

Nov. 25, 1947.

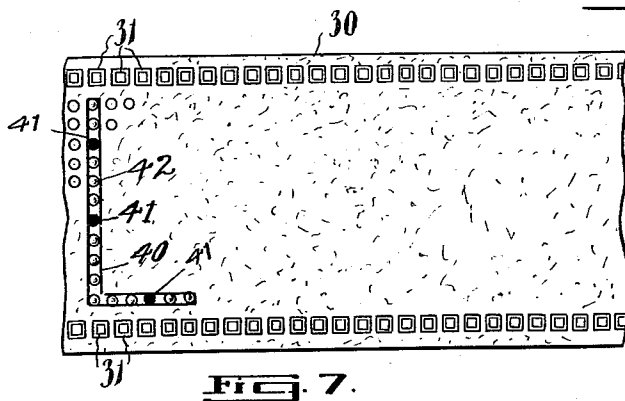
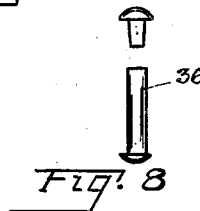
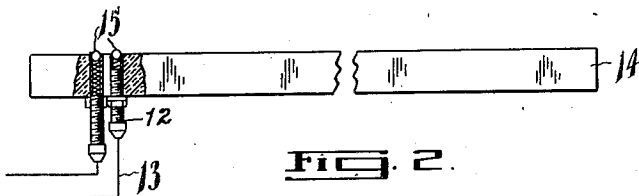
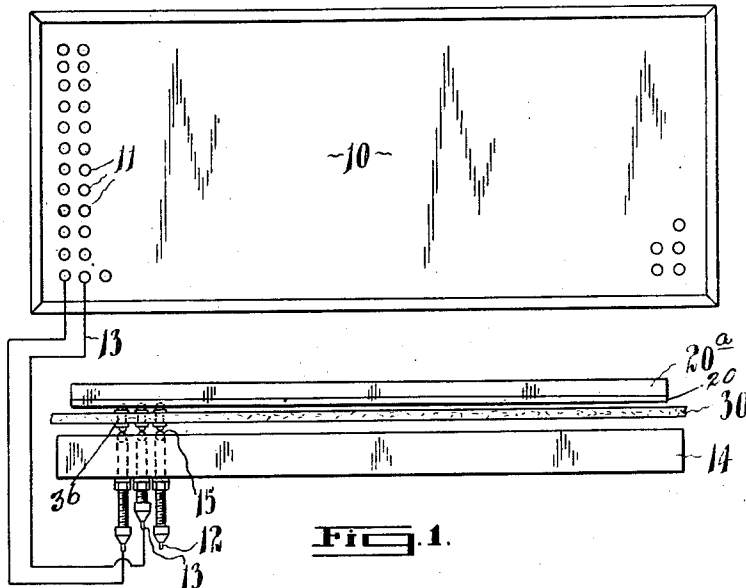
F. P. ELLIOTT

2,431,380

PATTERN SHEET CONTROL SWITCH

Filed Feb. 22, 1944

2 Sheets-Sheet 1



Inventor
F. P. Elliott

by *A. Harold M. Fisher*

ATTY.

Nov. 25, 1947.

F. P. ELLIOTT

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PATTERN SHEET CONTROL SWITCH

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2 Sheets-Sheet 2

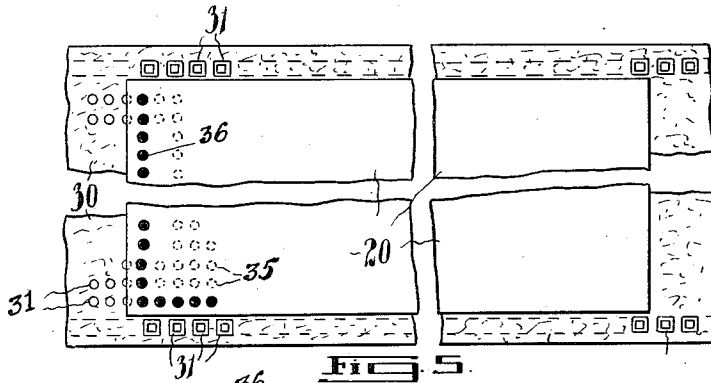


FIG. 5.

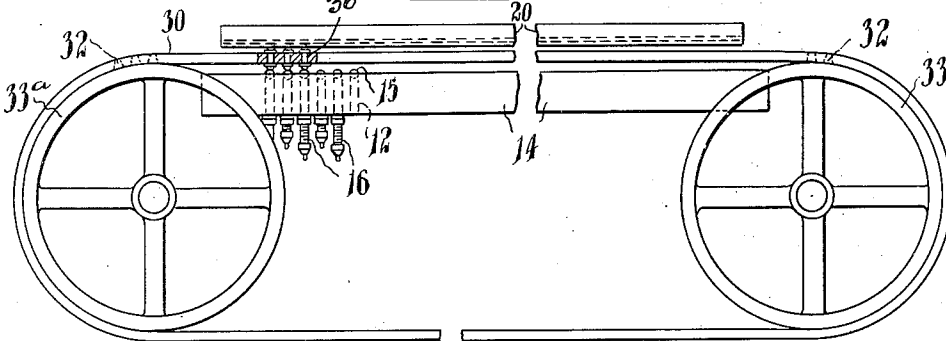


FIG. 6.

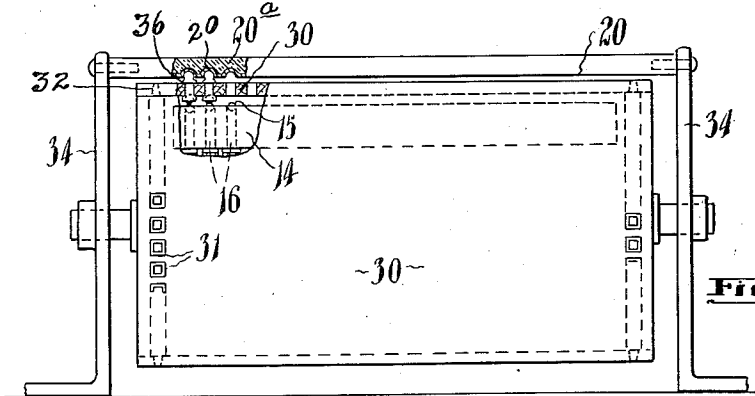


FIG. 3.

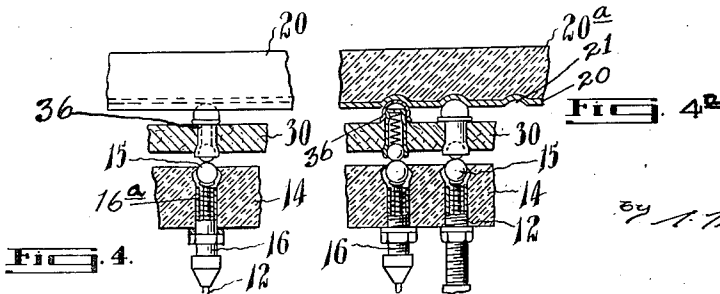


FIG. 4.

FIG. 4a.

Inventor
F. P. Elliott

By *J. Harold M. Jones*

ATTY.

UNITED STATES PATENT OFFICE

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PATTERN SHEET CONTROL SWITCH

Francis Percy Elliott, Toronto, Ontario, Canada

Application February 22, 1944, Serial No. 523,490

1 Claim. (Cl. 200—46)

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This invention relates to an electric control system and is particularly directed to providing a control system for a display sign of the travelling message type.

Electrically illuminated display signs are well known and are in wide spread use for advertising purposes. Display signs of the travelling message type are also known but their use has been restricted due to the complexity of the control mechanism necessary to form the continuously changing sequence of letters flashed on and moved along the bank of electric lamps comprising the sign.

One of the primary objects of this invention is to provide a control system for electric display signs of the travelling message type which is simple in design, very easily operated, and inexpensive to install.

A further object of the invention is to provide a control system in which the electric circuit to each electric lamp, in the bank of lamps forming the sign, is at all times under positive and direct control without the provision of switches or other electrical devices for opening or closing the circuits.

The control system of the present invention comprises, in general, a contact plate having a plurality of rows of connectors, each connector being connectable to an electric lamp, and each connector terminating in an electrical contact, electrically energized means parallel to and spaced apart from said contact plate, a belt movable between the energized means and the contact plate, and electrical conducting means carried by the belt for contacting the electrically energized means and selected contacts on the contact plate during the movement of the belt between the contact plate and the electrically energized means.

An understanding of the invention may be had from the following description, reference being made to the accompanying drawings, in which:

Figure 1 is a diagrammatic view of the connections from a bank of electric lamps forming a display sign to the contact plate;

Figure 2 is an enlarged side elevation of a portion of the contact plate and associated parts;

Figure 3 is an end elevation, partly in section, of the control mechanism;

Figures 4 and 4a are enlarged detail views of the arrangement of the contacts;

Figure 5 is a top plan view of the belt;

Figure 6 is a side elevation of the assembly;

Figure 7 is a bottom plan view of the belt showing an alternate arrangement for completing the

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circuits to selected contacts on the contact plate; and

Figure 8 is a side elevation of a form of a suitable stud.

Like reference characters refer to like parts throughout the specification and drawings.

The control system comprises, in general, the combination of a contact plate and spaced apart, electrically energized means with a moving belt which carries means for completing the electrical circuits from the electrically energized means to selected contacts on the contact plate and through the selected contacts to selected electric lamps to be illuminated.

Referring to the preferred embodiment of the invention illustrated in the drawings, the numeral 10 indicates a display sign comprising a bank of electric lamp 11. Each lamp 11 is connected by a wire 13, to a connector 12 mounted in the contact plate 14. Each lamp 11 in the sign is connected to a correspondingly positioned connector 12 mounted in the contact plate 14.

Each connector 12 extends through the contact plate 14 and preferably terminates in a recessed end. The contact plate is formed, of course, of electrically non-conductive material such as that sold under the trade name "Bakelite." A removable contact 15, substantially in the form of a spherical ball, and coated with or formed of electrically conductive material such as copper, is seated in the recessed end of each connector and extends beyond the surface of the contact plate 14. The contacts 15 are preferably seated in the recessed ends of the connectors so that they can be easily removed or replaced.

A preferred form of electrically energized means is in the form of an electrically energized plate 20, which is mounted above and parallel to the contact plate, and which extends preferably the full length of the contact plate 14. The electrically energized plate is preferably resiliently mounted to minimize the wear on the surface thereof. This can be conveniently effected by providing a rubber backing for the plate as indicated by the numeral 20a, Figure 4a, or by springs. Other arrangements for electrically energizing the system, such as bus bars or power lines, can be used, but it is found that the most satisfactory arrangement is that of the electrically energized plate.

A movable belt 30, preferably of the endless type, is extended over the sprockets 33 and 33a which are journaled in bearings carried by the frames 34. The frames 34 are positioned so that the belt passes between the contact and ener-

gized plates, as illustrated in Figures 5 and 6. The belt may be formed of various types of flexible, non-conductive materials such as leather, rubber, etc., either of single ply or laminated and either in continuous section or built with link sections. The belt is designed so that it extends somewhat beyond the outside rows of contacts on the contact plate to provide space for the perforations 31 which extend along the sides of the belt and which are engaged by the teeth 32 of the sprockets 33 and 33a. Either of the pairs of sprockets 33 or 33a can be driven in any suitable manner, such as from an electric motor through a reducing gear (not shown).

The belt is designed to carry interchangeable contacts 35 to complete the circuits between the energized plate 20 and selected contacts 15 on the contact plate 14. Contacts suitable to attain this end can be in several forms. For example, the belt illustrated in Figure 5 is formed with rows of perforations 35, the rows of perforations being in alignment with the transverse and longitudinal rows of contacts 15 on the contact plate. Studs 36, of roughly dumb-bell shape and formed of electrically conductive material, are insertable through the perforations, one end of each stud contacting the electrically energized plate and the other end contacting each one of a selected row of contacts 15 during the movement of the belt between the electrically energized and contact plates. Each group of studs in the belt is arranged in the form of a letter, character, numeral or symbol, the combination of groups forming the display which is to be flashed on the sign. A suitable form of stud is illustrated in Figure 8 in which one end is detachable for ease in insertion through a perforation in the belt 30.

An alternative arrangement for completing the electrical circuits to the selected contacts 15 is illustrated in Figure 7 in which a letter, character, symbol or numeral 40, formed preferably of flexible, non-conductive material and carrying electrically conductive studs 42, is connected to the underside of the belt by studs 41 which extend through perforations in the belt and contact the electrically energized plate. The character is connected to the belt in such a manner, of course, as to make contact with the proper contacts 15 on the contact plate 14. For example, the letter "L" is illustrated in Figure 7 as being connected to the belt. This letter is connected so that all the studs forming the letter make contact with the proper contacts 15 on the contact plate 14. As the studs 36 or 42 forming the letter move between the energized plate and the contact plate, contact is maintained with the contacts 15, which, in turn, complete the circuits to the lamps which, when illuminated, display the letter "L" on the display sign and this letter moves across the sign as the belt passes between the plates.

Various modifications can be incorporated in the details of the arrangement of parts. For example, the shank of each connector can be hollowed out below the recessed end to receive a spring 16a which tends to urge the contact 15 upwardly and improve the contact with the lower end of the stud. Also, the energized plate 20 can be formed with grooves 21, as illustrated in Figure 4a, which are parallel to the longitudinally extending rows of contacts and in which the upper ends of the respective rows of studs slide in contact with the plate during the movement of the belt between the plates.

The operation of the control mechanism is very simple. The contact plate is an exact replica of the arrangement of the electric lamps comprising the sign to be illuminated but on a much smaller scale, of course. If the sign is of the type in which the same message is to be moved along the length of the sign, such as may be used in conjunction with an illuminated display sign, the studs are arranged in the belt to spell out the words, or form the characters, used in the message. As the belt passes between the energized and contact plates, the studs 36 move over the selected contacts on the contact plate and thereby complete the circuits to the selected electric lamps to be illuminated. The mechanism can be designed to illuminate various forms of display on the sign, such as messages and the like, or to provide borders for other forms of display signs.

Any change in the message to be displayed on the sign can be made very easily by rearrangement of the grouping of the studs 36 to form the desired groups of letters, characters, symbols or numerals.

It is found that the control mechanism described hereinabove has many advantages over the systems of controls heretofore used for operating display signs of the travelling message type. For example, the control mechanism can be set up in a position convenient to the operator and is entirely independent of the position of the display sign. Also, each lamp in the bank of lamps forming the display sign is directly connected to a correspondingly positioned connector in the contact plate. It is not necessary to provide any switches in the lamp circuits and the flow of current to each individual circuit is at all times under positive control. An important advantage is that any changes in the arrangement of the lamps to be illuminated can be made by a simple rearrangement of the contacts applied to the moving belt and without any changes in the wiring of the lamp circuits. A still further advantage is that the mechanical operation of the system obviates any possibility of break downs due to electrical defects and the use of a non-conductive belt eliminates any possibility of static discharges.

It is found further that the control system is simple and inexpensive both in original installation and operating costs. There are no complicated and sensitive switches to get out of order and a minimum of supervision is necessary. The system can be used, of course, in conjunction with a control system for other forms of display signs, such as the type of display sign known as an animated sign in which lamps in the sign are illuminated in a predetermined sequence and remain illuminated for a predetermined time interval and, also, for the type of sign known as a flashing sign in which lamps are illuminated at and for predetermined intervals of time. The control system is also of important advantage in illuminated signs for conveying constantly varying messages, such as items of news, advertising slogans, and the like, the arrangement of the contacts affixed to the moving belt being readily changeable to complete the circuits to the electric lamps to be illuminated to form the letters of the words to be displayed.

It will be understood, of course, that modifications may be made in the preferred embodiment of the invention by others skilled in the art without departing from the scope of the invention as defined by the appended claim.

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What I claim as new and desire to protect by Letters Patent of the United States is:

In a control system for an electrically illuminated display sign, spaced substantially parallel plates, one of which is adapted to be electrically energized, a plurality of connectors extending through the second plate, resiliently mounted contacts associated with said connectors, an electrical conductor extending from each of said connectors to a lamp in an electrically illuminated display sign, a flexible non-conductive belt mounted to travel between said plates, spaced contact elements carried by said belt comprising a connector extending through said belt having a resiliently mounted rollable element recessed in one end thereof and a removable contact element positioned over the other end thereof in order that

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said connector may be easily inserted in or removed from said flexible belt.

FRANCIS PERCY ELLIOTT.

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