of the finger 31 from the arm 30 the pin 36 comes against the fingers 67 in the path thereof, rotating shaft 63 a one-quarter turn. This will cause the arms 64 to shift from the full line position shown in Figure 11 to the dotted line position, thereby breaking the circuit to the motor. After the finger 31 passes the cam 37 it can spring back to position and will stop at some point before reaching the other arm 30, the extent of this movement of the finger 31 depending on the momentum imparted thereto by the motor after the current has been cut off to the motor. The actuation of the web in this manner will bring the name of the second crossing to position where it will be displayed and here it will remain until that crossing is passed at which time the trip lever or contact 49 will be actuated by the tripping member 46 in the path thereof resulting in the repetition of the operation just described, it being understood that following each actuation of the solenoid the armature or core 51 will drop downwardly by gravity, swinging lever 52 therewith and causing the pawl 54 to slip over one of the teeth of the ratchet wheel 55. In other words, the second actuation of the solenoid will result in shifting the arms 56 from the broken line position shown in Figure 11 to the full line position shown in said figure whereupon a circuit will be completed through the arms 64

which are still in the broken line position shown in said figure. However, as soon as the sign has been changed and another finger 67 engaged and actuated by the pin 36, the arms 64 will be shifted from the broken line position in Figure 11 back to the full line position, thereby breaking the circuit to the motor.

When the web has been completely unwound and the last crossing has been passed, the contact 82 carried by the web will come against and electrically engage the contact 81, thereby completing a circuit to the solenoid 77. This will result in actuation of the core or armature 76 and the shifting of lever 74 whereby the disk 83 will be given a one-quarter rotation. This will bring the contacts to the relative positions shown in Figure 11, one of the contacts 85 being in engagement with contact 90 while the contacts 87 and 88 will engage respectively the contacts 89 and 91. Consequently the direction of rotation of the motor will be reversed and when the vehicle travels along the return trip the operation of the web will be reversed but the same will be actuated intermittently in the same manner as heretofore described.

If, for any reason, it should be desired to reverse the motor without waiting for the automatic reversal thereof, the shaft 72 can be rotated by a knob 94 so as to shift the relative positions of the contacts. Should it be desired to shift the web without awaiting the automatic actuation thereof, the shaft 53 could be actuated by a knob 95.

What is claimed is:

1. A changeable sign including take-up rolls, a web adapted to be wound thereon, an actuating roll engaging the web for unwinding from either roll, means operated by the actuating roll for maintaining the web taut when unwound from either of the take-up rolls, a motor, a tripping finger mounted for circular movement and actuated by the motor, oppositely extending arms rotatable with the actuating roll, either of said arms being disposed for engagement by the tripping finger for actuation therewith, thereby to move the web a predetermined distance, and means for automatically tripping the finger momentarily for disengaging it from the arm of the actuating roll on the completion of the predetermined movement of the web.

2. A changeable sign including separate take-up rolls, a web adapted to be wound thereon, an actuating roll engaging the web, means for holding said web pressed against the actuating roll, a motor, a shaft, means actuated by the motor for rotating the shaft, a tripping finger rotatable with the shaft in either direction, oppositely extending arms carried by the actuating roll, either of said arms being positioned for engagement by the finger, thereby to rotate the roll and shift the web a predetermined distance when the finger is rotated in either direction, and means in the path of the finger for automatically disengaging it momentarily from the arm when the web has completed its predetermined movement in either direction.

3. A reversible changeable sign including separate take-up rolls, a web adapted to be wound thereon, an actuating roll engaging the web, means for holding said web pressed against the actuating roll, a motor, a shaft, means actuated by the motor for rotating the shaft in either direction, a tripping finger rotatable with the shaft, oppositely extending arms carried by the actuating roll, either of said arms being positioned for engagement by the finger when rotated in either direction, thereby to rotate the roll and shift the web a predetermined distance, means in the path of the finger for automatically disengaging it momentarily from the arm when the web has completed its predetermined movement in either direction, and means for stopping the motor upon completion of the movement of the web.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

FLOYD R. STREHL.