

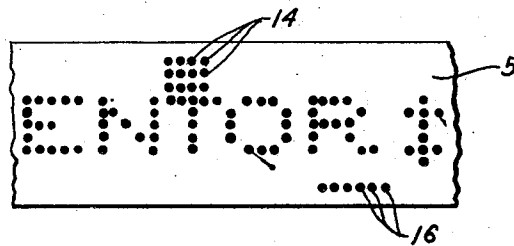
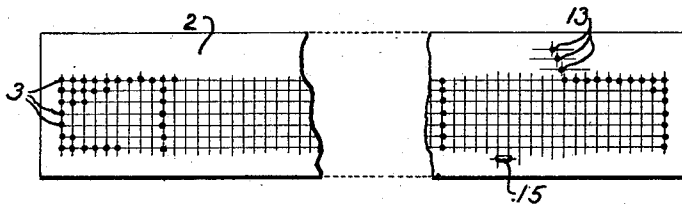
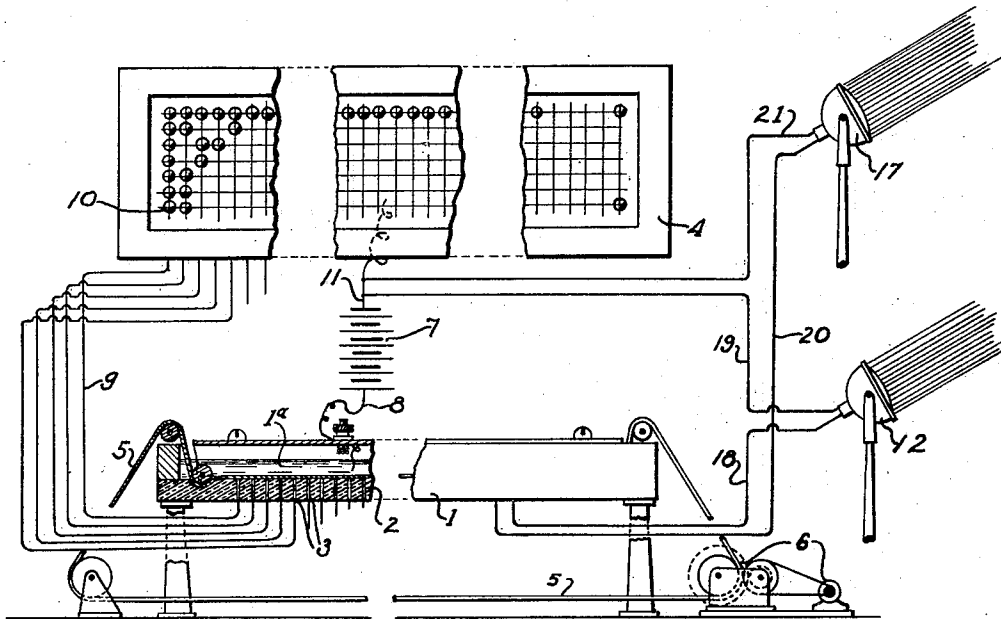
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J. E. LONG

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## SWITCH CONTROL FOR AUXILIARY DEVICES

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## SWITCH CONTROL FOR AUXILIARY DEVICES

Continuation of application Serial No. 212,755, filed August 13, 1927. This application filed April 26, 1928. Serial No. 273,076.

My invention relates to control apparatus for electric circuits generally, such as is described in United States re-issued Patent No. 16,809, granted December 6, 1927, to myself and entitled Electric circuit control apparatus and is a continuation of the United States application filed August 13, 1927, by myself, Serial No. 212,755, and entitled Electric devices for display.

The principal object of my present application is to provide means for controlling an electric sign and auxiliary devices by the same perforated control tape, the latter being provided with apertures of the same size and spacing for effecting such control, thus adapting such tape to have all of the perforations made by the same perforating machine, or instrumentality.

More specifically, the object of my invention is to provide control means of this character by which small, round, spaced perforations are adapted to produce a continuous or a "flash" operation of such auxiliary devices without the use of an alternating switch.

Such objects are attained by spacing the terminals in the control apparatus with which such perforations register so that one or more of the perforations in the common tape are in contact with the terminals for such auxiliary device at all times when the control perforations pass over such terminals, even though the perforations themselves are quite small and relatively widely spaced. The principal advantage gained by a control of this character is that small holes arranged in the tape do not weaken the latter unduly, and being relatively small, do not permit mercury or other electrically conducting fluid to pass therethru and force the tape away from the surface of the control element, which it slidably engages.

The details of construction and the mode of operation of such device are hereinafter described with reference to the accompanying drawings: in which,

Fig. 1 is a diagrammatic illustration of such control device;

Fig. 2 is a diagrammatic plan view of the

terminals arranged in such control apparatus; and

Fig. 3 is a plan view of the control tape which makes-and-breaks connection with such terminals.

My improved control apparatus comprises a container 1 having one wall portion, preferably the bottom 2, made of insulating material in which a number of terminals 3 are arranged in predetermined pattern. As shown in Fig. 2, such terminals are arranged in a plurality of longitudinal rows and are uniformly spaced in such rows. The letters to be visibly shown upon the electric sign 4 are perforated upon the tape 5, as shown in Fig. 3, in a manner similar to the terminal arrangement in the container 1, and thus are adapted to register with the terminals.

Such tape 5 preferably is arranged in endless form, as shown in Fig. 1, and operating devices 6 move the latter thru the container 1 to make-and-break contact between such terminals 3 and the electrically conductive liquid 1<sup>a</sup> within such container. Circuit is made thru battery 7, wire 8, liquid 1<sup>a</sup>, a selected terminal 3, wire 9, electric light 10 and return wire 11 to the battery 7. Reference is had to such re-issue patent as to further details of operation and construction.

When it is desired to operate auxiliary devices by such electric circuit control apparatus without interfering with the main operation thereof, it is common to arrange perforations at the sides of the tape 5.

Heretofore, the length of time which such auxiliary devices are to be actuated has been controlled by the longitudinal dimensions of such perforations, or if an alternating switch is used, by the spacing between successive perforations. The use of perforations of substantial size interferes with the operation of such electric circuit control apparatus by permitting the electrically conductive liquid to enter thru such larger perforations and to lift the tape from the terminals. The use of relatively large perforations also weakens such tape unduly

thus requiring such tape to be repaired or replaced frequently.

To effect the intermittent actuation of the auxiliary device 12, shown as a spotlight, I provide a series of spaced terminals 13 also arranged in longitudinal rows, such rows being spaced the same as the spacing between rows of the terminals in the main body of such control apparatus. Such terminals 13 are connected in electrical series and are spaced longitudinally to overlap, although they are spaced apart relatively in a lateral direction.

Perforations 14, adapted to register with such rows of terminals, are arranged in lateral alinement and thus one series of laterally alined perforations will be in continuous contact with the terminals 13 for an interval of time equal to the time required for the tape to pass one longitudinal space between the terminals in the rows. The perforations 14 are also adapted to be arranged in longitudinal spacing equal to that of the perforations in the main control and thus continuous operation of the auxiliary device 12 can be effected by arranging a laterally alined series of perforations 14 for each longitudinal space of the tape. Corresponding intermittent connections may be made by leaving some of such spaces unperforated.

An alternative mode of effecting such control is by providing a terminal 15 elongated longitudinally of the terminal pannel a distance equal to or slightly in excess of the longitudinal spacing of the terminals, and a single row of spaced perforations 16. This type of terminal is slightly disadvantageous in that when it is desired to "flash" an auxiliary device 17, the minimum length of time of such "flash" is the time necessary for the tape to move one longitudinal space. In the first described modification a "flash" can be produced in the auxiliary devices of such length only as is necessary for a perforation to pass into and out of registration with its terminal, which is only one-half or one-third of the longitudinal space, as shown in the drawings.

The series-connected terminals 13 are connected to the auxiliary device 12 by a wire 18 and such device is connected to the battery 7 by a wire 19. The auxiliary device 17 is connected to its terminal 15 by a wire 20 and to the battery 7 by a wire 21.

For manufacturing purposes it may sometimes be desirable to make the terminals 15 of a series of small round contacts, such as the remaining contacts, and have such contacts in electrical series with each other and spaced apart a distance different than that of the perforations and preferably spaced lesser distance. By making such terminal 15 in this manner all of the terminals can be made by boring round holes thru the bot-

tom 2 and inserting the ends of the wires 9 therein, as is shown in Fig. 1.

I claim:

1. The combination with electric circuit controlling apparatus of the character described comprising a container adapted to hold a body of electrical conductive liquid constituting one common terminal of a plurality of electric circuits, and a plurality of terminals, one in each of such circuits, embedded in one wall of such container, a tape-like control element adapted to overliesuch latter terminals and separate them from such body of liquid, such control element being electrically non-conductive and perforated in predetermined pattern to uncover such embedded terminals when in registration therewith thus to make corresponding electric circuits thru such liquid body, of a plurality of auxiliary embedded terminals and registering perforations spaced apart a distance greater than their width lengthwise of such tape, such latter terminals and perforations being differently spaced, such terminals being connected in electric series to permit uninterrupted electrical connection when such perforations pass over such terminals.

2. The combination with electric circuit controlling apparatus of the character described comprising a container adapted to hold a body of electrical conductive liquid constituting one common terminal of a plurality of electric circuits, and a plurality of terminals, one in each of such circuits, embedded in one wall of such container, a tape-like control element adapted to overliesuch latter terminals and separate them from such body of liquid, such control element being electrically non-conductive and perforated in predetermined pattern to uncover such embedded terminals when in registration therewith thus to make corresponding electric circuits thru such liquid body, of a plurality of auxiliary embedded terminals and uniformly spaced registering perforations spaced a distance greater than their width lengthwise of such tape, such latter terminals and perforations being differently spaced and such terminals being connected in electrical series to permit uninterrupted electrical connection when such perforations pass over such terminals.

3. In electric circuit controlling apparatus, the combination with a pattern switch which controls a plurality of electric circuits having individual terminals located in such switch, which terminals are covered and uncovered by a common perforated interrupter element adapted to traverse a lineal path, such terminals and the perforations in the interrupter element being spaced at uniform intervals in the direction of such path to produce intermittent electrical flow thru such circuits when such in-

interrupter is moved into and out of registration with such terminals, of an auxiliary electric circuit provided with a plurality of terminals connected in electrical series adapted to be controlled by such interrupter and spaced in the direction of travel of such interrupter at intervals different than those of such perforations in such interrupter thereby to produce continuous flow thru such auxiliary circuit, such terminals and perforations being arranged so that at least one of such terminals is in registration with a perforation at all times.

4. In electric circuit controlling apparatus, the combination with a pattern switch which controls a plurality of electric circuits having individual terminals located in such switch, which terminals are covered and uncovered by a common perforated interrupter element adapted to traverse a lineal path, such terminals and the perforations in the interrupter element being spaced at uniform intervals in the direction of such path to produce intermittent electrical flow thru such circuits when such interrupter is moved into and out of registration with such terminals, of an auxiliary electric circuit provided with a plurality of terminals adapted to register with perforations arranged at one side of such interrupter element, connected in electrical series adapted to be controlled by such interrupter, and spaced in the direction of travel of such interrupter at intervals different than those of such perforations in such interrupter thereby to produce continuous flow thru such auxiliary circuit, such terminals and perforations being arranged so that at least one of such terminals is in registration with a perforation at all times.

5. In electric circuit controlling apparatus, the combination with a pattern switch which controls a plurality of electric circuits having individual terminals located in such switch, which terminals are covered and uncovered by a common perforated interrupter element adapted to traverse a lineal path, such terminals and the perforations in the interrupter element being spaced at uniform intervals in the direction of such path to produce intermittent electrical flow thru such circuits when such interrupter is moved into and out of registration with such terminals, of an auxiliary electric circuit provided with a plurality of terminals connected in electrical series adapted to be controlled by such interrupter and spaced relatively to produce continuous flow thru such auxiliary circuit, inasmuch as at least one of such terminals is in registration with a perforation at all times.

6. In electric circuit controlling apparatus, the combination with a pattern switch which controls a plurality of electric circuits having individual terminals located

in such switch, which terminals are covered and uncovered by a common perforated interrupter element adapted to traverse a lineal path, such terminals and the perforations in the interrupter element being spaced at uniform intervals in the direction of such path to produce intermittent electrical flow through such circuits when such interrupter is moved into and out of registration with such terminals, of an auxiliary electric circuit having a terminal also covered and uncovered by the perforations in such interrupter, such terminal being elongated in the direction of travel of such interrupter sufficient to span the uniform interval between adjacent perforations in the latter thereby to produce uniform flow thru such auxiliary circuit when alined with a series of perforations arranged at sufficient intervals.

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