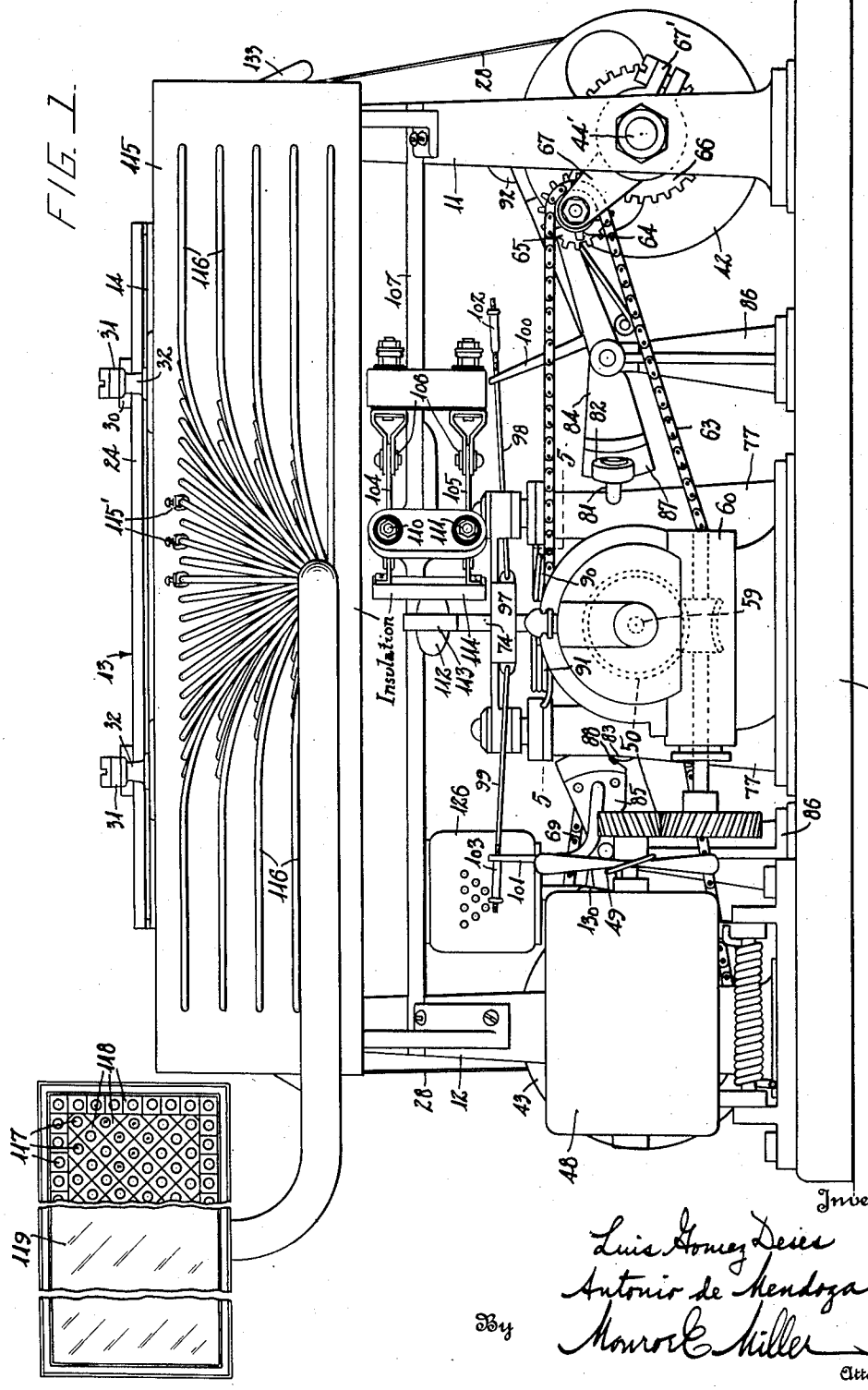
Nov. 2, 1926. 1,605,222

L. G. DESES ET AL

ELECTRIC SIGN CONTROLLER

Filed Oct. 6, 1925 4 Sheets-Sheet 1

FIG. 1.



Inventors:
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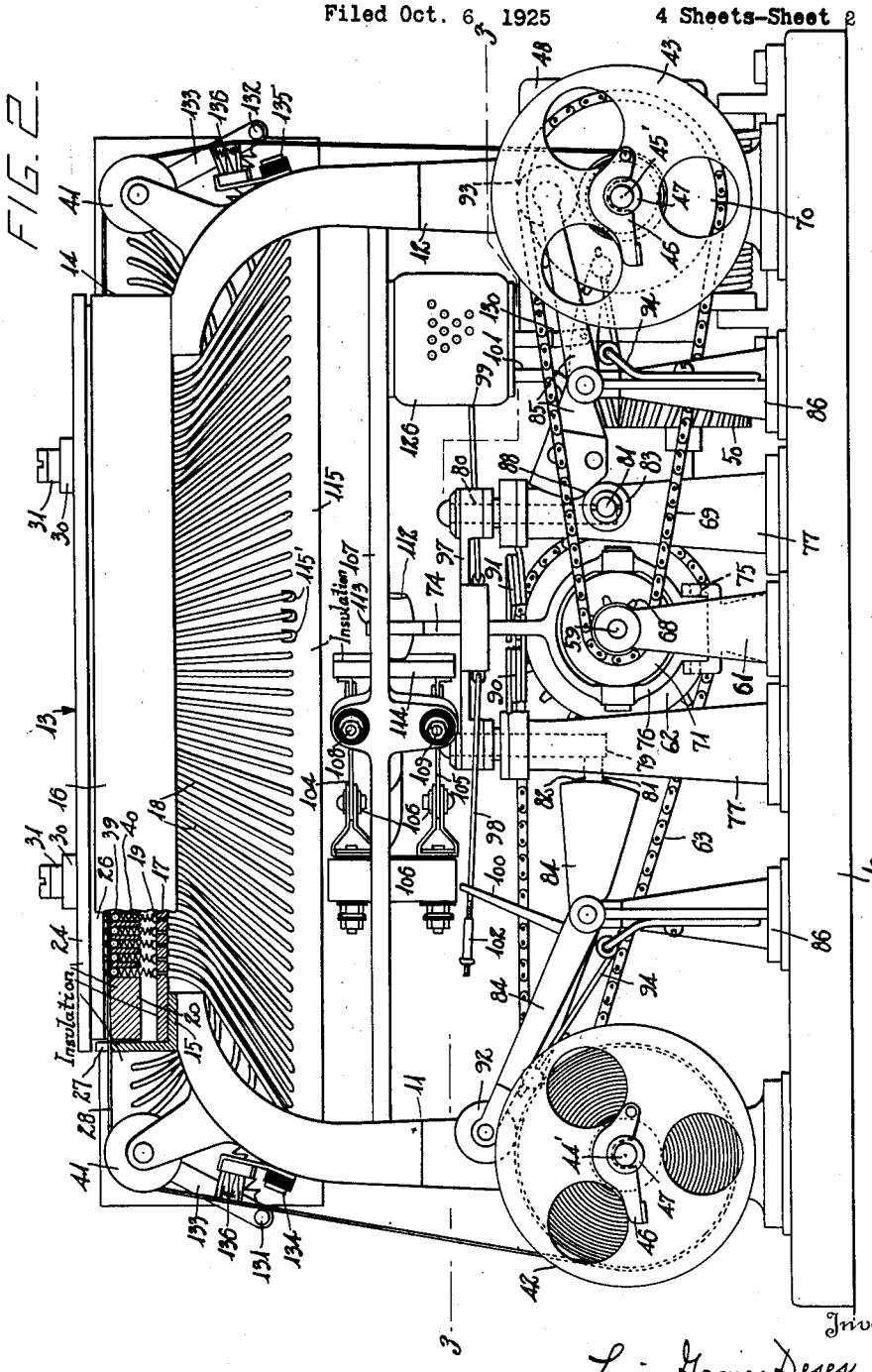
Nov. 2, 1926. 1,605,222

L. G. DESES ET AL

ELECTRIC SIGN CONTROLLER

Filed Oct. 6, 1925 4 Sheets-Sheet 2

FIG. 2.



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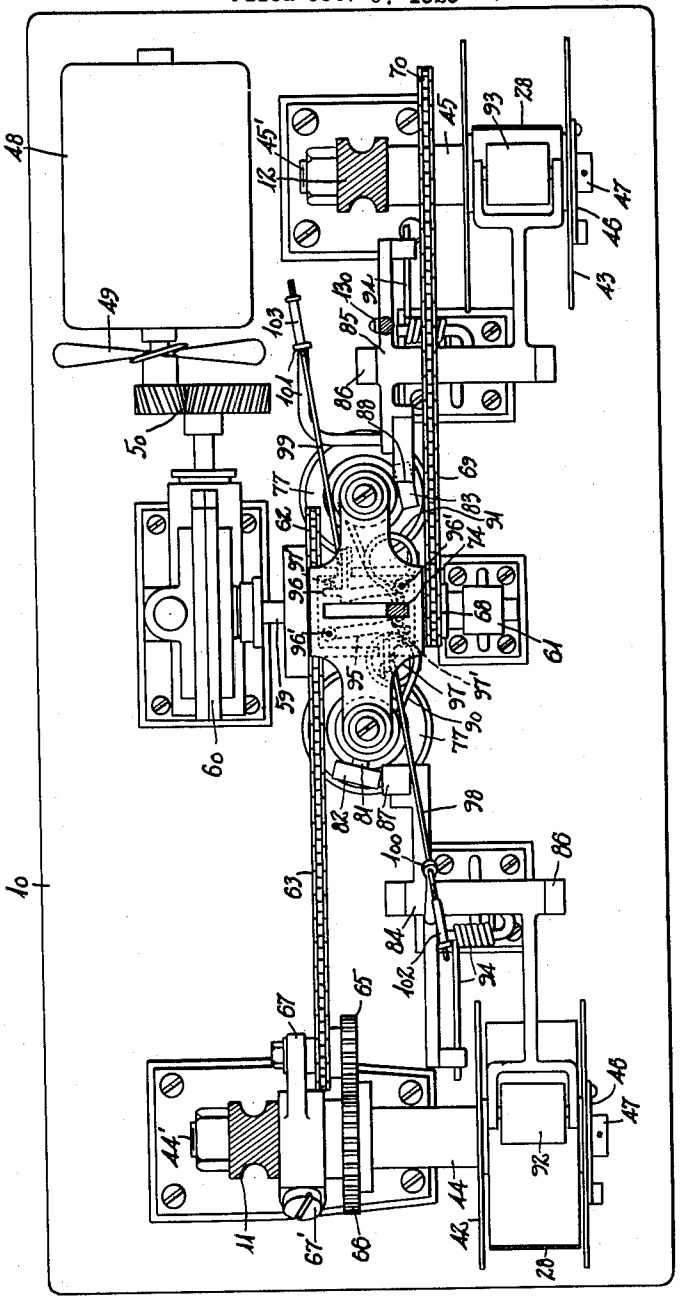
Nov. 2, 1926. 1,605,222

L. G. DESES ET AL

ELECTRIC SIGN CONTROLLER

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FIG. 3.



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Nov. 2, 1926. 1,605,222

L. G. DESES ET AL

ELECTRIC SIGN CONTROLLER

Filed Oct. 6, 1925 4 Sheets-Sheet 4

FIG. 6.

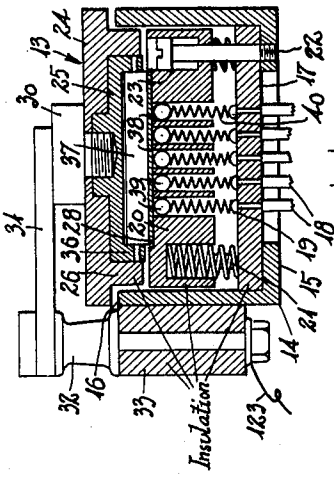


FIG. 7.

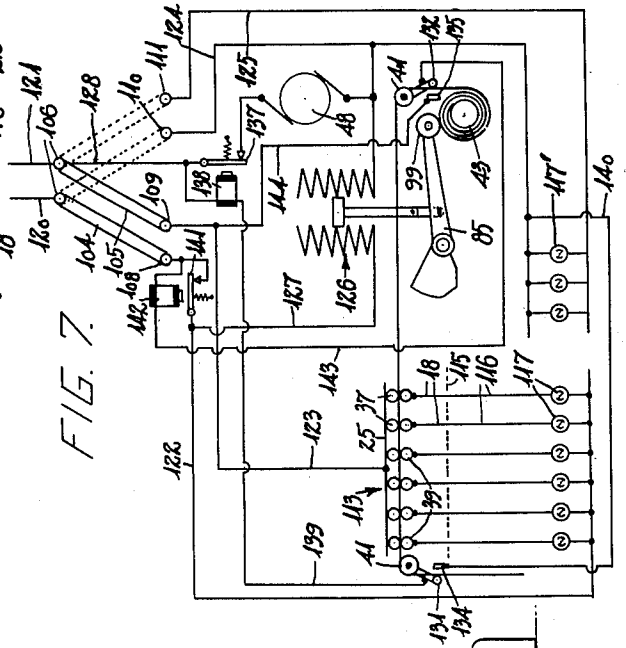


FIG. 4.

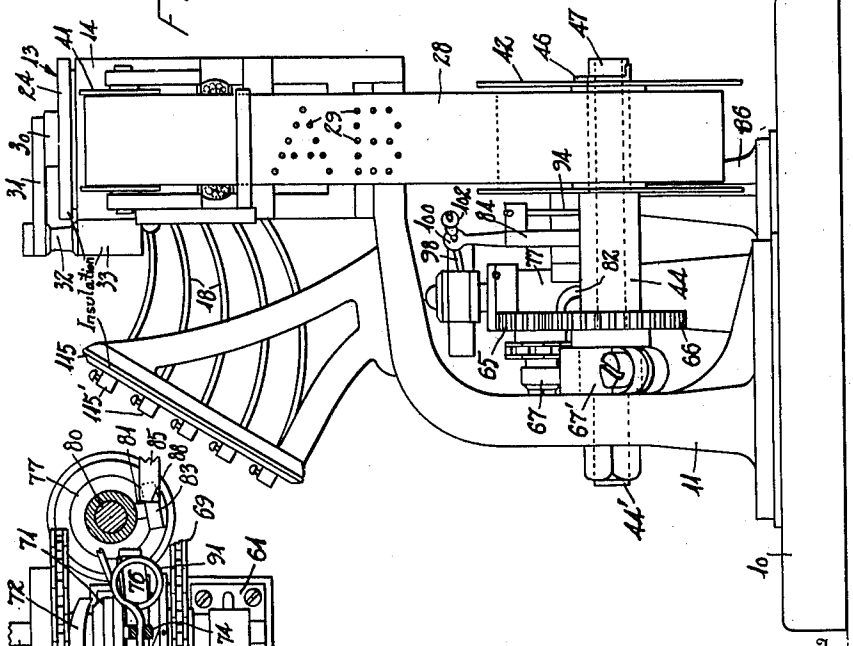
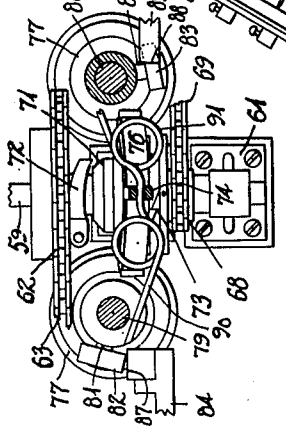


FIG. 5.



Inventors:
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Patented Nov. 2, 1926. 1,605,222

UNITED STATES PATENT OFFICE.

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ELECTRIC-SIGN CONTROLLER.

Application filed October 6, 1925, Serial No. 60,923, and in Mexico October 20, 1924.

The present invention relates to electric signs, and aims to provide a novel and improved circuit controller for the electric lamps of a sign to produce a series of words, pictures, or the like, that move across or along the sign, thereby providing a continuously changing display in order to attract attention and afford an effective advertising medium.

Another object is the provision of a novel and improved contact device cooperable with a perforated strip for controlling the electrical circuits according to the arrangement of the perforations in the strip.

A further object is the provision of novel means for moving the strip in opposite directions alternately, and for controlling the reversal of movement of the strip.

The invention also has for its object the improvement of the circuit controller generally in its construction and details to enhance the utility and efficiency of the mechanism.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts, as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the circuit controller, showing the sign board diagrammatically, portions thereof being broken away.

Fig. 2 is an opposite side elevation of the circuit controller.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2.

Fig. 4 is an end view of the machine.

Fig. 5 is a sectional detail on the line 5—5 of Fig. 1.

Fig. 6 is a cross section of the contact device.

Fig. 7 is a diagrammatical view of the electrical circuits.

The mechanism of the circuit controller is mounted on a base 10, and any suitable frame may be provided.

Brackets 11 and 12 are secured on the base and support the contact device 13. Said device comprises the frame 14 having the lower inwardly extending flange 15 and the upwardly extending flange or rim 16. A bottom plate 17 of insulating material is seated on the flange 15 and insulated electrical wires or conductors 18 have terminals engaged through the plate 17 from below and provided with the buttons or heads 19 above said plate. A vertically movable plate 20 is disposed within the rim 16 above the bottom plate 17, and is moved upwardly yieldingly by coiled springs 21 confined between the plates 17 and 20, and located within lower recesses in the plate 20. Screws 22 engage in and upstand from the plate 17 and have their heads located within upper recesses 23 in the plate 20, to limit the upward movement of the plate 20 by the springs 21. A cover plate 24 of insulating material is disposed over the plate 20 which is also of insulating material, and has secured to the bottom surface thereof a metal plate 25. The plate 24 has a depending flange 26 surrounding the plate 25 and fitted within the rim 16, and the rim 16 has recesses or openings 27 at its ends for the passage of the strip or tape 28 of paper, celluloid, or other insulating material, said strip passing between the plates 20 and 25, and having suitable perforations 29 to define the letters, pictures, or other characters to be displayed on the sign board. Screws 30 extend down through the plate 24 and engage the plate 25 to clamp said plates together, and also provide contacts to connect the plate 25 in an electrical circuit. Thus, arms 31 of metal or other conducting material are adapted to bear on the heads or contact portions of the screws 30, and said arms 31 are mounted rotatably on posts 32 carried by blocks 33 of insulating material secured to the frame 14. The arms 31 are preferably insulated to prevent a person touching said arms from receiving an electrical shock. When the arms 31 are swung over the contacts 30, this electrically connects the arms 31 with the plate 25, and furthermore, the cover plate 24 is held down, and when the arms 31 are swung to one side, the cover plate 24 may be removed so as to gain access to the interior of the contact device.

The plate 25 has depending flanges 36 at its longitudinal edges between which are disposed transverse rollers 37 to contact

with the upper surface of the perforated strip 28, and said rollers provide contact elements. The rollers 37 are pivoted for rotation at their ends in the flanges 36. The plate 20 has vertical holes 38 in which are disposed contact balls 39 that bear upwardly against the lower surface of the strip 28 so as to contact with the rollers 39 through the perforations in the strip, for closing the circuits in which the corresponding wires 18 are disposed. Coiled springs 40 are disposed in the apertures or holes 38 between the balls 39 and buttons 19, to electrically connect the balls 39 with the wires 18 and to yieldingly raise said balls. The rollers 37 and balls 39 enable the strip 28 to move through the contact device with minimum friction, said rollers and balls rotating as the strip moves between them.

The perforated strip 28 passes over guide rollers 41 mounted on the brackets 11 and 12 beyond the ends of the contact device, and from the rollers 41 the strip extends downwardly and is wound upon spools or reels 42 and 43. The reels are mounted on horizontal tubular shafts 44 and 45, respectively, which are rotatable on spindles 44′ and 45′ secured to the brackets 11 and 12, said reels being made to turn with said shafts by the provision of ordinary keys or splines on the shafts engaged by the hubs of the reels. Catches 46 are pivoted to the outer flanges or disks of the reels and are engageable in grooves between the outer ends of the shafts 44 and 45 and retaining collars 47 secured on the ends of the spindles 44′ and 45′ in order to retain the reels in place, and when said catches are disengaged from the grooves the reels may be slipped off the shafts over the collar 47 for changing reels and substituting one perforated strip by another.

An electric motor 48 or other source of power is used for operating the machine. The motor 48 is mounted on the base 10, and a fan 49 is mounted on the armature shaft of the motor to keep the motor cool. The motor 48 is connected by gearing 50 with a transverse shaft 59 between the shafts 44 and 45 and mounted in a pedestal 61 and a gear casing 60 secured on the base 10. The reel shafts 44 and 45 are driven from the shaft 59. Thus, a sprocket wheel 62 is mounted loosely on the shaft 59 and is connected by an endless sprocket chain 63 with a sprocket wheel 64 of smaller diameter to which is secured a gear wheel 65 that meshes with a gear wheel 66 secured on the shaft 44, whereby the shaft 44 is rotated at a higher speed than the sprocket wheel 62 and shaft 59. The wheels 64 and 65 are carried by an arm 67 having a clamp 67′ embracing the spindle 44′ between the shaft 44 and bracket 11, so that the arm 67 may be adjusted on the spindle, when the clamp 67′ is loosened, to tighten the chain 63. A sprocket wheel 68 is also mounted loosely on the shaft 59 and is connected by an endless sprocket chain 69 with a sprocket wheel 70 of larger diameter secured on the shaft 45, whereby the shaft 45 is rotated at a slower speed than the sprocket wheel 68 and shaft 59. The spindle 45′ may be adjusted in the bracket 12 to tighten the chain 69.

The reels 44 and 45 are alternately driven from the motor 48 through a clutch sleeve 71 that is slidable on the shaft 59 between the sprocket wheels 62 and 68 to alternately engage said sprocket wheels. Thus, the clutch sleeve 71 and sprocket wheel 62 have clutch portions 72 (Fig. 5) to engage one another for driving the sprocket wheel 62 with the shaft 59, and the sleeve 71 and sprocket wheel 68 have clutch portions or teeth 73 to engage for driving the sprocket wheel 68 with the shaft 59, the sleeve 71 being feathered or splined on the shaft to turn therewith. A clutch shifting lever 74 is fulcrumed, as at 75, on the base 10, and projects upwardly. Said lever has a yoke 76 surrounding the clutch sleeve 71 and provided with a swivel and oscillating connection with the sleeve, such connection being well known whereby the sleeve 71 is slid to its opposite positions when the lever 74 is oscillated, and said sleeve can turn within the yoke 76. Thus, by swinging the lever 74 the clutch is reversed to alternately connect the reels 42 and 43 with the motor 48.

The clutch is automatically reversed at the opposite limits of movement of the perforated strip 28, in order to reverse the movement of said strip. This reversal is controlled by the filling of one reel and the emptying of the other reel, as will presently appear. Two posts 77 are secured on the base 10, and rock shafts 79 and 80 are mounted for oscillatory movement in the upper portions of said posts, and have the radial arms 81 on which are mounted the respective rollers 82 and 83. Levers 84 and 85 are mounted for rocking movement on pedestals 86 secured on the base 10, and have the respective cams 87 and 88 to contact with the rollers 82 and 83 for turning the shafts 79 and 80. Spring arms 90 and 91 are secured to the shafts 79 and 80, respectively, above the posts 77 and extend through apertures in the lever 74. Thus, when the roller 83 is moved by the cam 89 to turn the shaft 80, the spring arm 91 is flexed in order to swing the lever 74 toward the sprocket wheel 62 and away from the sprocket wheel 68, whereas when the roller 82 is moved by the cam 88 to turn the shaft 79, the spring arm 90 is flexed in order to swing the lever 74 in the opposite direction. Said arms 90 and 91 may be made of resilient wire, with a spring coil in each arm between the ends thereof to allow for yielding action. The levers 84 and 85 have the rollers 92 and 93, respective-

ly, seating on the wound portions of the strip 28 on the respective reels 42 and 43, and springs 94 are carried by the pedestals 86 for yieldingly swinging the levers 84 and 85 to depress the rollers 92 and 93 and retract the cams 88 and 89 from the rollers 82 and 83.

In order to control the movement of the lever 74 and clutch, catches or detents 95 and 96 are provided, which are pivoted, as at 96', to a yoke 97 secured on the upper ends of the shafts 79 and 80 above the arms 90 and 91, and the lever 74 projects upwardly through a slot in the yoke 97. When the lever 74 is moved to bring the clutch portions 73 into engagement, as seen in Figs. 3 and 5, then the lever is held by the detent 95, and when the lever is in its opposite position it is held by the detent 96. It is therefore obvious that the lever 74 and clutch cannot be reversed until the corresponding detent is disengaged or retracted from the lever 74. Rods 98 and 99 are connected with the respective detents 95 and 96 and pass slidably through arms 100 and 101 of the levers 84 and 85, and collars or nuts 102 and 103 are engaged on the rods 98 and 99, respectively, to contact with the arms 100 and 101. Said collars 102 and 103 are preferably screw-threaded on the rods for purpose of adjustment. When the lever 84 is swung by its spring 94 the arm 100 will contact with the collar 102, as the reel 42 becomes empty, so that the rod 98 is pulled by the arm 100 to disengage the detent 95 from the lever 74. Similarly, when the reel 43 becomes empty so that the roller 93 is depressed by the spring 94 of the lever 85, the arm 101 will contact with the collar 103 and pull the rod 99 to disengage the detent 96 from the lever 74.

An electric switch is provided for changing circuit connections when the movement of the perforated strip 28 is reversed. This switch comprises the insulated switch blades 104 and 105 pivoted, as at 106, to a supporting bar 107 carried by the brackets 11 and 12. Insulated contacts 108 and 109 are carried by the bar 107 for the engagement of the respective blades 104 and 105 when the switch is swung by the lever 74 to connect the reel 43 with the shaft 59, and insulated contacts 110 and 111 are also carried by the bar 107 for the engagement of the respective switch blades 104 and 105 when the switch is swung to its opposite position. The switch blades 104 and 105 are connected by an insulated yoke 114 carrying a knob 112 which is loosely embraced by a loop or eye 113 on the upper end of the lever 74, so that the switch is reversed by the reversal of the lever 74.

The wires 18 extend to a terminal board 115 of insulating material supported by the brackets 11 and 12 in order that the wires 116 leading to the electric lamps 117 of the sign board may be readily connected to the wires 18. Thus, the board 115 is provided with terminal sockets 115' for the wires 18 for conveniently receiving the terminals of the wires 116.

The electric lamps 117 may be arranged in any suitable manner on the sign board, being preferably disposed in cells 118 across which is disposed a frosted glass panel 119, or the like, for diffusing the light rays.

The electric circuits are shown in Fig. 7. Thus, with the switch blades 104 and 105 engaging the contacts 108 and 109, the contact device 113 and electric lamps 117 are connected with the electric current supply wires 120, 121, the circuit including the wire 120, switch blade 104, contact 108, wire 122, lamps 117, wires 116 and 18, balls 39, rollers 37, plate 25, wire 123 connected to posts 32, contact 109, switch blade 105 and wire 121. The perforated strip 28 passing between the contact balls 39 and rollers 37 will control the individual circuits of the lamps 117 so as to light the lamps and produce the desired letters or characters. When the switch is reversed so that the blades 104 and 105 engage the contacts 110 and 111, then the other lamps 117' of the sign board are brought into the circuit, the circuit including the wire 120, switch blade 104, contact 110, wire 124, lamps 117', wire 125, contact 111, switch blade 105 and wire 121. The lamps 117' are not under the control of the contact device 113. A rheostat 126 suspended from the bar 107 is connected in circuit with the motor 48 when the switch blades 104 and 105 engage the contacts 108 and 109, and the motor circuit includes the wire 120, switch blade 104, contact 108, wire 127, rheostat 126, motor 48, wire 128, and wire 121. The rheostat or resistance 126 is cut out when the switch is reversed, so as to allow full speed operation of the motor, whereas the speed is retarded when the resistance is in the motor circuit. Thus, when the switch blades 104 and 105 engage the contacts 110 and 111, the motor circuit includes the wire 120, switch blade 104, contact 110, wire 124, motor 48, wire 128 and wire 120.

The movable element of the rheostat or variable resistance 126 is connected, such as by a link 130, with the lever 85 in order that the resistance is proportional to the amount of the strip 28 wound on the reel 43. Thus, as the roller 93 is raised by the winding of the strip on the reel 43, the movable element of the rheostat 126 is also raised so as to bring additional resistance into the motor circuit, thereby gradually slowing down the motor as the strip is wound on the reel 43. This is for the purpose of obtaining a uniform movement of the strip 28 through the contact device 13. Other-

wise, if the motor ran at the same speed, the speed of the strip 28 would increase as the diameter of the wound portion of the strip on the reel 43 increases.

In order to stop the motor in the event that the strip 28 is broken or torn in two, contact fingers 131 and 132 extend across the strip 28 between the guide rollers 41 and the reels 42 and 43, respectively, and are carried by pivoted arms 133 which engage the axles or shafts of the rollers 41, whereby said fingers 131 and 132 swing against the strip 28 by gravity. Insulated contact plates 134 and 135 are carried by the respective brackets 11 and 12 for the contact of said fingers 131 and 132, when the strip breaks, and brushes 136 are carried by said brackets above the contact plates to brush the lower or inner surface of the strip and to keep the strip spaced away from the contact plates 134 and 135. If, while the strip 28 is being wound on the reel 43, the strip breaks between the contact device 13 and reel 43, above the contact finger 132, this will permit the contact finger 132 to swing against the contact plate 135, for closing an electrical circuit. If, while the strip is being wound on the reel 42, the strip breaks between the contact device 13 and reel 42 above the finger 131, said finger will swing downwardly against the contact plate 134 to close another electrical circuit, as will presently appear.

A switch 137 is disposed in the wire 128 and is controlled by a magnet 138 having one terminal connected to the wire 128 and its other terminal connected by a wire 139 with the contact finger 131, the contact plate 134 being connected by a wire 140 with the wire 124. Thus, if the strip 28 breaks between the contact finger 131 and contact device 13 while being wound on the reel 42, so that the finger 131 swings against the contact plate 134, this will close a circuit including the wire 120, switch blade 104, contact 110, (the switch blades 104 and 105 in this case engaging the contacts 110 and 111), wires 124 and 140, contact plate 134, contact finger 131, wire 139, magnet 138 and wires 128 and 121. The magnet 138 being deenergized will open the switch 137, thereby opening the circuit of the motor 48, but leaving the circuit of the lamps 117' closed so that said lamps will remain lighted. However, should the strip 28 break between the contact finger 132 and contact device 13 while the strip is being wound on the reel 43, the lamps 117 will be extinguished as well as the stopping of the motor. For this purpose, a switch 141 is disposed between the contact 108 and the wires 122, 127, and is controlled by a magnet 142 having one terminal connected to the contact 108 and its other terminal connected by a wire 143 with the contact plate 135, the contact finger 132 being connected by a wire 144 with the contact 109. Therefore, when the finger 132 contacts with the plate 135, a circuit is closed including the wire 120, switch blade 104, contact 108, electromagnet 142, wire 143, contact plate 135, contact finger 132, wire 144, contact 109, switch blade 105 and wire 121. The magnet 142 being energized will open the switch 141 which is in both the motor and light or lamp circuits, so that the motor is stopped and the lamps 117 extinguished.

The operation of the control mechanism is as follows: Assuming that the lever 74 has been swung to bring the clutch portions 73 into engagement, as seen in Figs. 3 and 5, with the lever 74 held by the detent 95, the electric switch will have its blades 104 and 105 engaging the respective contacts 108 and 109, as seen in Fig. 7, thereby bringing the rheostat 126 in the circuit of the motor, so that the motor will operate with retarded speed. The contact device 113 is also brought into the circuits of the lamps 117. The sprocket wheel 68 being rotated with the shaft 59 will rotate the shaft 45 and reel 43 to wind the strip 28 on the reel 43, thereby pulling the strip through the contact device and unwinding the strip from the reel 42. As the strip is moved through the contact device the letters or other characters will be produced on the sign board by the lighting of some of the lamps, and such letters or characters will move across the sign board as the perforations of the strip move between the contact elements of the contact device 13 in succession. This provides a moving or continuously changing sign or display, and various words, pictures or other characters may be displayed according to the perforations in the strip. As the strip winds on the reel 43, the roller 93 is raised, thereby depressing the cam 89 and moving the roller 83 so as to turn the shaft 80, thereby flexing the arm 91 so that it has a tendency to swing the lever 74 away from the sprocket wheel 68 toward the sprocket wheel 62. However, the detent 95 will prevent the lever 74 from being swung by the spring arm 91, until the reel 42 has been emptied. The roller 83 being raised will also operate the rheostat to increase the resistance in the motor circuit and slow down the motor so that a substantially uniform speed of the strip 28 is obtained. When the roller 92 moves downwardly to a predetermined position by the withdrawal of the strip from the reel 42, the arm 100 will contact with the collar 102 and pull the rod 98 so as to swing the detent 95 out of engagement from the lever 74. The spring arm 91 will then throw the lever 74 to its opposite position where it will be held by the detent 96. The lever 74 being reversed will shift the clutch sleeve 71 to disconnect it from the sprocket wheel 68 and connect it with the sprocket wheel 62. This

immediately reverses the movement of the strip 28, inasmuch as the reel 42 is now driven from the shaft 59. The gearing between the shafts 59 and 44 will rotate the reel 42 faster than the reel 43 is driven from the shaft 59, and, furthermore, the lever 74 having reversed the switch, as seen in dotted lines in Fig. 7, will also cut out the rheostat or resistance 126 from the motor circuit, so that the motor will operate at full speed. This winds the strip 28 back on the reel 42 at a high speed, whereas the strip moves slowly in the opposite direction from the reel 42 to the reel 43. During the reverse movement of the strip, the contact device 113 and lamps 117 are disconnected from the wires 120 and 121, while the lamps 117′ are connected in the circuit of said wires so that the lamps 117′ are lighted during the return movement of the strip 28. This enables a stationary sign or display to be made by the lamps 117′ during the return of the strip. Then, as the strip is wound on the reel 42, the roller 92 is raised, thereby depressing the cam 82 and turning the shaft 79 to bring the spring arm 90 under pressure, tending to swing the lever 74 toward the sprocket wheel 68. However, the lever 74 is held by the detent 96 until the strip has been unwound sufficiently from the reel 43. When this occurs, the arm 101 contacts with the collar 103 and pulls the rod 99 to swing the detent 96 and disengage it from the lever 74, so that the spring arm 90 throws the arm 74 to reverse the clutch and switch, and as above described the strip 28 will now move from the reel 42 to the reel 43, and the circuit of the lamps 117′ is opened while the lamps 117 are now under the control of the contact device 13 through which the perforated strip moves. The operation is entirely automatic, the forward movement of the perforated strip through the contact device being slow from the reel 42 to the reel 43, while the return movement of the strip is fast in order that the moving sign display may be repeated without much loss of time, and during the return of the strip a predetermined stationary display may be made by the lamps 117′.

Having thus described the invention, what is claimed as new is:—

1. In a mechanism of the character described, a perforated strip, a contact device cooperable therewith, winding means for winding up the strip in opposite directions, driving means, an operative connection between the driving means and winding means including a clutch for reversing the connection to move the strip in opposite directions, and automatic mechanism controlling the clutch including spring means for reversing the clutch and arranged to be brought gradually to a condition for action as the strip is moved by the winding means and also including detent means for holding the clutch during the conditioning of said spring means and arranged to release the clutch for reversal by said spring means when the strip is moved a predetermined amount by said winding means.

2. In a mechanism of the character described, a perforated strip, a contact device cooperable therewith, winding means for winding up the strip thereon in opposite directions, driving means, an operative connection between the driving means and winding means including a clutch for reversing the connection to move the strip in opposite directions, spring means for moving the clutch in opposite directions, detent means for holding the clutch in either position, and automatic means controlled by the wound portions of the strip on the winding means and controlling said spring means and detent means whereby the spring means is influenced by the winding of the strip on either winding means to move the clutch to the opposite position and whereby the detent means is operated to release the clutch when the strip is unwound a predetermined amount from the other winding means.

3. In a mechanism of the character described, a perforated strip, a contact device cooperable therewith, two winding means for winding up the strip thereon in opposite directions, driving means, an operative connection between the driving means and winding means including a clutch for reversing the connection to move the strip in opposite directions, two spring means for moving the clutch in opposite directions to reverse said connection, two detents for holding the clutch in opposite positions, and means having portions bearing on the wound portions of the strip on said winding means and operably connected with said spring means and detents so that the winding of the strip on either winding means will bring the corresponding spring means into action tending to move the clutch to the opposite position, and so that the corresponding detent releases the clutch for movement to its opposite position when the other means has a predetermined amount of the strip removed therefrom.

4. In a mechanism of the character described, a perforated strip, a contact device cooperable therewith, two reels for winding up the strip thereon in opposite directions, a drive shaft, operative connections between said shaft and reels including a reversing clutch to connect either reel with the shaft, a lever for shifting the clutch, spring arms for moving said lever in opposite directions, detents for holding said lever in its opposite positions, and levers having portions to bear on the wound portions of the strip on said reels and operatively connected with said spring arms and detents,

so that when the strip is wound on either reel the corresponding spring arm will be flexed tending to move the lever to reverse the clutch, and so that when the strip is unwound a predetermined amount from the other reel the corresponding detent will release said lever for movement to its opposite position.

5. In a mechanism of the character described, a perforated strip, a contact device cooperable therewith, winding means for winding up the strip thereon in opposite directions, reversible actuating means for the winding means including an electric motor, means controlling the actuating means to reverse the winding of the strip on the winding means at the opposite limits of movement of the strip, resistance for the motor circuit, and means operable with the lastnamed means connecting said resistance in the circuit of the motor during the movement of the strip in one direction and disconnecting said resistance from the circuit of the motor during the movement of the strip in the opposite direction.

6. In a mechanism of the character described, a contact device comprising two members between which a perforated strip is movable, rollers carried by one of said members for the contact of the strip, spring pressed rotatable balls mounted in the other member for the contact of said strip and to contact with said rollers through perforations in the strip, and electric circuits connected to said rollers and balls.

7. In a mechanism of the character described, a contact device having opposite rotatable elements for the movement therebetween of a perforated strip, means for individually spring-pressing said elements at one side of the strip to cause them to contact with the elements at the opposite side of the strip through perforations in the strip, and electrical circuits connected to said opposite elements to be closed when said elements contact with one another through said perforations.

8. A contact device having a plate of insulating material and a plate of conducting material between which a perforated strip moves, the firstnamed plate having holes, contact balls in said holes, springs in said holes to move said balls against the strip and through the perforations thereof, the second named plate having recesses and rotatable contact elements in said recesses for the contact of said balls.

9. In a mechanism of the character described, a contact device having two plates of insulating material and a plate of conducting material, yieldable means for separating the two firstnamed plates, means for holding the plates assembled for the passage of a perforated strip between the secondnamed plate and one of the two firstnamed plates, one of said firstnamed plates having holes therein, spring pressed contact elements in said holes to bear against said strip and make electrical connections through the perforations thereof with the secondnamed plate, and electrical conductors connected to the other of the firstnamed plates and electrically connected with said contact elements.

10. A contact device comprising a frame, a bottom plate of insulating material therein, a second plate of insulating material above said bottom plate and having holes therein, yieldable means for raising the secondnamed plate, a cap plate of insulating material disposed over the secondnamed plate, a plate of conducting material secured to the lower surface of the cap plate for the passage of a perforated strip between the secondnamed and fourthnamed plates, the secondnamed plate having holes therein, conductors secured to the bottom plate below said holes, contact elements in said holes to make electrical connections through the perforations of the strip with the fourthnamed plate, spring means between said contact elements and conductors to electrically connect them and yieldingly raise said contact elements, and means for holding the cap plate down on the frame.

In testimony whereof we hereunto affix our signatures.

LUIS GOMEZ DESES.
ANTONIO DE MENDOZA.