Oct. 31, 1933. P. SCHOUWSTRA 1,933,344

CONNECTING DEVICE FOR ELECTRIC DISCHARGE TUBES

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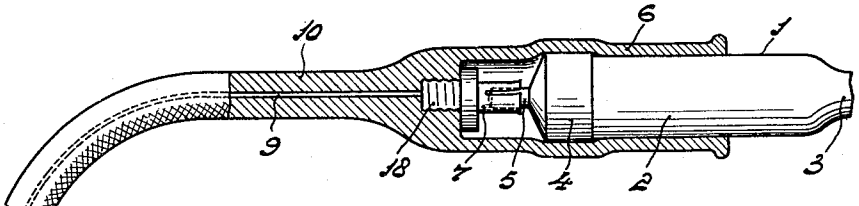
Fig. 1.



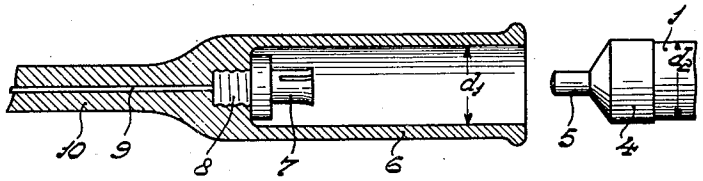


Fig. 2.

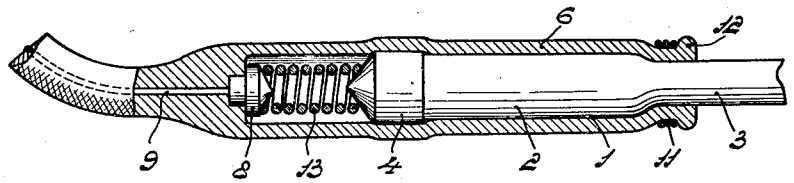


Fig. 3.

Inventor:
P. Schouwstra,

by
Lawyer, Parry, Card & Lawyer
Attys.

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UNITED STATES PATENT OFFICE

1,933,344

CONNECTING DEVICE FOR ELECTRIC DISCHARGE TUBES

Pieter Schouwstra, Eindhoven, Netherlands, assignor, by mesne assignments, to General Electric Company, a corporation of New York

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2 Claims. (Cl. 173—328)

The invention relates to electric discharge tubes and is of particular importance in the domain of discharge tubes destined for the radiation of light.

It is often dangerous to come into contact with parts of an electric discharge tube which are not enclosed in its wall or with the conductors whereby the current is supplied to the tube. Light radiating tubes, which are utilized on a large scale for advertising purposes, mostly operate at a high tension which sometimes amounts to some thousands of volts. If such tubes are not arranged in such manner that any possibility of touching them is excluded, it must not be omitted to take safety measures in order to avoid a contact with parts being under tension. This is a great drawback of the use of such tubes at points located within the reach of human hands such as shopwindows and other points where the use of transparencies or of luminous scrip is in place.

Another problem is the suitable attachment of the conductors to the tubes fed by them. The leading-in wires sealed into the wall of the tube often extend some distance outside the latter and in this case they are connected with the aid of simple connecting means to the feeders. In this case there exists the danger that such a supply wire breaks close to the glass wall so that the tube, although for the rest perfectly intact, becomes unfit for use.

The invention concerns a connecting device whereby the said two problems are simultaneously brought to a solution and which in other respect also affords advantages as may appear from the following specification.

In the device according to the invention, a current supply wire or a plurality of such wires is or are surrounded by an envelope which extends on part of the tube. This envelope may consist entirely or partly of an insulating material which serves as an insulation of the current supply wire and/or of parts of the tube which come under tension. To such a current supply wire may be secured an end-piece which is enclosed in the envelope and which, preferably by means of one or more resilient members, is electrically connected to a contact member secured to the tube.

In many cases it is advisable that the envelope should elastically close around the tube. At the ends where the leading-in wires are found the tube often has a widened portion. In this case it is very advantageous that the envelope should extend past this widened portion. Beyond this portion it may be contracted by means of a wire, thread or ribbon and preferably be clamped against the wall of the tube. in this case a boss provided at the end of the envelope prevents this wire or ribbon from sliding off the envelope.

In order that the invention may be more clearly understood and readily carried into effect it will be described more fully with reference to the accompanying drawing which represents, by way of example, some embodiments of a device according to the invention. In the drawing:

Figures 1 and 2 relate to the same construction, in Figure 1 a supply wire is connected to a tube and in Figure 2 both parts are separately represented.

Figure 3 represents another embodiment of the invention.

In the Figures 1 and 2 only the part 1 of an electric discharge tube is visible. This tube may, for example, be filled with dilute neon or other gas and may have the shape of a rod or be bent to a character or other sign. The part 2 is a chamber which contains an electrode. At 3 the tube passes into the luminous portion proper. The electrode, which is not represented, is electrically connected to a cap-shaped contact member 4 provided with a contact pin 5. On the part 2 of the tube may be slid an envelope 6. As appears from Figure 1, the contact pin 5 is inserted into a resilient bush 7 provided on an end-piece 8 which is embedded in the envelope and to which is secured a, preferably flexible, current supply wire 9. This wire is surrounded by an insulation 10 which is continued by a stocking-shaped envelope 6. The material of this insulation should preferably be elastic so that the stocking 6 elastically closes around the wall of the tube. This material may be constituted, for example, by rubber. The internal diameter d_1 of the stocking is so chosen as to be slightly smaller than the external diameter of the tube d_2 (Figure 2), owing to which not only a displacement of the contact pieces of the tube and of the wire relatively to one another is rendered difficult but also the additional advantage is obtained that penetration of moisture is avoided, the danger that in consequence thereof on the wall of the tube may be produced a conducting layer connected to the parts under tension, being thus eliminated.

An embodiment which satisfies still higher electric and mechanical requirements, is shown in Figure 3. In this construction the stocking-shaped envelope 6 extends as far as past the

widened portion 2 of the tube 1 and is constricted and pressed against the wall of the tube 3 by means of a tying-up wire or thread 11, which is prevented from sliding off the envelope by a boss 12 at the end of the envelope. A larger length of the tube is consequently protected while the mechanical connection of the tube and the envelope is proof against pulls exerted thereon. A helically wound spring 13 establishes the electric connection between the contact member 4 of the tube and the end-piece 8 of the current supply wire 9. If the insulating supply wire whereby the connection with a transformer or other source of current is established does not lead directly to the source of current, it may be provided at its other end with a contact device, owing to which it may be connected to a lengthening-piece which carries a device similar to the one described, an electrically and, if necessary, also mechanically protected coupling being thus obtained.

It will be evident that the invention is not only of importance for luminous tubes but can also be applied to other discharge tubes. Thus, for example, rectifiers whose anodes are sometimes enclosed in separate extensions may be provided with connecting means according to the above described principle, in which event the envelope extends on part of these extensions. Alternately, a plurality of contacts may be present in a single holder. Such is the case, for example, if the electrode in question is an incandescent cathode or if a plurality of electrodes are led out of the tube on the same side.

Discharge tubes provided with a device according to the invention, have at their surface no parts being under tension and they may consequently be constructed in such manner that coming into contact with them is under all conditions without any danger, particular safety measures being consequently made superfluous. The construction according to the invention affords the additional great advantage that the tubes may be given almost any desired position with respect to the source of current and that this position can be altered at will without any necessity of making alterations in the installation.

What I claim is:

1. A connecting device for an electric discharge tube having portions of different sizes, the device comprising a cable comprised of at least one current supply wire surrounded by insulating material, said insulation extending beyond the portion of the tube of larger size as far as the portion of smaller size, and an electrical contact member between said supply wire and an electrode of said tube, said member being permanently connected to said wire and detachably connected to said electrode.

2. A connecting device for an electric discharge tube having a widened end portion, the device comprising a cable comprised of at least one current supply wire surrounded by insulating material, said insulation resiliently closing around and extending past said widened end portion, means for constricting said insulation beyond said widened portion, and a boss at the end of said insulation for preventing said constricting means from sliding off.

PIETER SCHOUWSTRA.