

April 6, 1937.

A. WERTHEIMER

2,075,841

ELECTRIC ADVERTISING DEVICE

Filed March 8, 1935

2 Sheets-Sheet 1

Fig. 1

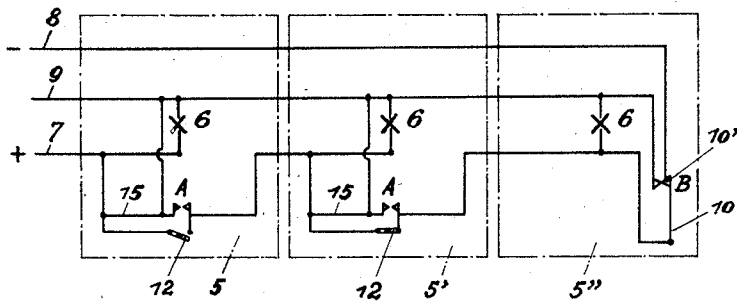


Fig. 2

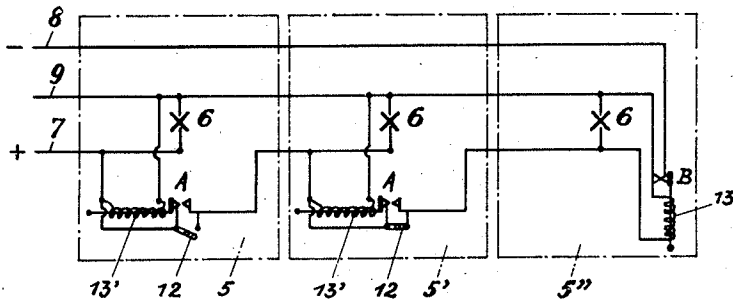
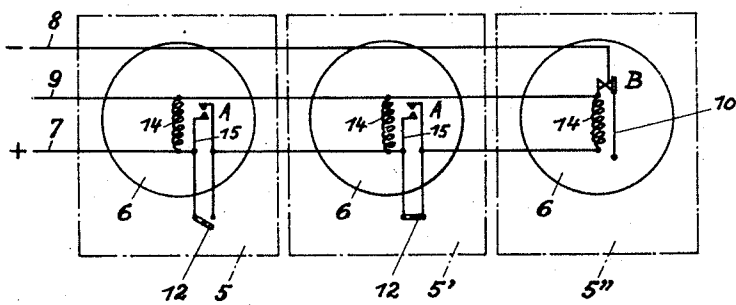


Fig. 3



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Fig. 4

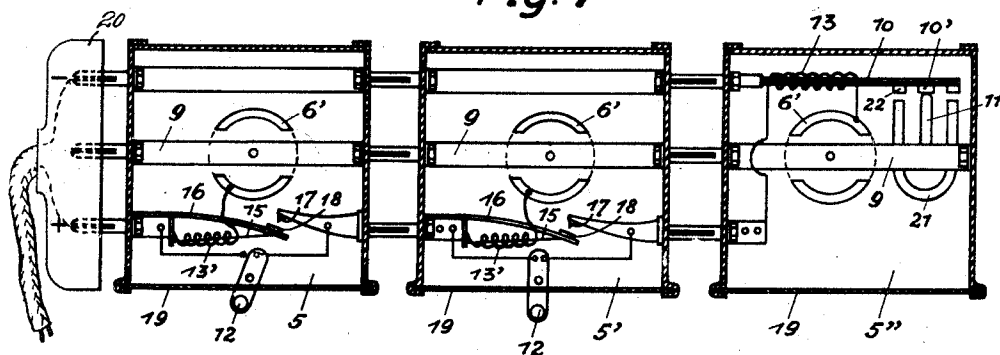
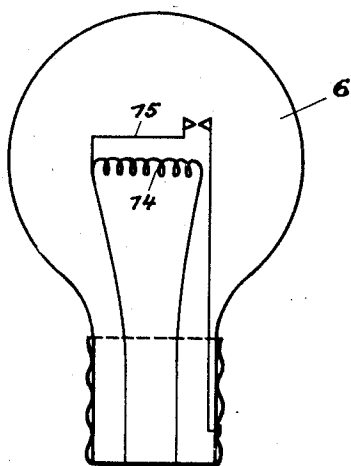


Fig. 5



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UNITED STATES PATENT OFFICE

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ELECTRIC ADVERTISING DEVICE

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7 Claims. (Cl. 177-346)

Electrical arrangements with moving letters are known which have light sources in separate transparent lamp casings and which are caused to light up automatically one after another by means of thermo-switches, but these are combined with more or less complicated and expensive time switches, such as switching clocks and the like, for cutting off and connecting the installation to the electricity supply. Such switching devices make the arrangement much more expensive and do not ensure reliable operation thereof.

In order to avoid the drawbacks of the known arrangements it is proposed, according to the invention, to connect one of the supply conductors through a thermo-switch in the last lamp casing by means of an auxiliary conductor with all the lamps in the casings in such a manner that all said lamps which are switched on successively from the first casing have current flowing through them until the thermo-switch in the last casing breaks the circuit. In this way a completely automatically and reliably operating switching device is obtained which, on account of its simplicity and easy assembly, is especially suitable for travelling light arrangements consisting of separate transportable lamp casings.

A further important feature of the invention consists in this that the thermo-switching arrangement of each lamp casing can be short-circuited by means of a hand switch. Thus the arrangement can be so adjusted that separate thermo-switches are switched on successively or a number of them are switched on together. In this way it becomes possible to have separate letters, syllables or complete inscriptions appearing successively. In this way the advertising value of an installation equipped with such a switching arrangement is considerably increased.

A further important feature of the invention consists in this that the thermo-switch belonging to each lamp casing may be incorporated in the lamp in such a manner that the thermostatic element is heated by the filament of the lamp. In this way the heating necessary for obtaining the switching is obtained in a very simple and economical manner. The thermoelement may, according to the invention, also be enclosed by a heating element carrying current and insulated from it.

The last feature of the invention consists in this that the thermostatic element, of the common cut-out switch is constructed as the armature of a permanent magnet so that the interruption of the main contact occurs suddenly

after the field of the permanent magnet has been overcome.

In the accompanying drawings:

Figures 1-3 are circuit diagrams of three arrangements according to the invention;

Figure 4 is a sectional view of a constructional example;

Figure 5 shows, on a larger scale, an incandescent lamp with a thermo-switch incorporated.

The installation consists of normal and end units which, in the constructional examples, are shown as lamp casings 5, 5', 5'' connected together by means of plug and socket contacts. Inside the lamp casings bulbs 6 are arranged which illuminate interchangeable transparent signs 19 inserted in front of the casings. The first lamp casing 5 is connected to the current supply, for example by means of a plug contact 20 (Fig. 4). From the source of current supply a conductor 8, for example the negative conductor, runs without interruption to the end casing 5'', where it is connected to a thermo-switch B which, in the normal or cold state, is closed and supplies current to an auxiliary conductor 9 acting as return lead, the conductor 9 being extended through the several normal units. One pole of the lamp 6 or the lamp-holder 6' is connected to this return lead 9 which is in the form of a bus-bar, while the other pole of the lamp is connected with the positive lead 7 of the current supply, and between these two connections there is interposed a thermo-switch A for the next switch. The thermo-switches A and B operate in a known manner by the heating of a thermostatic element, the expansion or contraction of which produces the necessary movement for switching. As shown in Figure 4, the thermo-switch B may consist of a bi-metal strip 10 which, in the cold state, bears with its contact 10' against the fixed contact piece 11 and is surrounded by a heating wire spiral 13 which is electrically insulated from the thermostat. The bimetal strip 10 may consist of a strip of iron alloy containing 25% nickel and 5% molybdenum and a second strip of iron alloy containing 35% nickel. Alternatively strips of brass and iron or of iron and chromium may be used.

The thermostatic element 10 of the switch B may, however, as shown in Fig. 1, be heated directly by the current passing through it, in which case said element must be of high resistance.

The electrical heating of the thermo-switch A also may in the new installation be carried out in various ways. In Figure 1 the thermo-

static element 15 is of high resistance and forms the current conductor so that it is directly heated. In Figures 2 and 4 there is placed around the thermostatic element 15, which consists of example of a wire, a heating wire spiral 13' insulated therefrom, whereby the heating of the thermostatic element is effected indirectly. In such instance, the thermostatic element may be of low resistance. The wire 15, as shown in Figure 4, may be rigidly fixed in the casing at one end and may engage at its other end with the leaf spring 16 carrying a contact 18 in such a manner that in the cold state the contact 18 is lifted from the fixed contact 17. In Figures 3 and 5 the thermo-switches A and B are arranged in the lamps 6, whereby the thermostatic elements 10 and 15 are directly heated by the incandescent filaments 14 of the lamps.

The mode of operation of the new device is as follows: On account of the circuit being closed by the thermo-switch B when cold, the lamp in the first casing 5 is caused to light up and at the same time the corresponding thermo-switch A is heated, whereby its thermoelement 15 expands and after a definite interval of time causes the contacts 17, 18 (Figure 4) to be closed. The lamp in the second casing 5' is thereby switched on and at the same time its thermo-switch A is heated, which in its turn closes the circuit for the lamp in the third casing which, in the example illustrated, is the end casing 5''. On account of the heating of the thermo-switch B, the thermostatic element 10 thereof, after a predetermined time, opens the contacts 10' and 11. The result is that all the lamps are extinguished at once. The thermostatic elements 10 and 15 then cool, whereby the latter opens the switches in the normal units, while the former closes the switch of the end unit, whereupon the operation begins again. In order to make the contacts 10' and 11 separate suddenly, the bi-metal strip 10 (in the closed position) is acted upon by a strong permanent magnetic field produced by a horseshoe magnet 21, the pole of which acts on an armature 22 on the bi-metal strip 10. Only when the bending force, due to the heating of the bi-metal strip 10, becomes sufficiently great to overcome the force of the magnetic field, are the contacts 10', 11 become suddenly separated so as to instantaneously interrupt the current for all the lamps.

In the arrangement shown in Fig. 1 each current conducting thermostatic element 15 is connected in parallel with the related lamp 6 and in Fig. 2 the heating coil 13' of the thermostatic switch A is also connected in parallel with the related lamp 6 and in each of these arrangements operation is not, therefore, interrupted in case of any one or several of the lamps 6 burning out.

By means of a hand-switch, for example in the form of a switch lever 12, the switching device A for any normal unit can be short-circuited (see the position of the switch in the middle casing 5' in Figures 1-4).

In this way the installation can be rapidly and conveniently adjusted so that separate units are switched on successively or several units are switched on simultaneously.

In the arrangement shown in Fig. 4, the heating coil 13' is connected in series with the related lamp holder 6' in each normal unit and in the case of the lamp becoming inoperative, the switch 12 of that unit may be closed so as to

maintain the remaining normal units in operation.

Obviously the invention is not restricted to the constructional examples illustrated. Thus, for example, the change-over switch 12 may also be so constructed that its switch lever does not bridge over the contacts but separates them so that when the switch lever is swung out of the way the contacts will short-circuit due to the spring action.

What I claim is:

1. In a display lighting system for two or more lamps each having the usual terminals; a common wire connection between one terminal of each lamp; a normally closed thermostatic switch for the last lamp interposed in said connection toward the end thereof which is adapted to be continued to one pole of a current source; a normally opened thermostatic switch for each of the other lamps, and one of whose contacts is connected to the common conductor while the other contact is connected to the other terminal of the succeeding lamp, except the first lamp whose other terminal is adapted to be connected to the other pole of the current source; and means to operate each of the last mentioned thermostatic switches a predetermined time after energization of the corresponding lamp.

2. A display lighting system as claimed in claim 1 characterized by the provision of means to selectively short circuit each of the second mentioned thermostatic switches.

3. An electric sign unit comprising a support, two groups of three connectors each carried by said support engageable with connectors of a second unit, a lamp holder having two terminals, a conductor connecting one of said terminals with one connector of each of the two groups, a conductor mutually connecting one other connector of each of the two groups, a thermostatic switch interposed between the two remaining connectors, and a connection between the other terminal and one of the last mentioned connectors.

4. An electric sign unit as claimed in claim 3 characterized in that the connectors forming the respective groups are constituted by plug and socket members whereby two or more of said units may be quickly and conveniently connected.

5. An electric sign unit as claimed in claim 3 characterized by the provision of a manually operable switch for short circuiting said thermostatic switch.

6. An electric sign installation comprising a group of normal units and an end unit, each normal unit including a support, two groups of three connectors each carried by said support engageable with the connectors of an adjacent unit, a lamp holder having two terminals, a conductor connecting one of said terminals with one connector of each of the two groups, a conductor mutually connecting one other connector of each of the two groups, a thermostatic switch interposed between the two remaining connectors, and a connection between the other terminal and one of the last mentioned connectors, said end unit including a support, a group of three connectors engageable with the connectors of the last of the group of normal units, a lamp holder having two terminals, a connection between one of the last mentioned terminals and the connector to be connected with the connector of the last of the group of normal units to which the thermostatic

switch is connected, a normally closed thermostatic switch controlled by the current supplied to the last mentioned lamp holder and interposed between the other terminal of the latter and the connector of the end unit to be connected with the mutually connected connectors of the normal units, and a connection between the last mentioned terminal and the connector to be con-

nected to the mutually connected connectors.

7. An electric installation as claimed in claim 6 characterized by the provision of a manually operable switch on each of said normal units for short circuiting the thermostatic switch associated therewith.

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