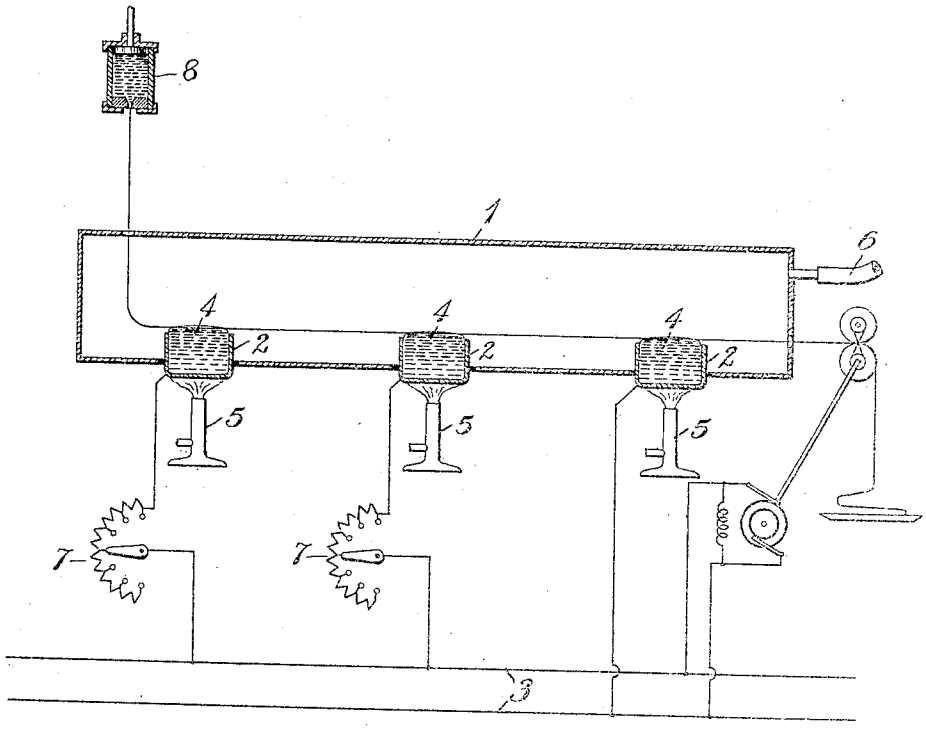
R. H. HENDERSON.

ELECTRICAL TERMINAL DEVICE.

APPLICATION FILED DEC. 5, 1910.

1,118,418.

Patented Nov. 24, 1914.



WITNESSES:

Fred. H. Miller

Otto J. Schairer.

INVENTOR

Robert H. Henderson

BY

Kirkpatrick

ATTORNEY

UNITED STATES PATENT OFFICE.

ROBERT H. HENDERSON, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO WESTINGHOUSE LAMP COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRICAL TERMINAL DEVICE.

1,118,418. Specification of Letters Patent. Patented Nov. 24, 1914.

Application filed December 5, 1910. Serial No. 595,632.

To all whom it may concern:

Be it known that I, ROBERT H. HENDERSON, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Electrical Terminal Devices, of which the following is a specification.

My invention relates to certain improvements in the method and means for treating or preparing filaments or wires for electric incandescent lamps composed more particularly of tungsten, tantalum, molybdenum, etc.

In an application for patent filed by Henry D. Madden and William G. Housekeeper, Serial No. 486,925, there is described a method of preparing filaments by forcing the filamentary paste through a die and gradually heating the resulting moving filament until it is completely formed, by passing different amounts of electric currents through successive portions thereof. In the apparatus there described the filament passes vertically through mercury contacts which serve to deliver the electric currents to successive sections.

My present invention aims to provide contacts of molten metal for delivering current to the successive portions, and to permit of a horizontal movement of the filament during the forming process for the double purpose of relieving the filament of strain to which the upper portion of the filament is subjected by the weight of the lower portion when in a vertical position, and also to provide heated terminals instead of cold terminals for the successive portions of the filament.

In the accompanying drawing, I have illustrated, more or less diagrammatically, an apparatus for carrying out the invention. This apparatus comprises a forming box, 1, containing a suitable inert or other atmosphere such, for instance, as an atmosphere of nitrogen. This may be supplied by forcing a continuous stream through the entrance 6. A plurality of separate alined terminal devices, 2, are arranged within the box or casing. These are shown as being all, except the last one of the series, electrically connected with a supply conductor, 3, constituting one side of an electric circuit. The last of the series is shown as being connected with the other side or return circuit. Adjustable resistances, 7, are shown for varying the potential which may be applied to the terminals.

Each terminal device consists of a comparatively shallow receptacle or hollow block containing a molten metal, 4, such for instance as tin, lead or other suitable conducting metal or material in molten condition. This material projects somewhat above the sides or tops of the receptacles and for this reason the material is preferably one which, when in liquid form, possesses a positive degree of capillary attraction. For instance, if molten tin is contained within the receptacles, they may be composed of iron or copper and their upper faces or edges may be tinned.

In order to maintain the metal 4 in a liquid or molten condition, the receptacles are heated by suitable means such, for instance, as gas flames that are directed thereon by means of burners 5. The receptacles are shown as projecting through the sides or bottom of the box so that the burners may be located externally to the box. Electrical means may be employed for heating the terminal devices and these may be located either within the forming box or outside thereof as desired.

The filamentary paste to be treated is passed from a suitable receptacle 8, through the forming box 1, over and in engagement with the molten liquid metal terminals, electric current being thereby conducted to and from the moving filament for the purpose of carbonizing and volatilizing its binder and sintering its particles together, or for other purposes. The filament either partially or wholly buries itself by weight in the liquid metal, but is maintained out of engagement with the solid portions of the terminal devices, so that there is little likelihood of its being broken during its treatment.

The heating of the molten terminals aids in the carbonization of the filament and also avoids the necessity of cooling the filament as it contacts therewith. Where mercury is used for the contact devices, the temperature of the filament will manifestly be lowered to practically atmospheric temperatures when passing across the contacts, because it is impossible to maintain the mercury in a highly heated condition. By the use of a molten metal, however, the temperature may be carried through the entire

process of treatment without successive chillings. This is important for several reasons. It has been found that by heating the metallic filament, such as tungsten, tantalum or molybdenum, especially during the last stages of its preparation to a very high temperature and then allowing it to gradually cool, a more durable and flexible structure can be obtained than by the ordinary process.

The present invention lends itself to such process in that it permits the filament to be heated to a high temperature throughout the entire length of its treatment without being chilled at intermediate points and allows it to proceed from the last contact in a heated condition instead of being chilled as would be the case with a mercury contact. In this way the filament is allowed to gradually cool after being heated to its high temperature which contributes to the improvement of the mechanical qualities of the filament.

I claim as my invention:

1. An electrical terminal device comprising a receptacle, a body of molten metal contained therein and projecting above its surface, and means for heating the said metal.

2. An electrical terminal device comprising a molten body of metal, a receptacle therefor for which the molten metal has a positive degree of capillary attraction and above which the molten metal projects, and means for heating the said metal.

3. The combination with a casing, of a receptacle within the casing, a molten metal contained in the receptacle and projecting above its sides, and means outside of the casing for heating the said metal.

4. In an apparatus for preparing and treating metallic filaments for incandescent electric lamps, the combination of a treating chamber, a horizontally arranged series of contacts therein, each contact comprising a receptacle for molten metal, means for heating the same and means for supplying a suitable atmosphere within the treating chamber.

In testimony whereof, I have hereunto subscribed my name this 23rd day of November 1910.

ROBERT H. HENDERSON

Witnesses:
OTTO S. SCHAIBER,
CHARLES E. KELLY.