Feb. 6, 1934. J. D. BRUMLEY 1,945,769

METHOD OF SEALING OFF

Filed Feb. 14, 1930

Fig. 1.

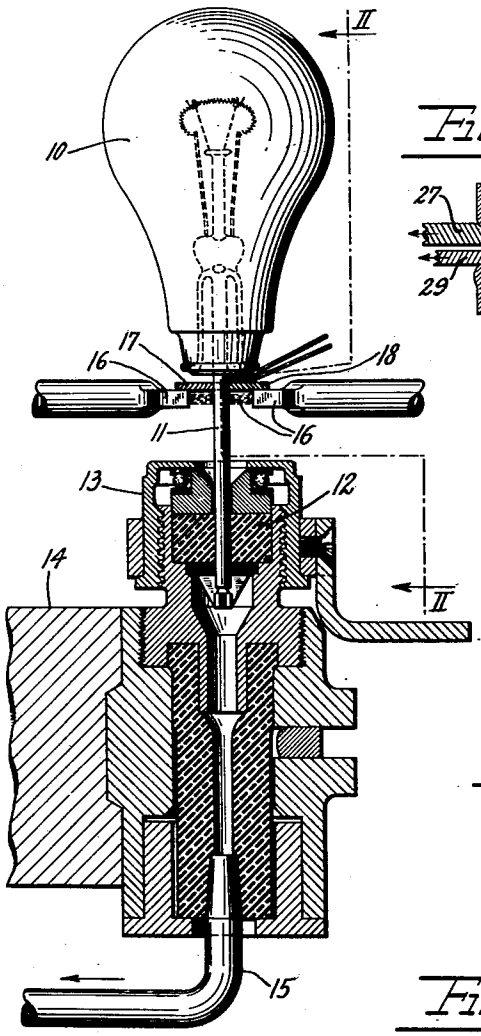


Fig. 2.

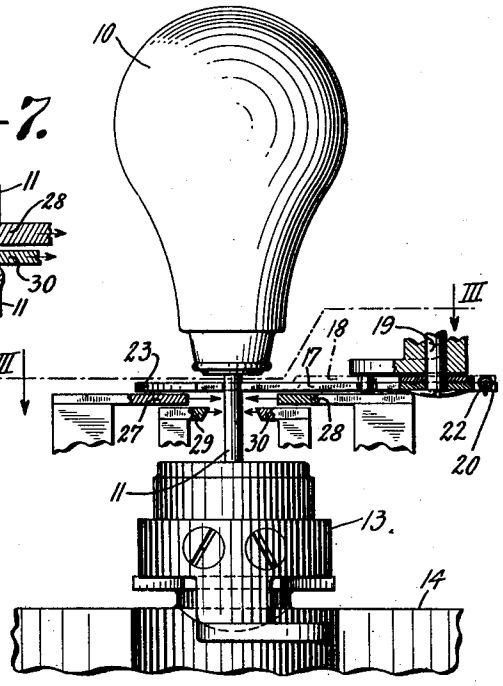


Fig. 7.

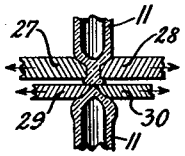


Fig. 3.

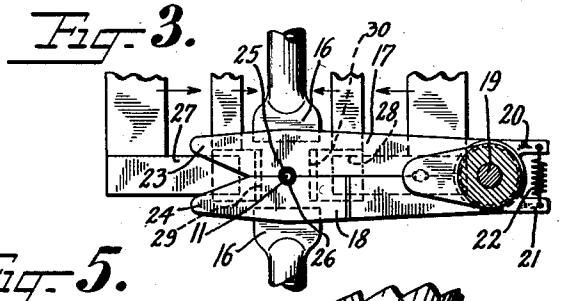
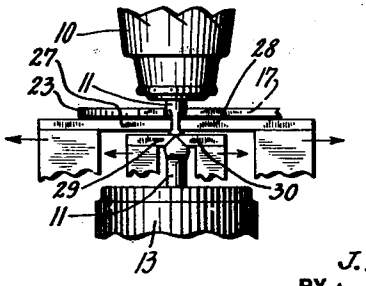


Fig. 5.



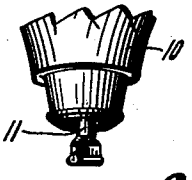


Fig. 6.

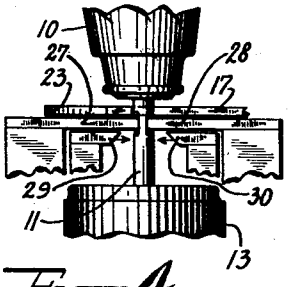


Fig. 4.

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METHOD OF SEALING OFF

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Application February 14, 1930. Serial No. 428,311

5 Claims. (Cl. 176—2)

This invention relates to the manufacture of incandescent lamps or similar evacuated devices which are exhausted through a tubular extension communicating with the interior of the bulb of the lamp and relates more particularly to a method of heating the tubular extension and closing the wall thereof to hermetically seal a bulb.

In the manufacture of incandescent lamps, radio tubes or similar evacuated devices the bulbs when provided with their internal structure include an exhaust tube which extends from the bulb and communicates with the interior thereof for an exhausting operation.

The exhaust tube is inserted into a port of an exhaust machine and it has been the practice to apply heat to the exhaust tube at a point adjacent to the bulb neck until the tube has been rendered plastic. By reason of the softening of the glass tube the same collapses under atmospheric pressure and the bulb is moved upwardly to cause the plastic portion to contract and provide a seal. Fires are employed to complete the softening operation and separate the portion of the tube connected with the bulb from the remaining portion of the exhaust tube which is held in the exhaust port and subsequently removed. The operation of sealing off the exhaust tube, which is termed a "tipping-off" operation, when performed in the manner above described, requires an appreciable amount of time.

The manufacture of incandescent lamps has undergone rapid development in its various phases and the greater number of the operations are performed at high speed.

The tipping off operation, however, which was relatively slow tended to retard high speed production since it was not possible to tip off, in the manner heretofore employed, at a rate of speed commensurate with the rapidity of other operations as for example the exhausting operation.

It is an object of the present invention, therefore, to provide a method of performing a tipping off operation in a rapid and effective manner.

Another object of the invention is to provide apparatus and method for accelerating the tipping off operation in connection with evacuated devices.

Another object of the invention is to provide a method of mechanically closing and substantially simultaneously separating an exhaust tube from an evacuated device.

Other objects and advantages of the invention will be apparent from the following description together with the accompanying drawing in which,

Fig. 1 is a side elevational view of an incandescent lamp having an exhaust tube disposed in an exhaust port of an exhaust machine, said exhaust port being shown in cross section.

Fig. 2 is a view taken on line II—II in Fig. 1 but showing the exhaust port in full lines.

Fig. 3 is a view taken on line III—III in Fig. 2.

Fig. 4 is a fragmentary view showing jaws for compressing an exhaust tube to close the passage therethrough.

Fig. 5 is a view similar to Fig. 4 but showing jaws for shearing the closed portion of the exhaust tube.

Fig. 6 is a fragmentary view showing the exhaust tube after the tipping off operation has been performed and

Fig. 7 is a fragmentary detail view showing a modification of the form of presser jaws for shaping the compressed portion of an exhaust tube.

In the selected embodiment of the invention an incandescent lamp 10 is shown having an exhaust tube 11 inserted in exhaust rubber 12 of a head or exhaust port 13. The head 13 is carried on a conveyor 14 and connected through a vacuum line 15 to suitable vacuum pumps (not shown).

Apparatus for exhausting the lamp bulb is well known in the lamp art and mechanism therefor has not been illustrated.

A bulb 10 may be positioned in the exhaust port and evacuated and then heated until plastic by suitable means as for example, gas fires 16. A pair of spring fingers 17 and 18 may be employed to grip the exhaust tube 11 to hold the bulb after the tipping off operation. These fingers may be mounted on a pivot 19 and may have short extending arms 20 and 21 connected by a spring 22 so as to normally cause the jaws to close. Ends 23 and 24 of the jaws may be formed to provide a flared or V-shaped portion to guide an exhaust tube to position to be gripped by notches or recesses 25 and 26 provided on the jaw faces.

A pair of presser jaws 27 and 28 may be moved to compress the plastic wall and close the passage through the tube. After the presser jaws have closed the tube wall and while the compressed portion is still plastic shearing members 29 and 30 may be moved to shear the compressed portion and more completely close the passage through the tube and consequently sever the bulb from the greater or excess portion of the exhaust tube which remains in the exhaust port and is subsequently removed by a tube puller or other device not shown.

When practicing the present method a lamp having its exhaust tube inserted in an exhaust port is moved to position between suitable fires which soften a portion of the exhaust tube. The lamp is then moved to position between presser and shearing jaws 27, 28 and 29, 30 respectively. These jaws operate substantially simultaneously and as the plastic portion of the tube is compressed by the presser jaws the shearing jaws sever the tube thus closing the passage and seal-

ing the bulb of the lamp from the atmosphere.

It will be obvious that if desirable the presser jaws 27 and 28 may be so formed as to give a particular shape to the compressed portion as for example these jaws may have partly concave or inclined faces to shape the compressed portion above the point of shearing, as shown in Fig. 7.

By reason of the above described method a tipping-off operation may be performed in a rapid and effective manner and at a greater rate of speed than was heretofore possible.

Although a preferred embodiment of the invention is shown and described herein, it will be understood that modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. The method of sealing an evacuated vitreous vessel having a tubular extension which comprises heating to render plastic a portion of said extension compressing the extended portion to close the passage therethrough and shearing said extension beyond the depression while said portion is still plastic.

2. A device for sealing-off an evacuated vitreous vessel having a communicating tubular extension, comprising means for heating to soften a portion of said extension, means for compressing said softened portion to close the passage through said extension and shearing members for dividing said extension at said compressed portion.

3. A device for sealing-off an evacuated vitreous vessel having a communicating tubular member, comprising means for rendering plastic a portion of said member, presser jaws for closing the passage through said extension at the softened portion and shearing members for severing said member.

4. The method of sealing-off an evacuated electric lamp bulb having an exhaust tube extending from the neck of the bulb which comprises heating to soften a portion of said tube in close proximity to said bulb neck while maintaining a vacuum in said bulb, compressing the softened portion to provide a solid mass as a closure for said bulb, creasing the exhaust tube between the mass and the extending portion of the tube and in severing the said extending portion of the tube at the creased portion.

5. The method of sealing-off an evacuated electric lamp bulb having an exhaust tube extending from the neck of the bulb which comprises heating to soften a portion of said tube in close proximity to the bulb neck while maintaining a vacuum in said bulb, compressing the softened portion to provide a solid mass as a closure for said bulb, reducing the transverse cross sectional area of the exhaust tube between the closure and the extending portion of the tube and in separating said extending portion from said mass at the portion of reduced cross sectional area.

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