Feb. 16, 1926. 1,572,874

F. ARCHILA

ELECTRIC SIGN

Filed April 3, 1924 4 Sheets-Sheet 1

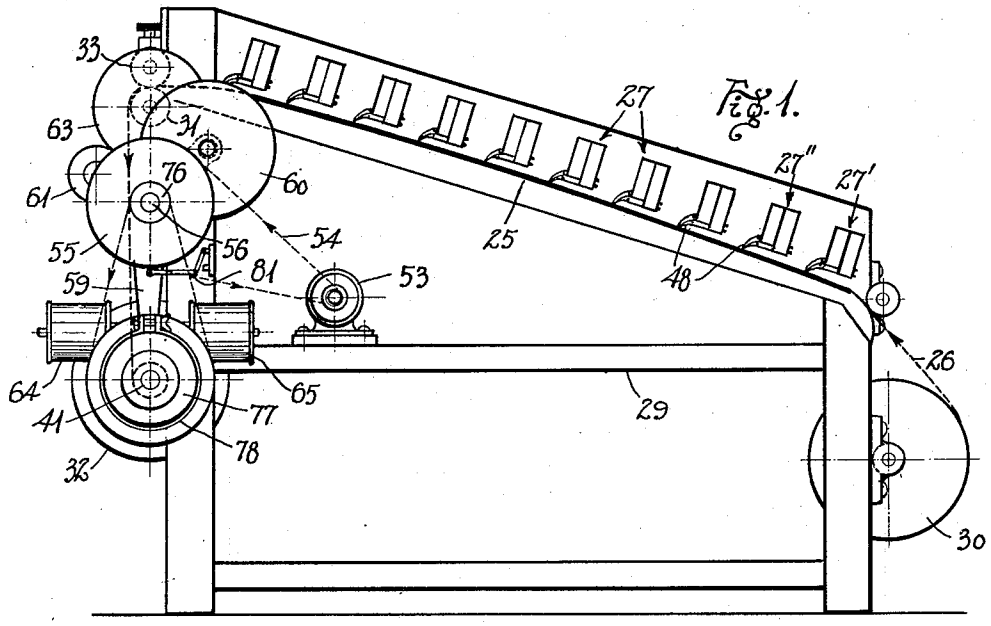


Fig. 1.

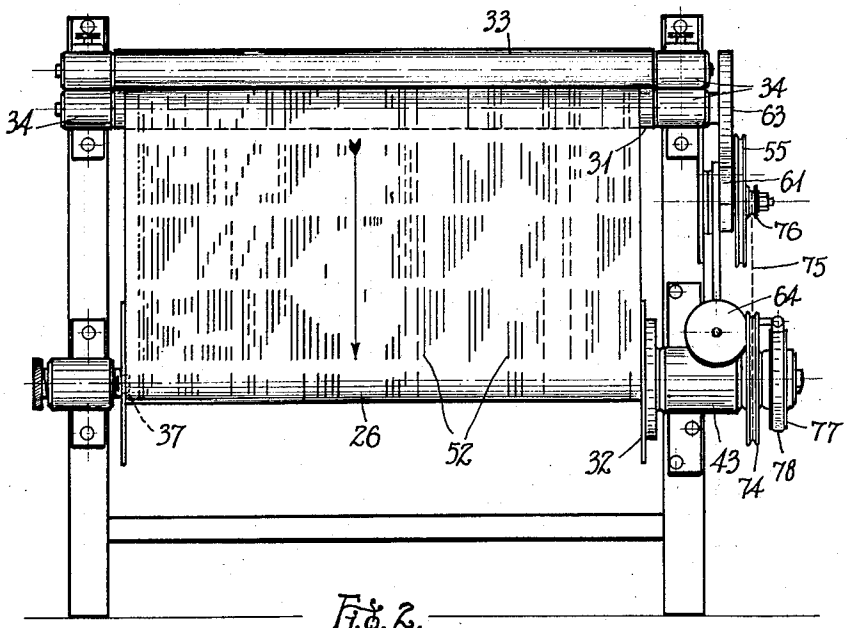


Fig. 2.

Inventor:

Fulgencio Archila,

By Mouser & Miller

Attorney.

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F. ARCHILA

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Filed April 3, 1924 4 Sheets-Sheet 2

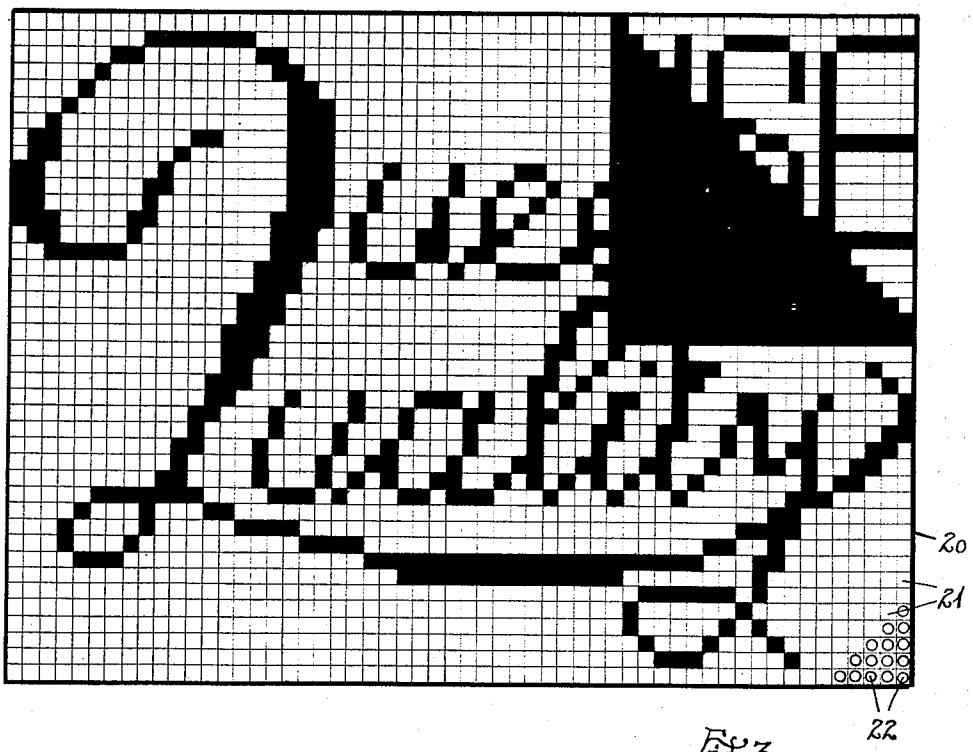


Fig. 3.

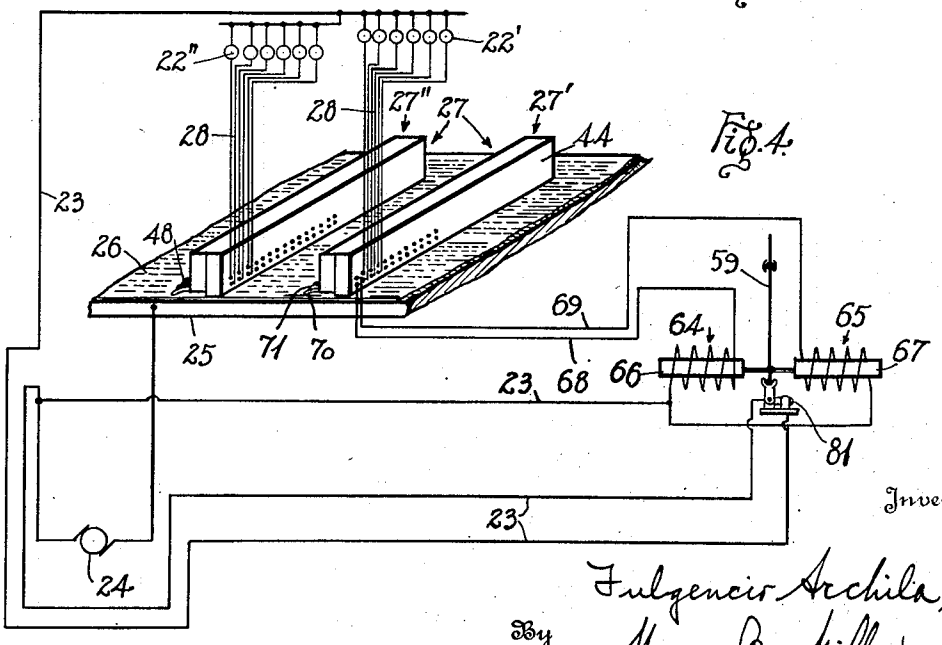


Fig. 4.

Inventor:
Fulgencio Archila,
By Monroe & Miller
Attorney.

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F. ARCHILA

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Filed April 3, 1924 4 Sheets-Sheet 3

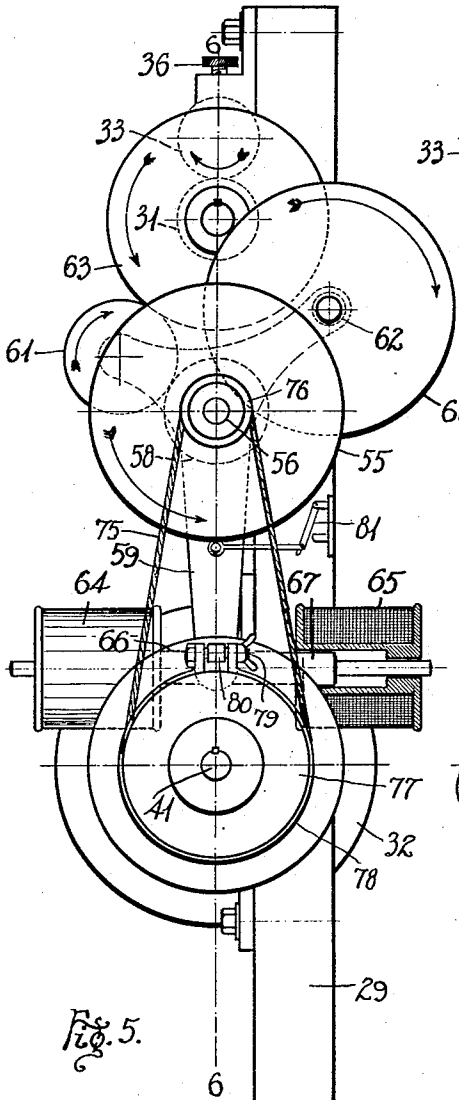


Fig. 5.

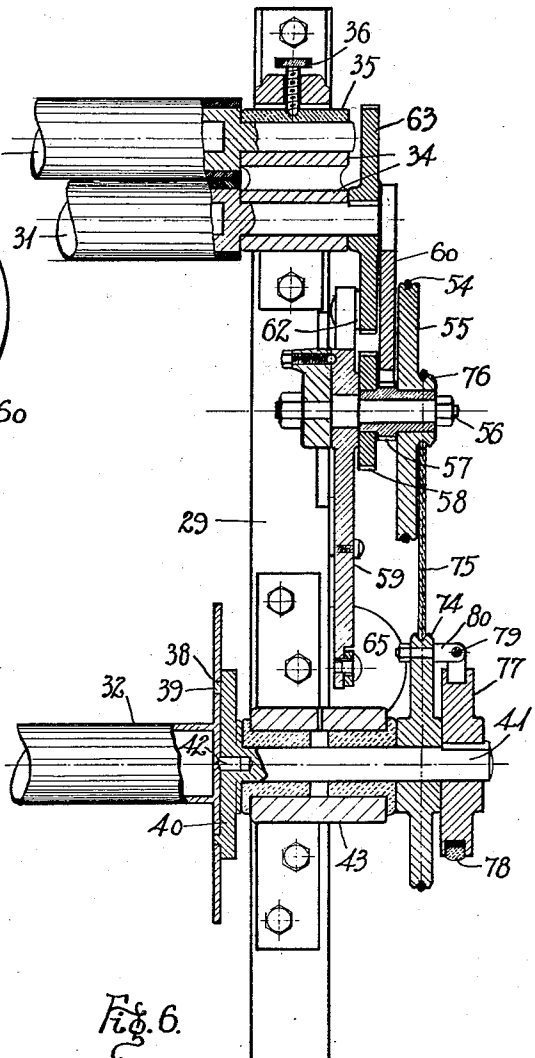


Fig. 6.

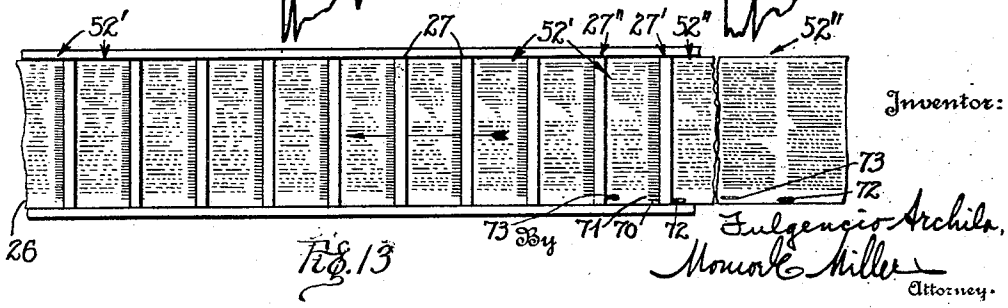


Fig. 13

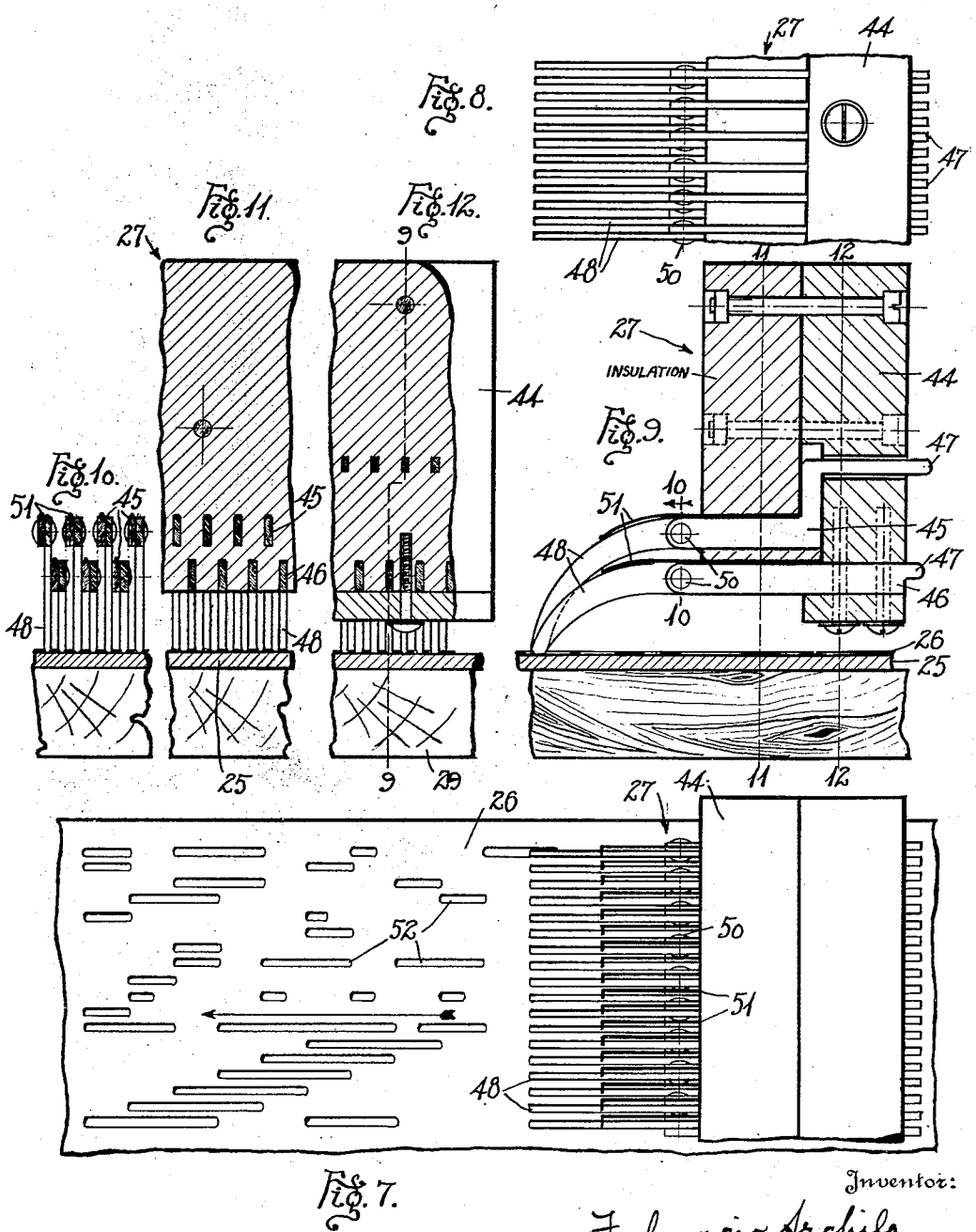
Inventor:
Fulgencio Archila,
By Monroe & Miller
Attorney.

Feb. 16, 1926. 1,572,874

F. ARCHILA

ELECTRIC SIGN

Filed April 3, 1924 4 Sheets-Sheet 4



Inventor:
Fulgencio Archila,
By Monroe C. Miller
Attorney.

Patented Feb. 16, 1926. 1,572,874

UNITED STATES PATENT OFFICE.

FULGENCIO ARCHILA, OF BOGOTA, COLOMBIA.

ELECTRIC SIGN.

Application filed April 3, 1924. Serial No. 703,992.

To all whom it may concern:

Be it known that I, FULGENCIO ARCHILA, a citizen of Colombia, South America, residing at Bogota, Colombia, have invented certain new and useful Improvements in Electric Signs, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to electric signs, such as are used for advertising or display purposes, and the invention aims to provide a novel and improved circuit controller for controlling the circuits of electric lamps distributed over the area of the sign, in order that the lamps can be lighted to produce moving pictures or characters, and other novel illuminating effects.

Another object is the provision of such a controller for the lamp circuits which is of such construction and operation that the circuits of the lamps can be quickly closed and opened in succession, for producing a series of rapid changes, thereby obtaining a motion picture, moving letters or characters, or the like, and the apparatus providing for successive displays, each having a period of display involving a predetermined number of changes for producing the motion picture or the like, whereby the successive displays can be for different subjects, for different advertisements, or the like.

A further object is the provision of such a controller in which the lamp circuits are controlled by a moving sheet, with circuit closing means spaced apart longitudinally of the sheet, so that the different zones or sections of the lamps of the sign are controlled from longitudinally spaced zones or sections of the sheet; and a further object, in this connection, is to provide means for advancing the sheet at a given speed for a distance the length of a zone or section of the sheet, to obtain the circuit changes for one display, after which the sheet is advanced at a greater speed so as to present the next display portion thereof for cooperation with the circuit closing means.

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, somewhat diagrammatical, of the controller for the lamp circuits.

Fig. 2 is an end view thereof.

Fig. 3 is a diagrammatical view of the electric sign.

Fig. 4 is a diagrammatical view showing the electrical circuits.

Fig. 5 is an enlarged elevation of the actuating means for the sheet.

Fig. 6 is a section on the line 6—6 of Fig. 5.

Fig. 7 is a fragmentary plan view of the perforated sheet and one of the sets of contacts.

Fig. 8 is a fragmentary bottom plan view of such set of contacts.

Fig. 9 is a vertical section on the line 9—9 of Fig. 12.

Figs. 10, 11 and 12 are vertical sections on the respective lines 10—10, 11—11 and 12—12 of Fig. 9.

Fig. 13 is a diagrammatical view of the perforated sheet and contact devices.

The sign 20 may be of any suitable size for either outdoor or indoor use, and is of suitable construction, comprising a frame having the display area thereof formed with cells 21 which, as shown, are arranged in rows crossing one another at right angles, although other arrangements of cells can be used. Electric lamps 22 are disposed in the cells.

The lamps are divided into zones or sections 22′, 22″, etc., and there may be any suitable number of such zones or sections, each containing a number of lamps. The divisions between the zones or sections may be either horizontally or vertically of the sign, or other zoning arrangements can be used. The lamps are all connected to a common conductor or wire 23 in which the electric generator 24 is disposed, although any suitable source of electrical energy can be used. The conductor 23 is connected to a table 25 of metal or other conductive material over which the perforated sheet 26 moves, and the circuit controlling means 27 are disposed above the table 25 so that the sheet moves under said means. The circuit controlling means 27 is composed of a number of sets of contact devices 27′, 27″, etc., corresponding to the zones of lamps 22′, 22″, etc., and the devices 27′, 27″, etc., are dis-

posed transversely of the table and sheet and are spaced apart longitudinally of said table and sheet, as seen in Figs. 1 and 4. Conductors or wires 28 connect the lamps and contact means 27. Thus, the lamps 22′ are connected to the contact device 27′, the lamps 22″ are connected to the contact device 27″, and so on. As seen in Fig. 1, there are ten contact devices and corresponding zones of lamps, although the number thereof may be more or less.

The table 25 and contact devices form part of the controller, said table being supported by a suitable frame 29. The sheet 26 is wound on a drum 30 which is removably supported from one end of the frame 29, and from the drum 30 the sheet passes longitudinally over the table 25, and over a roller 31 at the opposite end of the table. The sheet extends downwardly from the roller 31 and is wound upon a drum 32. A pressure roller 33 is disposed above the roller 31 to hold the sheet in frictional contact with the roller 31 that advances the sheet over the table. The end journals of the rollers 31 and 33 are disposed in bearings 34 carried by the frame, and pressure pieces 35 are disposed on the journals of the upper roller 31, and are forced downwardly by the adjusting screws 36, to force the roller 33 downwardly with the desired pressure.

The drum 32, like the drum 30, is removable, so that after the sheet is completely wound on the drum, said drum can be removed, and the drum 30 can be substituted by another drum having another perforated sheet thereon, or the same sheet can be used repeatedly. As shown, one end of the drum 32 is pivotally supported by a pivot 37 that is screw-threaded or otherwise adjustably mounted to be projected and retracted. The end flange of the drum at the end opposite to the pivot 37 has apertures 38 to receive the lugs 39 of a disk 40 on the inner end of a shaft 41 journaled in a bearing 43 carried by the frame. The corresponding end of the drum 32 has a stud or pin 42 to engage in the end of the shaft 41. When the pivot 37 is retracted, the drum 32 can be disengaged from the disk 40 and removed.

One of the contact devices 27 is shown in detail in Figs. 7 to 12, inclusive. The contact device comprises a bar 44 disposed transversely above the table and sheet 25 and carried by the frame, said bar being composed of several pieces secured together, as seen in Fig. 9. Secured in the bar 44 are the vertically spaced metal strips 45 and 46, which are in staggered arrangement, as seen in Figs. 10 and 11, the bar 44 being of wood or other insulating material. The strips 45 and 46 have the projections 47 to which the conductors or wires 28 are connected, and contact fingers 48 are pivoted, as at 50, to the opposite ends of the strips 45 and 46 and their free ends bear on the sheet 26, suitable springs 51 being provided for pressing the fingers down. The free ends of the contact fingers of each set are in a transverse line. The sheet 26 is of paper or other insulating material, and has the slots or perforations 52, which, when they pass under the fingers, permit the fingers to contact with the table or contact plate 25, thereby closing the circuits of the corresponding lamps, as will be apparent.

Each set of contacts or contact fingers 48 therefore controls the circuits of the lamps of the corresponding zone or section of the sign, and by using a number of sets of contacts spaced longitudinally of the table 25 and sheet 26, the width of the sheet and table can be reduced in proportion, so as to avoid the objections incident to the use of a very wide perforated sheet that would be necessary for a large sign having a great many electric lamps.

The perforations or slots 52 of the sheet 26 are divided into longitudinally spaced zones 52′, as seen in Fig. 13, and said zones are arranged in sets or groups. Thus, reference being had to Fig. 13, the first set or group of zones 52′ is composed of ten zones, one for each of the contact devices 27, the length of the zones corresponding to the spaces between said devices. The next set of zones 52″ follows after the first set, and so on, each set of perforated zones being intended to produce a complete display on the sign, as will hereinafter more fully appear.

The sheet 26 is advanced over the table to move the perforations of the zones 52′ under the contact devices 27, and then, when the sheet has been advanced the length of a zone under the devices 27, the sheet is advanced the length of a set of zones, thereby bringing the next set of zones in position to move under the contact devices 27, and the mechanism for advancing the sheet in such manner will now be described.

The power for moving the sheet 26 is obtained from an electric motor 53, as shown, although other driving means can be used. The motor 53 is connected by a belt 54 with a pulley wheel 55 that is rotatable on a spindle 56 carried by the frame 29. Gear wheels 57 and 58 are rotatable with the pulley wheel 55, said wheels 55, 57 and 58 being preferably secured on the same hub which rotates on the spindle 56. A lever 59 is fulcrumed on the spindle 56 and carries gear wheels 60 and 61 meshing or engaging the respective gear wheels 57 and 58, and said gear wheels 60 and 61 are oscillated bodily with the lever 59 about the axis of the spindle 56. A small gear wheel 62 is

secured to the gear wheel 60 to rotate therewith. The gear wheels 61 and 62 are arranged to alternately engage a gear wheel 63 secured to one end of the roller 31, whereby the roller 31 can be rotated through either of two trains of gear wheels. One train of gear wheels includes a small gear wheel 57, a large gear wheel 60, small gear wheel 62 and the gear wheel 63, while the other train includes the gear wheels 58, 61 and 63. When the gear wheel 63 is driven from the gear wheel 62 it will rotate much slower than when rotated by the gear wheel 61, due to the differences in gear ratios of the two gear trains, thus providing for different speeds of movement of the sheet 26 when the lever 59 is oscillated to its opposite positions.

In order to operate the lever 59, there are provided the solenoids or electro-magnets 64 and 65 in which the cores 66 and 67 work, and the lever is connected to said cores between the solenoids. Both solenoids 64 and 65 are connected to the common feeder conductor 23, and the other terminals of the solenoids are connected by the respective conductors 68 and 69 with contact fingers 70 and 71, respectively. Said contact fingers 70 and 71 are similar to the contact fingers 48 and are preferably carried by the bar 44 of the first contact device 27'. The sheet 26 has slots or perforations 72 and 73 to move under the respective contact fingers 70 and 71, the perforation 72 moving under the contact finger 70 when the sheet 26 has been moved the length of a zone to complete one display, so that the circuit of the solenoid 64 is closed to swing the lever 59 and bring the gear wheel 61 into engagement with the gear wheel 63. The perforation 73 is so arranged on the sheet, in conjuction with each set of perforated zones, so as to move under the contact finger 71 when the sheet is moved to bring the corresponding set of perforated zones into position to move under the contact devices 27. The perforations 72 and 73 and contact fingers 70 and 71 are preferably located at one edge of the sheet.

When the perforation 73 moves under the contact finger 71, the circuit of the solenoid 65 is closed so as to swing the lever 59 to remove the gear wheel 61 from the gear wheel 63 and bring the gear wheel 62 into engagement with the gear wheel 63, thereby changing the speed of movement of the roller 31 and sheet 26.

The drum 32 is rotated with a steady motion, to wind the sheet thereon. For this purpose, a pulley wheel 74 is rotatable loosely on the shaft 41, and is connected by a belt 75 with a pulley wheel 76 carried by the pulley wheel 55. A drum 77 is secured on the shaft 41 and is embraced by a friction band 78 having its ends connected by an adjusting screw or bolt 79 that is engaged by a lug 80 carried by the pulley wheel 74, so that the band 78 is rotated with the wheel 74 to rotate the drum 77, shaft 41 and drum 32. The band 78 and drum 77 permit of slippage between them, so that if the drum 32 is rotated too fast for the movement of the sheet from the roller 31, the band 78 can slip on the drum 77.

The operation of the apparatus is as follows: Starting with the sheet 26 in the position, as shown in Fig. 13, with the perforated zones 52' in position adjacent to the corresponding contact devices to move under said devices, the aperture 73 is below the contact finger 71, so that said finger contacts with the table or plate 25 through said perforation or slot, thereby closing the circuit of the solenoid 25 by way of the generator 24, plate 25, contact finger 71, conductor 69, solenoid 65 and return to generator. The core 67 is attracted into the solenoid 65, thereby swinging the lever 59 to move the gear wheel 62 into engagement with the gear wheel 63, and the roller 31 is therefore driven by the train of gears 57, 60, 62 and 63 to move the sheet 26 over the table 25. As the perforations or slots of the sheet move under the contact fingers 48, the circuits of the lamps 22 are closed, the contact fingers of each set controlling the circuits of the lamps of the corresponding zone of the sign. The several zone of perforations 52' move simultaneously under the contact devices 27 so that the lamps of the several zones of the sign are all simultaneously controlled, the perforations or slots being properly cut in the sheet to produce the desired effect, which may be a motion picture, moving letters, words, or characters, and the like. As shown in Fig. 3, an effect can be obtain resembling the tearing off or removal of sheets containing the words or characters. Thus, at the start, the lamps may be lighted to produce certain words or characters, and as the sheet moves under the contact devices, the lamps can be lighted, starting at one corner of the sign, to represent the back of a sheet being torn off, thereby exposing the next words or characters, the black squares or cells in Fig. 3 representing lighted lamps. Thus, as the perforated zones 52 of the sheet move under the contact devices 27, the lamps of the sign are lighted and extinguished to produce motion pictures, moving letters, words or characters, and other optical effects, and such display can continue for a predetermined length of time, depending on the spacing of the contact devices 27. When the perforated zones 52' have moved under the corresponding contact devices 27, to complete the display, the perforation or aperture 72 moves under the contact finger 70, so that said finger touches the table or plate 25 thereby closing the circuit of the solenoid 64, including the generator 24, table 25, con-

tact finger 70, conductor 68, and solenoid 64. The core 66 is drawn into the solenoid 64, thereby swinging the lever 59 to remove the gear wheel 62 from the gear wheel 63, and bring the gear wheel 61 into engagement with said gear wheel 63. The roller 31 is now driven at a faster speed through the gears 58, 61 and 63, and the sheet 26 is moved with greater speed over the table 25, so as to make the change from one display to the next without too long an interruption. The set of perforated zones are thus removed from under the contact devices, and the next set of perforated zones is brought into postion adjacent to the corresponding contact devices, and as soon as the sheet has moved sufficiently to bring the next set of perforated zones adjacent to the corresponding contacts, the corresponding perforations or apertures 73 moves under the contact finger 71, thereby energizing the solenoid 65 and swinging the lever 59 to remove the gear wheel 61 from the gear wheel 63 and return the gear wheel 62 into engagement with said gear wheel 63. The sheet is now moved, as before, under the contact devices to produce the next display. Any number of displays can thus be provided for, each display running for a number of seconds or minutes, and the different displays can be composed of different words, pictures, or characters, for advertising purposes.

It is desirable, when changing the displays, to keep the sign dark, and this is readily accomplished by the provision of a switch 81 in the conductor 23 in series with each of the lamps, as seen in Fig. 4, said switch being operatively connected with the lever 59 so that when said lever is swung by the energization of the solenoid 64, the switch 81 is opened, said switch being closed when the solenoid 65 is energized. Thus, when the perforated zones of one set have moved under the contact devices, and the aperture 72 moves under the contact finger 70, so that the solenoid 64 is energized to control the speed change gearing to move the sheet at a faster speed for changing the displays, the switch 81 is opened during such interval, to prevent the lamps of the sign being lighted until the next set of perforated zones are brought to a position to cooperate with the corresponding contact devices.

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

1. An electric circuit controller comprising longitudinally spaced contact devices, a sheet movable longitudinally past said devices and having successive sets of longitudinally spaced zones of circuit controlling means cooperable simultaneously with said devices, actuating means for moving said sheet past said devices, and means controlled by the movement of the sheet by the actuating means for removing the control of said circuits from said devices and circuit controlling means after the zones of circuit controlling means have passed the corresponding devices until the next set of zones of circuit controlling means are brought to a position to cooperate with the corresponding devices.

2. An electric circuit controller comprising longitudinally spaced contact devices, a sheet movable longitudinally past said devices and having successive sets of longitudinally spaced zones of perforations cooperable simultaneously with said devices for controlling electrical circuits, actuating means for moving said sheet past said devices, and means controlled by the movement of the sheet by the actuating means for opening said circuits after the zones of perforations have passed the corresponding contact devices until the next set of perforations are brought to a position to cooperate with the corresponding contact devices.

3. An electric circuit controller comprising longitudinally spaced contact devices, a sheet movable longitudinally past said devices and having successive sets of longitudinally spaced zones of circuit controlling means cooperable simultaneously with said devices, and variable speed actuating means for said sheet controlled by the movement of the sheet and operable to move the sheet at one speed when the zones of circuit controlling means move past said devices in cooperation therewith, and operable to move the sheet at a faster speed when said zones of circuit controlling means have passed said devices until the next set of zones of circuit controlling means are moved into position to cooperate with the corresponding contact devices.

4. An electric circuit controller according to claim 3 and including, in combination, means controlled by the movement of the sheet by the actuating means for removing the control of the circuits from said devices and circuit controlling means while said actuating means is moving the sheet at the faster speed.

5. An electric circuit controller comprising longitudinally spaced contact devices, a sheet movable longitudinally past said devices and having successive sets of longitudinally spaced zones of perforations cooperable simultaneously with said devices for controlling electrical circuits, and variable speed actuating means for said sheet controlled by the movement of the sheet and operable for moving the sheet at one speed when the zones of perforations move past the corresponding devices in cooperation therewith, and operable to move the sheet at a faster speed when said zones of perforations have passed the corresponding devices until the next set of zones of per-

forations are moved into position to cooperate with the corresponding contact devices.

6. An electric circuit controller according to claim 5 and including, in combination, means controlled by the movement of the sheet by the actuating means for opening said circuits during the movement of the sheet by said actuating means at the faster speed.

7. An electric circuit controller comprising contact devices, a sheet movable past said devices, said sheet and devices being cooperable to control electrical circuits, and variable speed actuating means for moving said sheet, said sheet and means having cooperable portions for controlling said means when the sheet is moved to predetermined positions so as to automatically increase and decrease the speed of movement of the sheet.

8. An electric circuit controller comprising longitudinally spaced contact devices, a sheet movable longitudinally past said devices and having successive sets of longitudinally spaced zones of circuit controlling means cooperable simultaneously with said devices, and variable speed actuating means for moving said sheet, said sheet and means having cooperable portions for controlling said actuating means to automatically increase and decrease the speed of movement of the sheet, said portions of the sheet being so arranged with reference to said sets of zones of circuit controlling means that the sheet moves at a reduced speed when the zones of circuit controlling means are moving past the corresponding contact devices, and that the sheet moves at a faster speed after said zones of circuit controlling means have moved past the corresponding contact devices until the next set of zones of circuit controlling means are moved into position to cooperate with the corresponding contact devices.

9. An electric circuit controller comprising longitudinally spaced contact devices, a sheet movable longitudinally past said devices and having successive sets of longitudinally spaced zones of circuit controlling means cooperable simultaneously with said devices, speed change gearing for moving said sheet, and controlling means for said gearing controlled by said sheet for moving the sheet at a given speed when the zones of circuit controlling means of one set moves adjacent to the corresponding contact devices for cooperation therewith, and for moving the sheet at a faster speed after said zones of circuit controlling means have moved past the corresponding contact devices to bring the next set of zones of circuit controlling means into position to cooperate with the corresponding contact devices.

10. An electric circuit controller comprising longitudinally spaced contact devices, a sheet movable longitudinally past said devices and having successive sets of longitudinally spaced zones of perforations cooperable simultaneously with said devices for controlling electrical circuits, speed change gearing for moving said sheet, and controlling means for said gearing, said sheet having perforations cooperable with said controlling means and so arranged that when a set of perforated zones are moved adjacent to the corresponding contact devices the sheet is moved at a given speed, and when the zones of perforations are moved past the corresponding contact devices, the sheet is moved at a faster speed to bring the next set of perforated zones adjacent to the corresponding contact devices for cooperation therewith.

11. An electric sign controller according to claim 9 and including in combination a switch operable with the controlling means for opening the circuits when the gearing is controlled for the movement of the sheet at the faster speed.

In testimony whereof I hereunto affix my signature.

FULGENCIO ARCHILA.