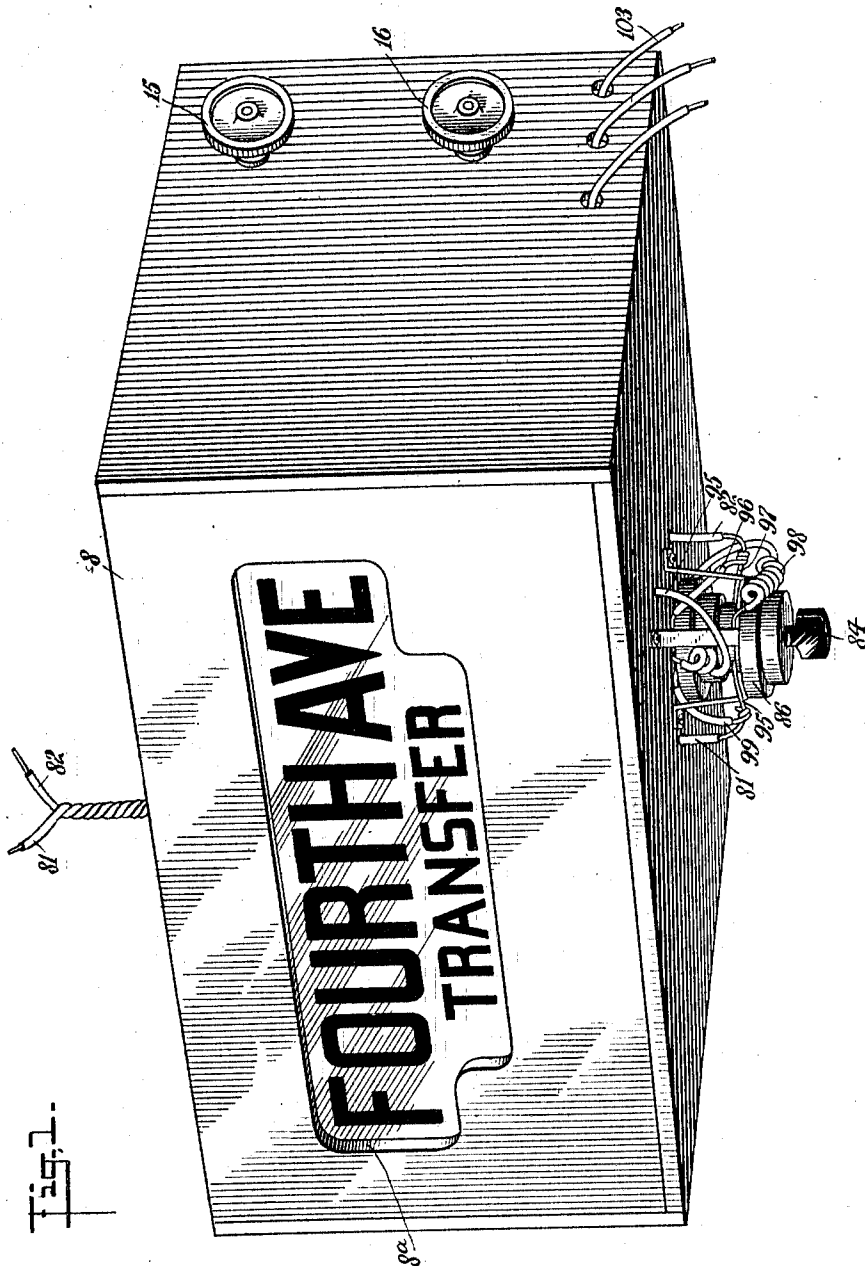


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ELECTRIC INDICATOR.
APPLICATION FILED JAN. 21, 1910.

Patented Apr. 15, 1913.
4 SHEETS—SHEET 1.

1,059,273.



WITNESSES

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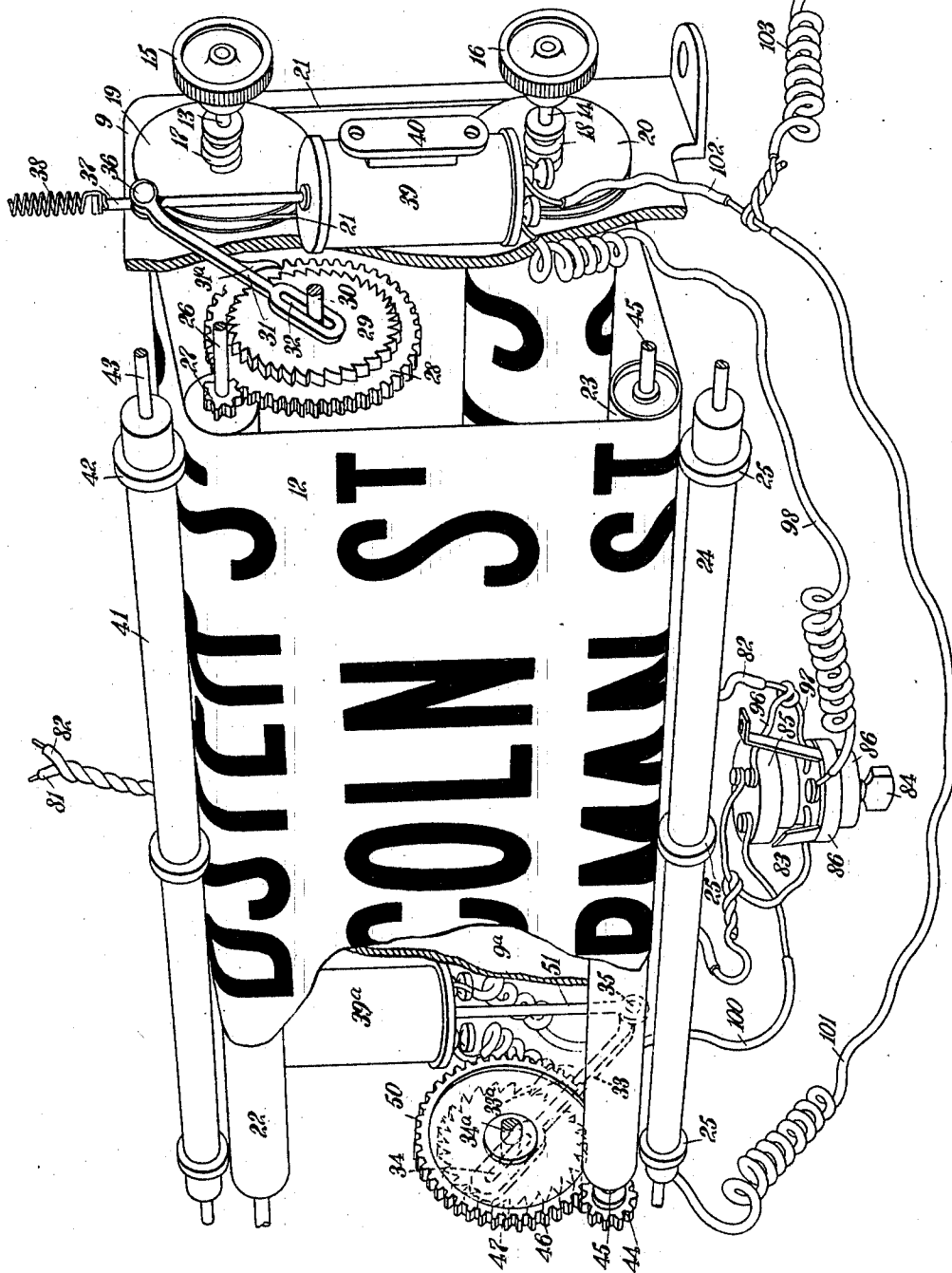
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4 SHEETS—SHEET 2.



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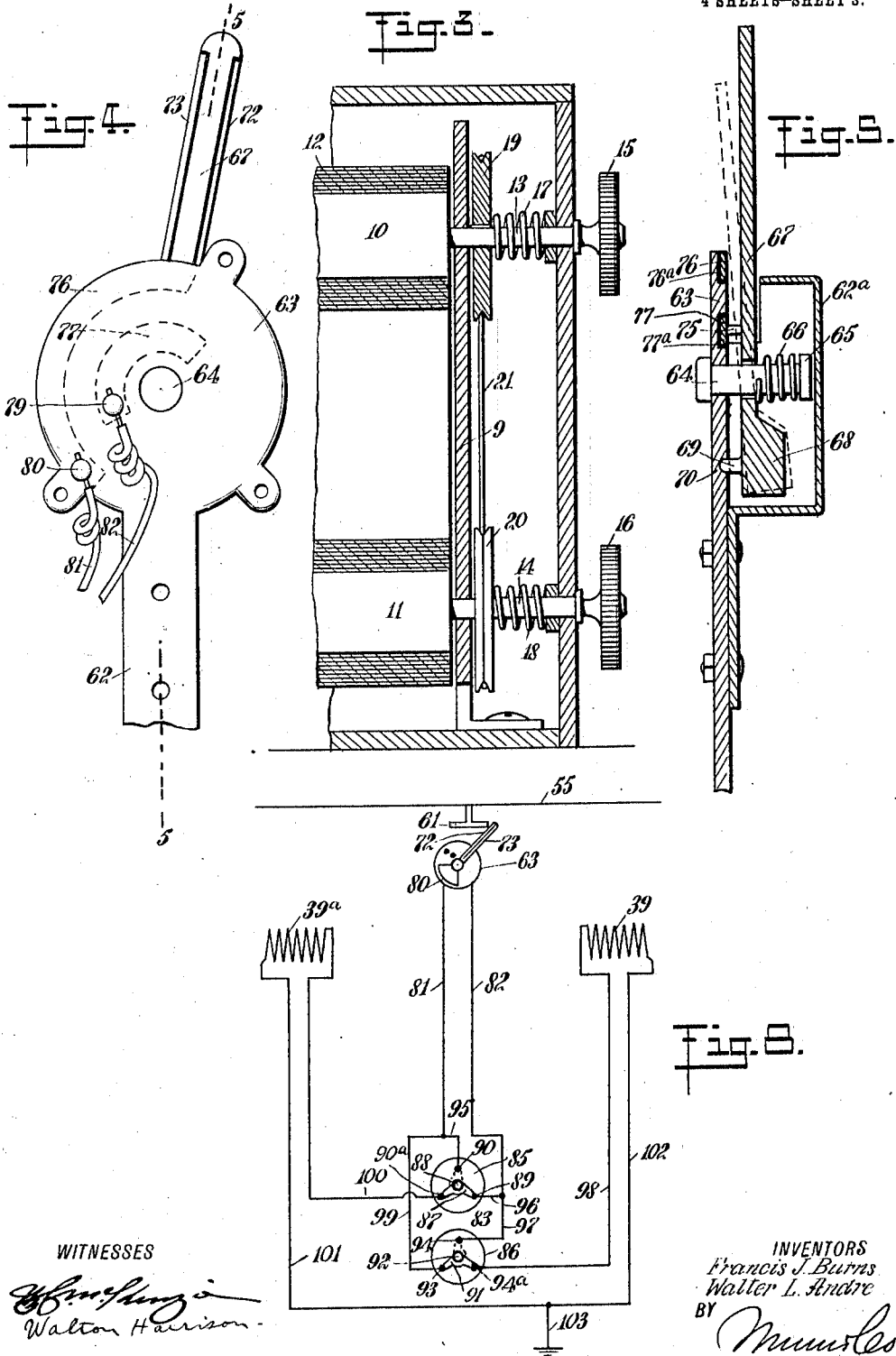
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4 SHEETS-SHEET 3.



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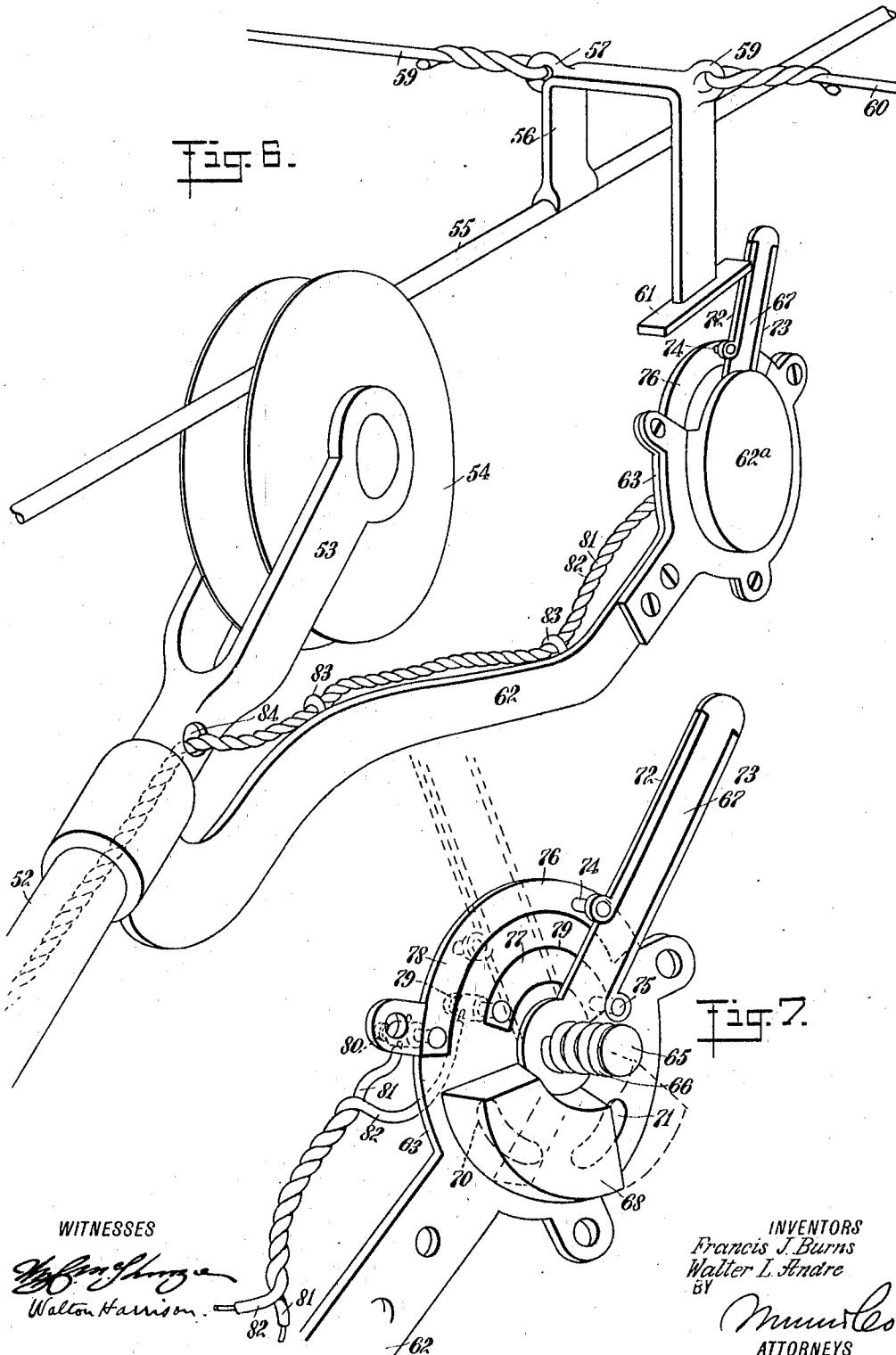
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

FRANCIS JOSEPH BURNS AND WALTER LEWIS ANDRE, OF SPOKANE, WASHINGTON.

ELECTRIC INDICATOR.

1,059,273.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed January 21, 1910. Serial No. 539,298.

To all whom it may concern:

Be it known that we, FRANCIS J. BURNS and WALTER L. ANDRE, both citizens of the United States, and residents of Spokane, in the county of Spokane and State of Washington, have invented a new and Improved Electric Indicator, of which the following is a full, clear, and exact description.

Our invention relates to electric indicators of the kind employed more particularly for indicating the designations of streets and the like, our purpose being to produce an indicator which is operated automatically by movements of a car or other piece of rolling stock and provided with means for indicating the streets in reverse order in case the car or other piece of rolling stock happens to run backward during a trip.

Our invention further contemplates various mechanical and electrical details whereby the general efficiency of the indicating mechanism is greatly increased.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective of the casing carried upon the car and containing many parts used in connection with our invention; Fig. 2 is a fragmentary perspective showing most of the mechanism carried in the casing just mentioned; Fig. 3 is a fragmentary vertical section through the casing at one of its ends, and showing the rollers carrying the display curtain, and also showing parts associated with these rollers; Fig. 4 is a side elevation showing our improved form of contact lever carried as an auxiliary upon the trolley pole, for the purpose of periodically closing the circuit; Fig. 5 is a substantially vertical section through the mechanism shown in Fig. 4, on the line 5—5 of Fig. 4; Fig. 6 is a perspective of the trolley wheel and contact mechanism associated with it; Fig. 7 is a fragmentary perspective showing the contact lever carried upon an arm of the trolley pole; and Fig. 8 is a diagram of the wiring.

Most of the movable parts of the indicating mechanism are carried within a casing 8. This casing is provided (see Figs. 2, 3) with two vertical partitions 9 and 9^a, which are spaced a little apart from the ends of the casing, as will be understood from Fig. 3. Located within the casing 8 are

rollers 10, 11 carrying a curtain 12 which is partially wound upon them and is adapted to be shifted step by step from one roller to the other, as will be understood from Fig. 2. The curtain 12 is provided with the names of the streets, as indicated in Fig. 2, and the casing 8 is provided with a slot 8^a (see Fig. 1) through which the names of the streets may be read by the passengers in the car.

As the curtain 12 is shifted step by step, the various successive street names are brought into view. The rollers 10, 11 are mounted upon shafts 13, 14 which are journaled in the casing 8 and partition 9. The shafts 13, 14 are provided with milled heads 15, 16 whereby the rollers may be turned by hand. Keyed rigidly upon the shaft 13 is a pulley 19, and similarly mounted upon the shaft 14 is a pulley 20. A belt 21 connects together the pulleys 19, 20, so that any turning movement communicated to either roller 10, 11 is transmitted through the belt 21 to the other roller, thereby rendering positive the rotation of the rollers. Encircling the shafts 13, 14 are spiral springs 17, 18, for the purpose of keeping the pulleys 19, 20 in proper alinement—that is, in the same plane. The pulleys are so formed and arranged as to regulate the unrolling and taking up of the curtain 12. For instance, it might happen that a large quantity of the curtain is rolled upon the upper roller and very little of the curtain upon the lower roller, and the rollers in turn might begin to take up the curtain disposed therebetween. This would cause the lower roller to turn more rapidly than would be commensurate with the rate of rotation of the other roller. This difficulty is compensated by allowing a little slip between the pulleys and the belt connecting them. The curtain 12 passes over guide rollers 22, 23. Adjacent to the guide roller 23 is another guide roller 24 which is provided with presser rings 25 made preferably of rubber. These presser rings engage the outside of the curtain 12 and hold it closely against the guide roller 23. The guide roller 22 is mounted rigidly upon a shaft 26, and a pinion 27 is also mounted rigidly upon this shaft, a gear 28 meshing with this pinion. This gear, together with a ratchet wheel 29, is mounted rigidly upon a shaft 30, the gear and ratchet wheel being also connected rigidly together.

A lever 31 is provided with a slot 32 which encircles the shaft 30, as shown at the right of Fig. 2. At the opposite side of the machine a similar lever 33 is provided with a slot 34 which encircles a shaft 34^a, the latter being in its action substantially similar to the shaft 30. The lever 31 is, by aid of a pivot pin 36, connected with an armature 37 made of soft iron and having generally a cylindrical form. The lever 33 is connected by a pin 35 with another armature 51 as hereinafter described, this armature being substantially similar to the armature 37. Connected with the armature 37 is a spiral spring 38, whereby it is supported. A solenoid 39 co-acts with the armature 37 and is adapted to draw the same downwardly, thereby stretching the spring 38. The solenoid 39 is provided with a plate 40 whereby it is supported within the casing.

The lever 31 is provided with a pawl 31^a and the lever 33 is provided with a similar pawl 33^a, these two pawls being respectively integral with the levers and yet so arranged that when either lever (31 or 33) is actuated, its pawl immediately engages the ratchet wheel associated with it. Such being the case, either ratchet wheel is adapted to turn backward whenever the other ratchet wheel is turned forward, the pawls not interfering with this action. For instance, after the armature 37 has been drawn upwardly the pawl 31^a is disengaged so that the shaft 30 may, under proper conditions, be turned by aid of the belt 12, in the opposite direction from that in which it last rotated.

A guide roller 41 is provided with presser rings 42 for engaging the outer surface of the curtain 12, this guide roller 41 being similar to the guide roller 24 at the bottom of the casing and being mounted upon a revoluble shaft 43. The guide roller 23, together with a pinion 44, is mounted rigidly upon a revoluble shaft 45. The pinion 44 meshes with a gear wheel 46, this gear wheel, together with a ratchet wheel 47, being mounted rigidly upon a revoluble shaft 50. The lever 33 turns the ratchet wheel 47 step by step in the same manner that the lever 31, with its pawl 31^a turns the ratchet wheel 29.

A solenoid 39^a, quite similar to the solenoid 39, is located adjacent to the gear wheel 46 and is provided with a movable armature 51 which is connected with the lever 48 in the same manner that the armature 37 is connected with the lever 31. In fact, the solenoids, their armatures, and the levers for operating them, are duplicated at opposite ends of the casing. This will be understood from Fig. 2, although it is not deemed necessary to repeat at the left of Fig. 2 all of the parts shown at the right thereof. Whenever the solenoid 39 is energized it draws the armature 37 downward and causes the lever 31 to make a downward stroke. The armature

37 and the lever 31 are immediately thereafter restored to normal position by the contraction of the spring 38—that is, when the solenoid 39 is energized. A number of successive strokes of the lever 31, by causing the pawl 32 to engage the ratchet wheel 29 and turn this wheel step by step, cause the curtain 12 to move step by step in order to display the several names of the streets. The immediate effect of the step by step rotation of the ratchet wheel 29 is to cause the shaft 30, wheel 29, pinion 27 and roller 22 to turn step by step, thereby pulling the curtain 12 out from the roller 10. Since this turns the roller 10, it necessarily turns the pulley 19 (see Fig. 3) and in doing this transmits a rotary motion through the belt 21 and pulley 20 to the roller 11. The rollers 10, 11 are thus turned positively.

At 52 (see Fig. 6) is a trolley pole which is carried upon the car. This trolley pole is not shown in full, for the reason that for the most part it may be of the conventional or any preferred type. Mounted upon the upper end of the trolley pole is a trolley fork 53 carrying a trolley wheel 54. The trolley wire is shown at 55 and engaging it is a yoke 56 which is provided with ears 57, 58, and connected with these ears are span wires 59, 60 which thus support the yoke 56 and partially support the trolley wire 55. The outer and lower end of the yoke 56 carries a contact plate 61 which is substantially parallel with the trolley wire 55 and is at all times in metallic communication therewith.

An arm 62 is mounted rigidly upon the trolley pole 52 and extends upwardly and outwardly therefrom, as indicated in Fig. 6. The arm 62 carries a disk 63 provided with a cap 62^a, these two parts constituting practically a light casing. Extending through the arm 62 (see Fig. 5) is a pin 64, the latter being provided just inside of the cover 62^a with a head 65. A spiral spring 66 encircles the pin 64 and engages the head 65. Journaled upon the pin 64 is an arm 67, this arm being provided with a sector 68 carrying a boss 69. The disk 63 is provided with two slots 70, 71 of arcuate form and so disposed that the boss 69 may lodge in either of said slots. By turning the arm 67 in one direction, the boss 69 lodges in the slot 70 and by turning the arm 67 in the opposite direction the boss 69 lodges in the slot 71. The arm 67 is thus held in either one of two proximate positions, and yet is allowed some little degree of play when in such position, owing to the fact that the boss 69 can not leave its slot 70 or 71 too easily.

The arm 67 is provided upon its opposite edges with two contact strips 72, 73, the latter carrying contact pins 74, 75. Mounted upon the disk 63 are two contact strips 76, 77 made of metal or other conducting material and separated from the disk 63 by

strips 76^a, 77^a of insulating material. A binding post 79 is mounted upon the contact strip 77 and a similar binding post 80 is mounted upon the contact strip 76. Connected with these binding posts are two wires 81, 82 properly insulated and twisted together so as to form a cable, as will be understood from Fig. 6. This cable is held upon the arm 62 by fastenings 83 and extends through a hole 84^a into the trolley pole 52 which is generally of tubular form.

Mounted upon the lower side of the casing 8 is a switch 83 controllable by aid of a thumb piece 84. This switch contains essentially a couple of three-way switches 85, 86 which may be of ordinary construction, these switches being together controllable as a unit by merely turning the thumb piece 84. The switch 85 is provided with a movable arm 87 and with an insulated stem 88 upon which this arm is journaled. It is further provided with contact buttons 89, 90, 90^a. The switch 86 is provided with a movable arm 91, a central insulated stem 92, and contact buttons 93, 94, 94^a. A wire 95 is connected with the contact button 90 and a wire 96 is connected with the contact button 89 and with the wire 82. A wire 97 is connected with the wires 96 and 82, and also with the contact button 94. A wire 98 leads from the binding post 94^a to the solenoid 39 and a wire 99 is connected with the wires 81, 95 and also with the contact button 93. A wire 100 is connected with the contact button 90^a and with the solenoid 39^a. Wires 101, 102 are connected with the solenoids 39, 39^a and are also connected with a ground wire 103.

The operation of our device is as follows:

The operator turns the milled head 15 or the milled head 16, as the case may be, and winds the curtain 12 from one of the rollers 10, 11 to the other. The car now starts out, we will say, from the end of the line, the curtain at the start being wound mainly upon the roller 10 and unwound from the roller 11. Each successive street is provided with a yoke 56, so that as each street is reached, the arm 67 passes beneath the contact strip 61. Whenever this occurs the contact strip 72 engages the contact strip 61, and the following circuit is thereby completed: trolley wire 55, yoke 56, contact strips 61, 72, contact pin 74, contact strip 76 (see Figs. 6, 7), binding post 80, wire 81 (see Fig. 8), wire 99, contact button 93, switch arm 91, contact button 94^a, wire 98, solenoid 39, wires 102, 103, to ground, thence to power house and back to the trolley wire 55. This energizes the solenoid 39 (see Fig. 2) and causes it to draw the armature 37 downward, as above described. This turns the gear wheel 28 slightly in a clockwise direction, according to Fig. 2, and the roller 22 thereupon turns in a contraclock-

wise direction, pulling upon the belt 12 and causing the street names to move downward. The roller 10, being thus turned slightly, causes motion to be transmitted through the pulleys 19, 20 and belt 21, to the roller 11, so that the roller last mentioned takes up the curtain as unwound from the upper roller 10. This process is repeated at each intersecting street where one of the yokes 56 is located, so that at each successive street a different street name is displayed, as will be understood from Fig. 2. Suppose, now, that without the car finishing its trip or turning around, it merely proceeds backwardly a little distance. In this event, it is desirable that the street names shall be displayed one at a time as before, but in reverse order. The arm 67 now makes contact with one of the contact strips 61—as, for instance, the one shown in Fig. 6. In doing this, the arm 67 is thrown to the left according to Fig. 6, so that the strip 73 (instead of the strip 72) engages the contact strip 61. The following circuit is thus completed: trolley wire 55, yoke 56, contact strips 61, 73, contact pin 75, contact strip 77, binding post 79, wire 82, wire 96, contact button 89, switch arm 87, contact 90^a, wire 100, solenoid 39^a, wire 101, wire 103, to ground, thence to power house and back to trolley wire 55. This energizes the solenoid 39^a (instead of the solenoid 39) and by lifting the armature 51 moves the lever 48 upon the shaft 50 as a center and causes the pawl 49 to turn the ratchet wheel 47. This turns the gear 46, pinion 44, and roller 23, thereby moving the curtain in the opposite direction. Positive motion is communicated to both rollers 10, 11, as before, owing to the action of the belt 21 upon the pulleys 19, 20, substantially as above described.

No matter how far the car may travel backward, the street names are displayed in inverse order during the entire time of such backward travel, and as soon as the car again starts ahead, the street names are again displayed as when the car was first traveling in the direction in which it originally started. No matter if a car travels backward and forward a number of times, the reversal of the order of the street names is accomplished automatically. Suppose, now, that the car reaches the end of the line and that the curtain 12 has, of course, meanwhile been shifted so that it is now wound principally upon the bottom roller 11 and consequently unwound from the top roller 10. The operator now grasps the thumb piece 84 and turns it. In so doing, he shifts the switch arm 87 from the contact button 89 to the contact button 90, and also shifts the contact arm 91 from the contact button 93 to the contact button 94. If, now, the car in passing along brings the contact strip 72 into engagement with the contact strip

61, the following circuit is complete: trolley wire 55, yoke 56, contact strips 61, 72, contact pin 74 (see Fig. 7), contact strip 76, binding post 80, wire 81, wire 95, contact button 90, arm 87, contact button 90^a, wire 100, solenoid 39^a, wires 101, 103, to ground, thence to power house and back to trolley wire 55. Again, if (depending upon the direction of travel of the car and the use for which it is employed) it should happen that the arm 67 is moved toward the contact strip 61 in such manner that the contact strip 73 engages the contact strip 61, the following circuit is completed: trolley wire 55, yoke 56, contact strips 61, 73, contact pin 75 (see Fig. 7), contact strip 77, binding post 79, wire 82 (see Fig. 8), wire 97, contact button 94, arm 91, contact button 94^a, wire 98, solenoid 39, wires 102, 103, to ground, thence to power house and back along wire 55. The two circuits last traced energize respectively the solenoids 39^a, 39, and thereby cause the curtain to travel in one direction or the other. By aid of the reversing switch 83, the device is rendered somewhat more adaptable, in that the reversing switch is a valuable auxiliary for use in connection with the reversibility of the car. Except for the inconvenience in having the trolley pole inclined in the wrong direction, the reversing switch need not be used.

From the foregoing description, it will be noted that no matter where the car may stop, no matter what may be the direction in which the car traveled last, and no matter whether the last movement of the car was forward or backward relatively to any preceding movement made by the car, it always happens, whenever a particular pawl 31^a or 33^a is in engagement with its corresponding ratchet wheel, the opposite pawl is necessarily out of engagement with the ratchet wheel with which it is associated. Hence, neither of these pawls can ever obstruct the retrograde movement of the belt and the rollers carrying it, whenever this movement is brought about by the opposite pawl. Whenever a solenoid 39 or 39^a is energized and then deenergized, all of the mechanism which it controls is left in such condition that the belt may readily be turned at its next movement in either direction.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. An electric indicator for cars or the like, comprising a movable curtain, mechanism including a magnetic member for shifting

said curtain, step by step in one direction, mechanism including a magnetic member for shifting said curtain step by step in the opposite direction, a trolley pole to be carried by the car, an arm mounted upon said trolley pole and movable relatively to the same, contact members mounted oppositely to each other upon said arm, separate connections from said contact members to said magnetic members for energizing said magnetic members independently, and a stationary contact member along the line of travel of the pole to be engaged by one or the other of said first mentioned contact members according to the direction of travel of the car.

2. An electric indicator for cars or the like, comprising a movable curtain, mechanism including a magnetic member for shifting said curtain step by step in one direction, mechanism including a magnetic member for shifting said curtain step by step in the opposite direction, a trolley pole to be carried by the car, an arm mounted upon said trolley pole and movable relatively to the same, contact members mounted oppositely to each other upon said arm, separate connections from said contact members to said magnetic members for energizing said magnetic members independently, a stationary contact member to be engaged by one or the other of said contact members according to the direction of travel of the car, and a reversing switch through which said separate connections pass, said reversing switch being controllable by hand for shifting the electric current to one magnetic member or the other, as desired.

3. In an electric indicator, the combination of a curtain, electro-magnetic means for shifting said curtain in one direction, a second electro-magnetic means for shifting said curtain in the opposite direction, mechanism controllable automatically by movements of the car for energizing the one of said electro-magnetic means or the other, according to the general direction of travel of said car, and a reversing switch for shifting the electric current to the one electro-magnetic means or the other, as desired.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANCIS JOSEPH BURNS.
WALTER LEWIS ANDRE.

Witnesses:

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H. I. HANNAN.