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UNITED STATES PATENT OFFICE.

JOSEPH BRANIGAN, OF BLOOMFIELD, NEW JERSEY, ASSIGNEE TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

GLASS-WORKING MACHINE.

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To all whom it may concern:

Be it known that I, JOSEPH BRANIGAN, a citizen of the United States, residing at Bloomfield, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Glass-Working Machines, of which the following is a full, clear, concise, and exact description.

This invention relates to a glass working machine and more particularly it relates to a machine for sealing the electrode supporting stems of vacuum tubes to the external glass bulbs or envelopes.

In the manufacture of vacuum tubes, particularly of the type containing more than one electrode, it is a common expedient to insert the electrode supporting stem in the glass envelope through an opening provided therefor in a constricted portion of the envelope and then to seal the constricted portion of the envelope to the stem.

An object of this invention is to provide an improved apparatus for maintaining the envelope and the stem in the desired relation with respect to each other while the sealing is being made.

The apparatus provided according to the present invention comprises a rotatable shaft on which the electrode support may be mounted. A frame-work fastened to the shaft is provided for holding the bulb of the envelope by means of spring clips. In order to prevent the constricted portion of the envelope from undergoing axial oscillations while the shaft is rotating, a petticoat is provided on the shaft, which petticoat fits snugly in the constricted portion of the envelope. It is also preferable that openings be provided in the petticoat so that heat may pass readily therethrough to heat the lower portion of the stem, since it has been found that better results are obtained by applying heat to both the stem and the glass envelope in order to seal them together.

This invention will be better understood by reference to the following detailed description taken in connection with the accompanying drawings, in which Fig. 1 represents the preferred form of this invention; Fig. 2 is a longitudinal section of a portion thereof and Fig. 3 is a cross-sectional view of a portion thereof.

Referring more particularly to Figure 1, 5 is a rotatable shaft which is supported by a movable arm 6, only a portion of which is shown. Cog-wheels 8 and 9 are provided at the lower end of the shaft for rotating the same. Frictionally attached to a portion of the rotatable shaft 5 is the electrode support 11, the flare portion 13 of which fits snugly over the end of the shaft. It is preferable that the upper end of the shaft 5 be hollow so that the lead-in wires 13 may be inserted therein. The glass envelope 15 is held in place by a plurality of spring clips 16, 17, 18, which are fastened to a circumferentially incomplete member 20, which is attached to the rotatable shaft 5 by means of rods 21 and 22. 19 is a petticoat mounted on the shaft 5 such a size that it fits snugly within the constricted portion of envelope 15 and prevents any lateral motion thereof when the shaft is rotated. It is preferable that this petticoat 19 be provided with openings or slots through which heat may readily pass to reach electrode support 11. 23 is a suitable flame for heating the constricted portion of the envelope 15 so that it will collapse and become sealed to the flared portion 12 of the electrode support. Since it has been found that a better seal is made by the direct heating of the flared portion 12 as well as the glass wall of the envelope 15, an additional flame 25 is provided, the heat from which passes up through the openings in petticoat 19 to the flared portion 12. It is not essential that flame 23 be applied to envelope 15 at the same time flame 25 is applied to heat the flared portion 12. In fact it has been found preferable to apply the direct heat for the flared portion 12 prior to the heating of the envelope 15. This successive heating may be accomplished by turning on the gas for flame 23 after flame 25 has been applied for a definite length of time, or flames 23 and 25 may be spaced so that the rotatable shaft 5 may be successively brought near the two flames by the movement of arm 6.

Fig. 2 is a longitudinal sectional view of the envelope, electrode support and shaft. Reference characters applied in this figure refer to the similar parts in Fig. 1.

The cross-sectional view shown in Fig. 3 may be readily understood by referring to the detailed description given above for Fig. 1.
It is obvious that this invention is not limited to the particular form described above, but it may be variously modified without departing in any wise from the spirit of this invention as defined in the appended claims.

What is claimed is:

1. A machine for sealing a stem in a bulb comprising a support for the stem, a support for the bulb, means mounted on said support for the stem, and surrounded by the bulb for maintaining the bulb in the desired relation to the stem, said means having a discontinuous surface whereby heat may be applied to the stem.

2. A machine for sealing an electrode support in a glass envelope comprising a shaft, means for temporarily attaching said support to said shaft, means supported by said shaft for holding said envelope over and around said electrode support, and means comprising a fluted petticoat on said shaft for steadily said envelope when said shaft is rotating.

3. A machine for sealing in an electrode support in an elongated envelope comprising a rotatable shaft, means for frictionally mounting said electrode support on the end of said shaft, means comprising spring clips supported by said shaft for supporting said envelope, and a petticoat on said shaft, a portion of said envelope surrounding said petticoat.

4. A machine for sealing an electrode support in an elongated envelope having an opening in a restricted portion thereof, comprising a rotatable shaft, said electrode support being frictionally mounted on said shaft, means comprising spring clips supported by said shaft for holding said envelope over and around said electrode support, and a petticoat on said shaft, said petticoat being snugly into the opening of said envelope whereby said envelope is steadied when said shaft is rotating, said petticoat having openings therethrough whereby heat may be supplied to said electrode support through the openings in said petticoat.

5. A machine for sealing an electrode support in a glass envelope comprising a rotatable shaft, said electrode support being frictionally attached to an end of said shaft, spring clips supported by said shaft for holding said envelope over and around said electrode support, means for heating said envelope and means for heating a portion of said electrode support.

In witness whereof, I have set my hand this 22 day of September, 1908.

JOSEPH BRANIGAN.