Aug. 6, 1935. J. E. LONG 2,010,310

METHOD AND MEANS FOR CONNECTING PLURAL CIRCUITS

Filed March 31, 1930

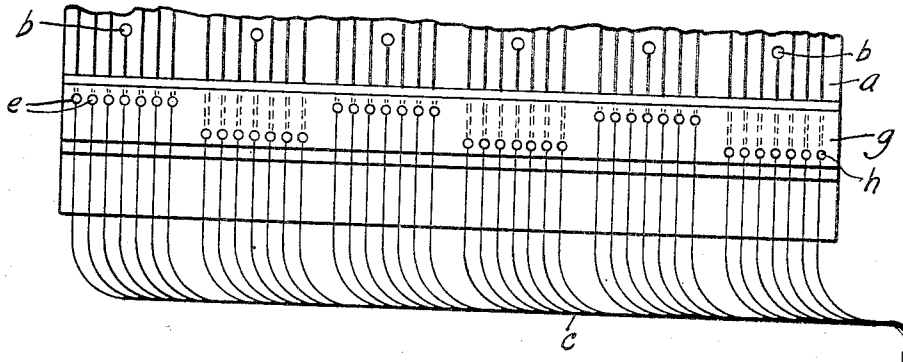
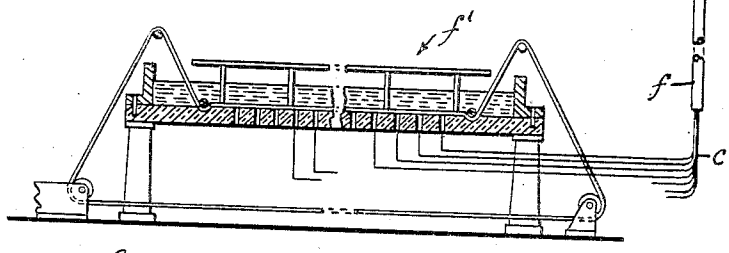


Fig. 1.



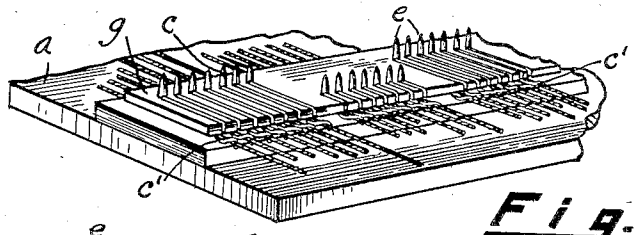


Fig. 2.

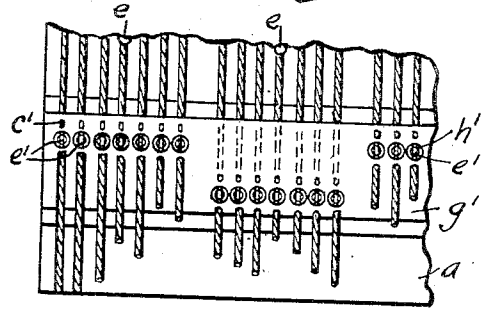
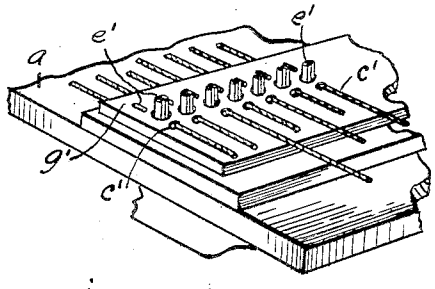


Fig. 3.

Fig. 4.



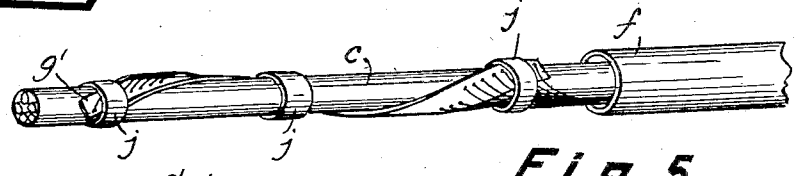


Fig. 5.

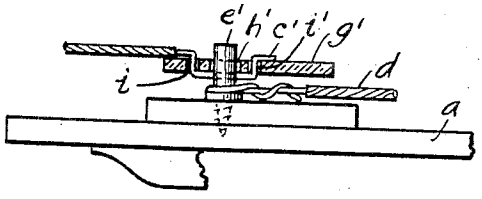


Fig. 6.

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Patented Aug. 6, 1935 2,010,310

UNITED STATES PATENT OFFICE

2,010,310

METHOD AND MEANS FOR CONNECTING PLURAL CIRCUITS

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Application March 31, 1930, Serial No. 440,461

9 Claims. (Cl. 177—346)

My invention relates to a method and means for disconnecting a series of wires, such for example as in a cable, and making them again in proper order and sequence.

My invention is particularly directed to the installation of electric signs of the type illustrated in the United States reissue patent issued to myself under date of December 6, 1927, which patent bears Reissue No. 16,809.

Electric signs of this character are frequently placed in positions in which it is not desirable to place the control portion alongside of the sign and in cases such as these the signs are operated by remote control. The underwriters and authorities in various communities require that the cable running from the controls to the sign be housed within fixed metal conduits. To comply with such requirement, it has been necessary heretofore to make the connections between the ends of the separate wires and the terminals for the lights on such sign, after such sign has been installed. Inasmuch as there are approximately forty-two lights to the running foot, it is obvious to see that making such connections in place is a difficult and expensive job, and because of this factor the expense incurred limits the installation of a sign of this character.

The object of my invention is to provide a method and means by which all of the connections to the display board can be made and the wires connecting the control element and the board be disconnected intermediate the board and the control, such method and means being adapted to match up the plurality of circuits quickly and easily, and with a minimum probability of error.

A further object of my invention is to attain this object by the use of spaced terminals and connecting blocks, which latter are adapted to be permanently fastened to the cable, which must be lead thru the conduit, such connecting blocks being devised and arranged to permit their passing thru the bore of such conduit without being disconnected.

Further details of my invention and the mode of operation are hereinafter described with reference to the accompanying drawing, in which:

Fig. 1 is a view of a display board embodying my invention, looking at the back thereof and showing the insulated base portion of such board provided with spaced terminals and a cooperating connecting block and diagrammatically illustrates a control used with said sign, spaced therefrom and with the electrical conductors passing through a conduit;

Fig. 2 is a detail view of such connecting block;

Fig. 3 is a view similar to Fig. 1, showing a modification of a connecting block embodying my invention;

Fig. 4 is a detailed view of such latter modification;

Fig. 5 is a view somewhat diagrammatically illustrating the manner in which such connecting block is adapted to be passed thru the bore of a conduit; and

Fig. 6 is a fragmentary detail of construction.

In United States Patent No. 1,894,380, issued January 17, 1933, to myself, entitled Panel unit sign, I have illustrated and described an electric sign to which my present invention is specifically directed, although the utility of my present invention is not limited to such type of sign.

Suffice to say with respect to my present invention, the display board of a sign of this character is mounted upon a base *a* of non-conducting material. Spaced at uniform intervals across the face of such display board are a series of electric lights and the connections *b* therefor extend thru the base, as is shown in Figs. 1 and 3. The arrangement of such connections indicates the manner in which such lights are arranged upon the face of such display board. Each of such connections is connected by separate wire to a control so that each light can be actuated separately and thus there are as many wires composing the cable *c* as there are lights to be actuated. Each wire *d* is soldered or otherwise fastened to its connection *b* which in turn is electrically connected to a terminal *e*.

The terminals for each of the lights are arranged in grouped sequence and are arranged in rough alinement along one marginal edge of the base. All of the lights in one vertical line are arranged in one group and the adjacent groups are staggered relatively. In each group the wires connecting the lights composing such vertical line are connected in predetermined sequence so that an inspection of the group not only indicates which vertical line is affected thereby, but the sequence provides an indication of the particular light in such line.

If the sign is one requiring a distant control, the underwriters and inspectors in certain districts require that the cable *c* be housed within a fixed metallic conduit *f*, which conduit encircles such cable from a point adjacent the sign to a point adjacent the control *f'*, so as to minimize the danger of fire occurring thru a short-circuit in any of the wires in such cable. Such conduit is fastened in place before the sign is

installed and it is necessary that the cable *c* be led thru the bore of the conduit *f* before such cable can be fastened either to the control *f'* or to the sign.

Inasmuch as it is necessary that each wire be fastened directly to the light to be controlled and that such wires be fastened in predetermined sequence, it is evident that to select a proper wire from a mass would be a difficult task. To expedite the making of this selection and the connection of the selected wires in place and to eliminate the necessity of soldering either one of the ends of such cable in place after the sign is installed, I sever such cable at a point adjacent the terminals *e*.

The end of cable *c*, which must be passed thru the conduit, is provided with a connecting block *g*, which comprises an elongated relatively thin and flexible strip of insulating material, such for example as so-called pressed board, carstock, or rubber. Such connecting block is provided with a series of recesses or perforations *h* arranged longitudinally of the connecting block, such recesses or perforations being proportioned and grouped in size and in pattern to correspond with the terminals *e* upon the base *a*. The ends *c'* of the wires constituting the cable *c* are arranged in predetermined sequence similar to the manner that their opposite ends are arranged in the control box, which in turn is similar to the manner in which the connections *b* are arranged on the insulated base of the display board. In the modification shown in Figs. 1 and 2, the ends of each of the wires are bared of insulation and passed thru the perforations or recesses and fastened about the intermediate portion of the wire and thus are secured tightly to the connecting block.

In the modification shown in Figs. 3, 4 and 6, the ends *c'* of the wires constituting the cable *c* are bared of insulation and extend diametrically across the recess or perforations *h'* in the connecting block *g'*. Such end of the wires extend downwardly thru a perforation *i* in such block and upwardly thru a perforation *i'* therein and the end of such wire is bent to lie flat over the top of such block, as is shown most clearly in Fig. 6. The terminals *e'* shown in this modification are transversely slotted and are screwed tightly in place in the base *a*. Thus the end *c'* of the wires is brought into electrical connection with the terminals *e'* by being fitted tightly into the slotted portion of such terminals.

The recesses or perforations *h* in such connecting block are arranged so as to correspond in size and spacing to the terminals and thus when the connecting block is arranged in alinement with the terminals, each perforation with its wire fast therein will come into registration with its terminal when the connecting block is fastened in place. Electrical connection is thus made between the end of the wire and the terminal.

If it is desired to pass the cable with the connecting block fast thereto thru the conduit *f*, the terminal block being thin and flexible can be arranged either to lie alongside and in longitudinal alinement with the cable, or can be wrapped securely around the cable and fastened temporarily in place by strips of tape *j*, for example. To prevent the overall diameter of the cable with the connecting block wrapped thereabout or extending along such cable from exceeding the size of the bore of the conduit, I consider it preferable to arrange the connecting block parallel to or to wind such connecting block spirally about such cable, so that the overall diameter of the whole is increased only by the thickness of one course of such connecting block. As has been pointed out heretofore, my invention particularly concerns the connections between electric signs and distant controls therefor. It is desirable that the separate wires constituting said cable be continuous—that is, not spliced—between the connecting block and the control element. The number of wires in the cable is determined by the number of lights to be actuated. I preferably remove from the general sheathing groups containing all of the wires which control the lights upon one panel. That is, if the panels are each one foot wide, they will contain forty-two lights per panel. Thus the forty-two wires leading to a given panel separably are grouped and are withdrawn from the remainder of the cable at one point. All of said wires are joined to a common connecting block, which is adapted to be placed upon the terminals of the panel and thus each panel is adapted to be connected up to its control by a single operation. This is illustrated in Fig. 5, where all of the wires leading to one panel are shown connected to a continuous, flat, flexible strip and the wires therefrom are joined to the cable at a point within the conduit *f*. The separate bundles of wire are indicated in said figure by the dotted circles at the ends of the cable and thus this would diagrammatically illustrate that the grouped wires which are removed are for the panel sixth from the end. That is, there are five remaining bundles comprising the cable denoted by the five dotted circles and the sixth bundle has been removed and connected to the connecting block.

It is unimportant how the connecting block is secured to the remainder of the cable when it is being passed thru the conduit, the connecting block being secured thereto by cord, tape, friction tape, or any manner which will provide a secure but temporary connection. The specific numbers of wires and their arrangement are cited merely by way of illustration and are not to be considered necessary limiting factors in practicing my invention.

I claim:

1. The method of passing a cable, which is composed of a plurality of electrical conductors insulated from each other, endwise thru a conduit having a fixed bore, which bore exceeds the cross-sectional area of such cable consisting in fixing in spaced relation one end of each of said conductors to a separable flexible elongated flat strip of electrically non-conducting material of lesser thickness than the play between said cable and said bore and arranging said strip so as to lie flatwise alongside of said cable so as to increase the overall cross-section of said cable to a lesser degree than the play between the normal diameter of the cable and the bore of the conduit.

2. The method of passing a cable, which is composed of a plurality of electrical conductors insulated from each other, endwise thru a conduit having a fixed bore, which bore exceeds the cross-sectional area of such cable consisting in fixing in spaced relation one end of each of said conductors to a separable flexible elongated flat strip of electrically-non-conducting material of lesser thickness than the play between said cable and said bore and winding such strip spirally flatwise about said cable so as to increase the

overall cross-section of said cable to a lesser degree than the play between the normal diameter of the cable and the bore of the conduit.

3. The method of passing a cable, which is composed of a plurality of electrical conductors insulated from each other, endwise thru a conduit having a fixed bore, which bore exceeds the cross-sectional area of such cable consisting in arranging one end of each of said conductors in spaced relation transversely of an elongated separable flexible flat strip of electrically non-conductive material of lesser thickness than the play between said cable and said bore and fixing said ends as positioned to said strip and arranging said strip so as to lie flatwise alongside of said cable so as to increase the overall cross-section of said cable to a lesser degree than the play between the normal diameter of the cable and the bore of the conduit.

4. The method of making wired connections from a control mechanism to a varying electric display sign remote therefrom and having a conduit extending between the aforesaid parts which consists of connecting the wires of the sign to the relatively stationary part of a quick detachable connector in a predetermined sequence, at a remote point connecting to a cooperating removable quick detachable connector the terminals of the wires providing a source of power from said control mechanism to the first said terminals and in a sequence corresponding to the first said sequence, passing the last named connector and wires through said conduit to the first mentioned connector and then detachably connecting the two cooperating connectors.

5. The method of making wired connections to a remote electric sign having a conduit extending to such sign, which method consists of connecting the wires of the sign to the relatively stationary part of a quick detachable connector in a predetermined sequence, and at a point remote from said sign and at the other end of said conduit connecting to a cooperating removable flexible, flat, quick detachable connector the terminals of the wires to be connected to said sign and in a sequence corresponding to the first said sequence, arranging said connector flatwise of said wires and passing them through said conduit to the first mentioned connector and then detachably connecting the two cooperating connectors.

6. The method of making wired connections thru a plurality of electrical circuits to a remote electric sign provided with a conduit adapted to house the conductors defining said electric circuits, connecting said conductors to the relatively fixed part of a quick detachable connector in predetermined sequence at the end of said conduit adjacent said sign, and at the other end of said conduit connecting the conductors to a flat and flexible quick detachable connector which is thinner than the spacing between the conductors and said conduit, and in a sequence corresponding to the first said sequence, arranging said last named connector flatwise of the conductors and passing them through said conduit and then detachably connecting the two cooperating connectors.

7. The method of making wired connections thru a plurality of electrical circuits thru a conduit adapted to house the conductors defining said electric circuits, connecting said conductors to the relatively fixed part of a quick detachable connector in predetermined sequence at one end of said conduit, and at the other end of said conduit connecting the conductors to a flat and flexible quick detachable connector and in a sequence corresponding to the first said sequence, arranging said last named connector flatwise of the conductors and passing them through said conduit and then detachably connecting the two cooperating connectors.

8. The method of passing a cable composed of a plurality of electrical conductors, insulated from each other, endwise thru a conduit which fits about said cable and which conductors must be connected in predetermined order at the distant end of said conduit to a series of terminals, consisting in arranging the ends of the conductors in predetermined order, securing said ends transversely of an elongated thin strip of non-conducting material, winding said strip about the cable, drawing the cable, thus prepared, thru the conduit, and connecting the conductor ends to the terminals.

9. The method of passing a cable composed of a plurality of electrical conductors, insulated from each other, endwise thru a conduit which fits about said cable and which conductors must be connected in predetermined order at the distant end of said conduit to a series of terminals, consisting in arranging the ends of the conductors in predetermined order, securing said ends transversely of an elongated flexible strip of flat electrically non-conductive material of lesser thickness than the play between the cable and the inner surface of the wall defining the bore of the conduit, arranging said strip so as to lie flatwise alongside of said cable, fixing said strip temporarily in place, drawing the prepared cable thru the conduit, withdrawing said strip, arranging it in registration with said terminals and connecting said conductors to said terminals.

JOHN E. LONG.