Sept. 4, 1923. 1,467,187

F. J. METZGER

LUMINESCENT TUBE

Filed Aug. 6, 1921

Fig. 1.

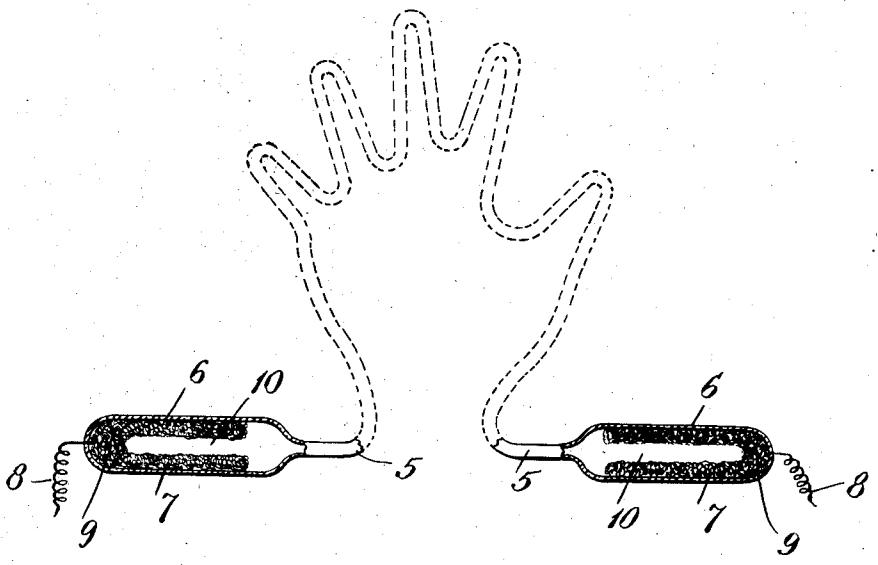


Fig. 2.

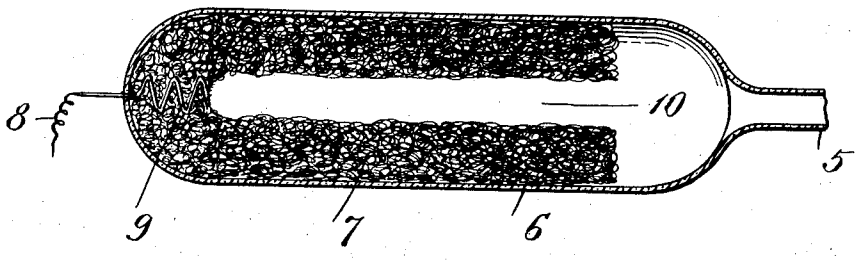
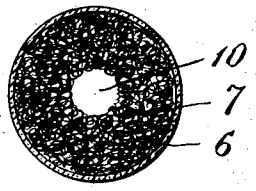


Fig. 3.



Floyd J. Metzger INVENTOR

BY

Pennie Davis Marvin & Edmonds

ATTORNEYS

Patented Sept. 4, 1923.

1,467,187

UNITED STATES PATENT OFFICE.

FLOYD J. METZGER, OF NEW YORK, N. Y., ASSIGNOR TO AIR REDUCTION COMPANY, INCORPORATED, A CORPORATION OF NEW YORK.

LUMINESCENT TUBE.

Application filed August 6, 1921. Serial No. 490,428.

To all whom it may concern:

Be it known that I, FLOYD J. METZGER, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Luminescent Tubes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to luminescent tubes wherein an electrical discharge passes through an atmosphere preferably rarefied and consisting, for example, of neon, helium or other gaseous medium which is thereby caused to glow.

Such tubes have been made heretofore with electrodes disposed therein or with conductive coatings disposed either internally or externally upon the walls of the tube. Electrodes are relatively unsatisfactory owing to the frequent breakage of the connecting wire resulting from vibration of the electrodes. This difficulty is in part eliminated by supporting the electrodes within the tube by means of glass beads or the like but at additional expense. Metallic or other conducting coatings are more satisfactory though difficult to apply uniformly and relatively expensive.

It is the object of the present invention to simplify and cheapen the manufacture of luminescent tubes and to provide at the same time a more satisfactory and durable conducting medium in the tubes which are thus more readily available for general signaling purposes for which they are otherwise well adapted.

Further objects and advantages of the invention will be apparent as it is better understood by reference to the following specification and accompanying drawing, in which—

Fig. 1 is a view in elevation of a luminescent tube embodying the invention.

Fig. 2 is a longitudinal section through one end of the tube, and

Fig. 3 is a section on the line 3—3 of Fig. 2.

In conducting extensive studies of luminescent tubes containing neon, for example, it has been discovered that metal woool, e. g., ordinarily steel wool, may be employed advantageously to provide the conducting medium at the ends of such tubes. Preferably the metal wool is sealed within the ends of the tube and is connected to metallic conductors which pass through the ends of the tube. The metal wool, being relatively light, and supported by contact with the walls of the tube, does not vibrate when the tube is subjected to shock so that there is no danger of breaking the electrical connection. It furnishes, moreover, an extended dispersion surface which ensures the maximum discharge through the tube. By the use of metal wool, the cost of manufacture of tubes is greatly reduced because it may be readily inserted in the ends of the tube before sealing. The difficulties attending the deposit of metal coating, electrolytically or otherwise, uniformly on the interior surface of the tubes is thus avoided.

Preferably the plugs of metal wool are formed, prior to insertion in the tubes, over a thimble or core so that they are hollow. This increases the amount of discharge surface exposed and consequently the efficiency of the conducting medium, though tubes may be satisfactorily made with plugs of metal wool which are not cored. In either case, the conductors which pass through the wall of the tube are preferably bent and entangled in the metal wool so that disengagement is prevented.

Referring to the drawing, 5 indicates the tube which may be straight or of any suitable form and dimensions. It may be shaped in the outlines of letters or symbols for signalling purposes or in arbitrary outlines for similar or illuminating purposes. The ends 6 of the tube may be enlarged conveniently, particularly when the body of the tube is of small diameter, as is preferable. The ends 6 which are sealed contain plugs 7 of steel or other metal wool and conductors 8 are sealed through the end walls and are bent as at 9 and entangled in the metal wool. As hereinbefore noted, the plugs may be provided with central hollow spaces 10 extending substantially therethrough.

When such a tube is filled with neon, for example, at a suitable pressure, e. g., five to fifty millimeters of mercury, and the conductors are connected to a source of high tension electrical current, the tube will glow with a reddish-orange light. If other gases are used, the character and color of the light emitted will vary.

It will be observed that an advantage lies in the peculiar simplicity of the invention and particularly in the ease with which tubes can be assembled by relatively unskilled labor. The tubes are, moreover, durable and efficient, the metal wool being substantially unaffected by the passage of the current because heat generated is dispersed through the wall of the tube without subjecting it to excessive temperature, because the numerous threads of the metal wool contact with the wall at many points.

Various changes and modifications may be made within the scope of the accompanying claims without departing from the invention or sacrificing any of the advantages thereof.

I claim:

1. A luminescent tube wherein an electrical discharge passes between conducting surfaces, the surfaces comprising metal wool disposed in the ends of the tube and conductors sealed through the wall of the tube and engaging the metal wool.

2. A luminescent tube wherein an electrical discharge passes between conducting surfaces, comprising metal wool disposed in the ends of the tube and arranged adjacent the wall thereof with a hollow central space and conductors sealed through the wall of the tube and engaging the metal wool.

3. A luminescent tube wherein an electrical discharge passes between conducting surfaces, the surfaces comprising metal wool disposed in the ends of the tube and conductors sealed through the wall of the tube and entangled with the metal wool.

4. A luminescent tube wherein an electrical discharge passes between conducting surfaces, the surfaces comprising steel wool disposed in the ends of the tube and conductors sealed through the wall of the tube and engaging the metal wool.

5. A luminescent tube having conducting surfaces consisting of metal wool disposed at its ends.

In testimony whereof I affix my signature.

FLOYD J. METZGER.