April 17, 1934. R. S. V. WOOD 1,955,571

HIGH TENSION CUT-OUT

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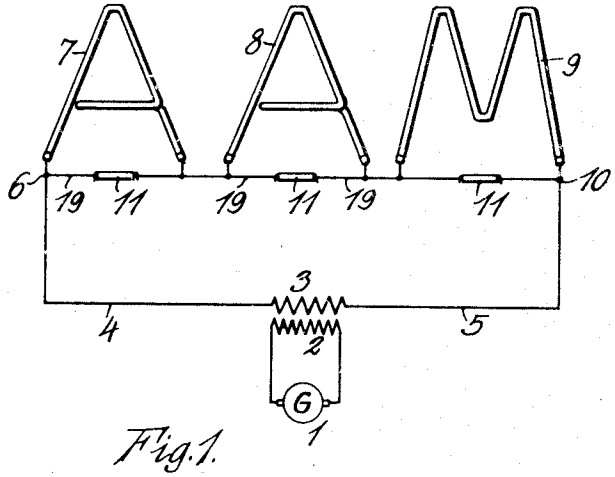


Fig. 1.

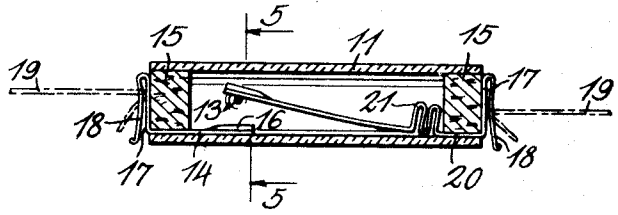


Fig. 2.

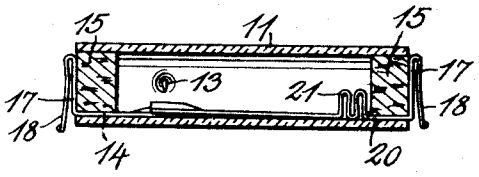


Fig. 3.

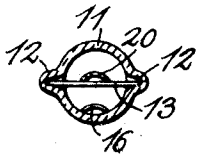


Fig. 4.

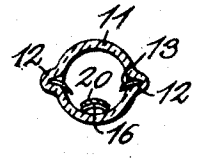


Fig. 5.

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HIGH TENSION CUT-OUT

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4 Claims. (Cl. 200—142)

This invention relates to improvements in vapor sign constructions and has reference more particularly to an electric circuit comprising a number of neon tubes in series and of a high potential cut-out is to be used in parallel with each of the sign sections.

It is well known that display signs for outdoor advertising are now using almost exclusively neon tubes for the production of light for illumination as such signs possess advantages that are not possessed by the ordinary incandescent lamp illuminated signs and can be operated at a greatly decreased expense.

Neon vapor tubes are operated on a high potential alternating current circuit and take comparatively small amounts of current, but the ordinary voltage employed in connection with such signs is fifteen thousand volts and therefore if a break occurs in the circuit, this high potential current may cause considerable damage and set fire to the signs and to the buildings to which they are connected, as well as destroy other sections of the vapor tubes.

When an ordinary neon sign comprising several sections, as, for example, several letters, each formed from a separate section of tubing and in which the sections are all connected in series, has a break occur in one of the sections, the entire sign goes out and the trouble man has considerable difficulty in determining which of the several sections is defective because since all the letters are connected in series, they will all go out when one becomes defective.

It is the object of this invention to produce a simple and efficient high potential cut-out that can be connected in parallel with each section and which shall be so constructed that as long as the section to which it is connected functions properly, the cut-out circuit will be held in open position, but if the section with which it is connected breaks or ceases to function properly, the voltage across the terminals of this section will immediately rise and will cause an arc to take place in the cut-out, thereby releasing a contact member which completes a circuit between the terminals, thereby permitting the remaining portions of the sign to function.

The transformers employed in connection with signs of this type are constructed with high potential and low current secondaries and the secondary winding is usually so designed that it has sufficient impedance to prevent it from burning out, even when the terminals are short circuited, and therefore in a sign composed of several sections or letters, all but one of the letters can be short circuited and the remaining letter will still be illuminated without any damage to it on account of the increased voltage.

In order to more clearly describe this invention, reference will be had to the accompanying drawing in which it has been illustrated, and in which:

Fig. 1 is a circuit diagram showing my combination applied to a neon sign;

Fig. 2 is a longitudinal section through one of the high potential cut-out devices showing the same in open circuit position;

Fig. 3 is a section similar to that shown in Fig. 2, but shows the cut-out in closed circuit position, as it appears after it has operated to short circuit one of the sign sections;

Fig. 4 is a section taken on line 4—4, Fig. 2, and shows the manner in which one of the contact members is held out of engagement with the other; and

Fig. 5 is a section similar to that in Fig. 4, but shows the parts in the position they assume after the fusible supporting member has been destroyed by heat.

In the drawing reference numeral 1 indicates a generator and reference numeral 2 the primary of a high tensioned transformer, while reference numeral 3 indicates the secondary of the transformer. Extending from the terminals of the secondary coil of the transformer are conductors 4 and 5.

Conductor 4 is connected to a terminal 6 at one end of an electric sign comprising the letters 7, 8 and 9, while the conductor 5 is connected to the terminal 10 at the other end of the sign. The several sign sections, which have been shown as comprising the three capital letters "A A M", are connected in series. Normally, the sign would operate in the manner shown without any means for short circuiting any of the letters in case that section of the tube or sign should break. In the ordinary way, if one of the sections becomes inoperative, all of the letters will immediately cease to function with the result that the sign becomes useless until it has been repaired, and owing to the fact that all of the letters are dark, the repair man must resort to an elaborate system of testing before he can find out which letter is defective. When a neon sign of the ordinary construction becomes defective, the high potential from the secondary winding will try to overcome the insulation and unless the parts are sufficiently insulated to resist the entire secondary voltage, it will jump across to some

other part of the sign and sometimes fires will be started in this manner, while at other times different sections of the sign will be ruined by the high potential thus released.

It is the object of this invention to connect in parallel with each sign section, a high potential cut-out device that will short circuit the section with which it is connected whenever the voltage across the terminal rises unduly, as it always does when the tube is injured so as to destroy the vacuum.

The construction of the cut-out device has been shown in Figs. 2, 3, 4 and 5 from which it will be seen that it consists of a tube of insulating material 11 which may be of glass or other insulating material, but which is preferably constructed of glass. The tube may have a length of about from two to three inches, although lengths in excess of this may be used. When the tube is made of glass, two diametrically located projections 12 are provided near one end and a short piece of readily fusible material 13 is placed with its ends in the recesses on the inside of the tube, as shown in Fig. 4. At one end of the tube a conductor 14 is provided. This conductor terminates approximately below the fusible element 13, as shown in Fig. 2 and is held in place by a plug 15, which may be of cork or other suitable material. The inner end of the conductor 14 is convex on its upper surface, as designated by reference numeral 16, while the other end is bent as shown in Fig. 2, so as to form two parallel sides 17 and 18 between which the ends of a conductor 19 can be placed. Extending inwardly from the other end of the tube, is a conductor having a straight portion 20 that is held in place by means of a plug 15. Directly inside of the plug, the conductor is preferably bent back and forth as indicated by reference numeral 21 so as to give it a spring effect, and this conductor then extends over onto the fusible member 13, and is supported on the latter as shown in Fig. 2. A conductor 19 extending from the other terminal of the tubular section is connected to the bent end portions 17 and 18 of conductor 20. It will be seen that when the parts are in the position shown in Fig. 2, there is a gap between conductors 16 and 20 and that therefore no current can flow through this bypass. If, however, the tube section 7 should spring a leak so as to destroy the vacuum, the amount of voltage necessary to send a current through the tube would immediately increase to such an extent that an arc would be set up between the two conductors located in the tube 11 and the heat from this arc would melt the fusible wire and permit the conductor 20 to snap down into contact with the convex end 16 of conductor 14, as shown in Figs. 3 and 4. A short circuit will now be established between the two terminals 6 and 6' and therefore the current will still flow through letters 8 and 9 and when the repair man arrives, he can immediately see which letter is out of commission.

It is evident that the cut-out functions in the same way regardless of which letter or section goes out of commission and that therefore only the defective section will be eliminated and therefore when a sign is equipped with this high potential cut-out it will continue to function except with respect to the defective section.

Having described the invention what is claimed as new is:

1. A high tension cut-out for use in short-circuiting, a high tension apparatus comprising in combination, a tubular member of insulating material, an electrical conductor extending inwardly from each end thereof, one of said conductors being resilient, the adjacent ends of the conductors overlapping, means at each end of the tube for attaching the conductors to the tube, the resilient conductor functioning as a means for urging the adjacent ends of the conductors into electrical engagement, and means for holding the conductors in spaced relation, said means comprising a link of fusible material extending transversely across the interior of the tube with its ends secured to the wall of the latter, the link serving as a support for one of the resilient conductors.

2. A high tension cut-out for use in short-circuiting, a high tension apparatus comprising, in combination, a tubular member of insulating material, an electrical conductor extending inwardly from each end thereof, one of said conductors being resilient, the adjacent ends of the conductors overlapping, means at each end of the tube for attaching the conductors to the tube, the resilient conductor functioning as a means for urging the adjacent ends of the conductors into electrical engagement, the inner surface of the tube having oppositely located depressions, and a link of readily fusible material having its ends located in the depressions, said link serving to support the resilient conductor out of engagement with the other in opposition to the resilient force tending to move them into engagement.

3. A high tension cut-out for use in short-circuiting, a high tension apparatus comprising, in combination, a tubular member of insulating material, an electrical conductor extending inwardly from each end thereof, one of said conductors being resilient, the adjacent ends of the conductors overlapping, means comprising removable plugs in the ends of the tube for attaching the conductors thereto, the resilient conductor functioning as a means for urging the adjacent ends of the conductors into electrical engagement, and means for holding the conductors in spaced relation, said means comprising a link of fusible material extending transversely across the interior of the tube with its ends secured to the wall of the latter, the link serving as a support for the resilient conductor.

4. A short circuiting device for the purpose described comprising, in combination, a tubular member of insulating material, an electrical conductor projecting inwardly into the tube from each end thereof, a removable plug at each end of the tube for holding the conductors in place, the ends of the conductors overlapping within the tube the upper conductor being resilient and biased towards the lower conductor, so as to normally hold the conductors in electrical contact, the ends of the conductors outside of the tube having means for making connection with electrical conductors, and a fusible link connected with the inside of the tubular member and with the resilient upper conductor to hold the latter in open circuit position and to permit it to move to circuit closing position when the fusible link melts.

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