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F. J. MALLOY ET AL

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METHOD OF AND APPARATUS FOR SEALING ELECTRIC LAMPS AND SIMILAR ARTICLES

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Fig. 2.

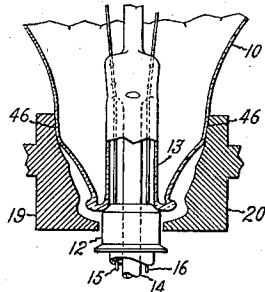


Fig. 3.

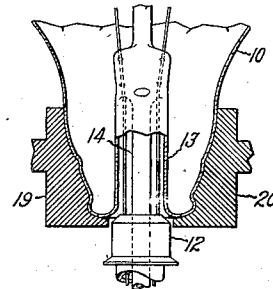
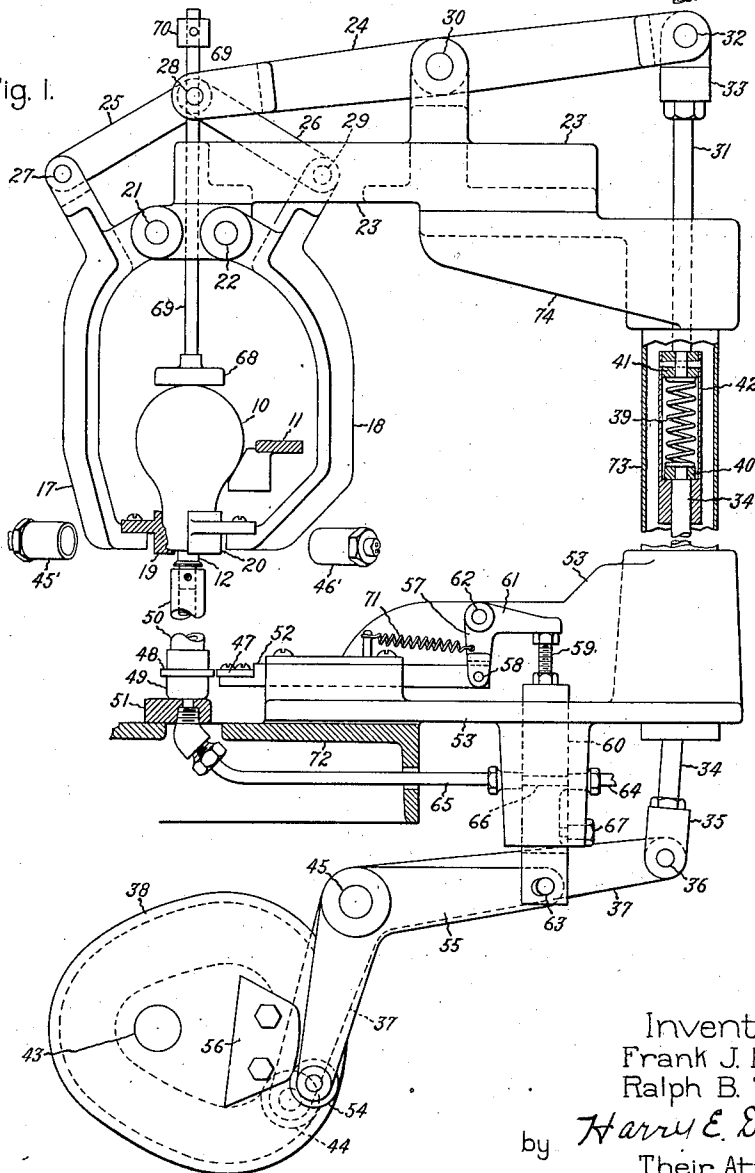


Fig. 1.



Inventors:  
Frank J. Malloy,  
Ralph B. Thomas,  
by *Harry E. Dunham*  
Their Attorney

## UNITED STATES PATENT OFFICE

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## METHOD OF AND APPARATUS FOR SEALING ELECTRIC LAMPS AND SIMILAR ARTICLES

Frank J. Malloy, Cleveland Heights, Ohio, and  
Ralph B. Thomas, Salem, Mass., assignors to  
General Electric Company, a corporation of  
New York

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6 Claims. (Cl. 49—78)

Our invention relates to the manufacture of electric lamps and similar devices and more particularly to methods and apparatus for shaping and otherwise completing the seal between the bulb and stem which constitute parts of such devices. In the manufacture of electric lamps and the like it has always been necessary to form or work the seal between bulb and stem by a so-called "pull down" operation. This operation consists in pulling down the stem a short distance after the seal is made and while it is still plastic. The pull down frees the seal from strains and makes it strong and serviceable.

The principal object of our invention is to shape the seal portion of an incandescent lamp or the like in such a manner as to accomplish the proper shaping and at the same time to secure the results formerly secured by the pull down. Another object of our invention is to form the seal of the device so that uniformity of shape is ensured for that part of the device which receives the base. One feature of our invention is the avoidance of strains which is secured by freeing the seal portion of the device from contact with the apparatus immediately following the completion of the aforesaid operation.

Other features and advantages of our invention will appear from the drawing and description which follows of one species thereof.

In the drawing Fig. 1 is a side elevation of the device of our invention for practicing our method of seal forming; and Figs. 2 and 3 are sections through the mold and the seal portion of a lamp before and after the forming operation.

Our device is preferably operated in conjunction with a sealing machine and in this way duplication of supporting, heating and driving means is avoided. A type of sealing machine with which this particular species of our device can be readily operated is disclosed in Patent 1,662,045 to Patterson, issued March 6, 1928. Our device is preferably located at the rest position of the sealing head occupied by the last sealing fires which keep the entire seal portion of the lamp in a plastic state. The rotation of the sealing head is stopped at this point. The lamp bulb 10, as shown in Fig. 1, is supported by the sealing head through the bulb holder 11 which engages three points on the bulb equidistant thereabout and through the hollow mount pin 12 which engages the base of the stem tube 13 of the mount as shown in Fig. 2. The protruding portions of the exhaust tube 14 and leading-in wires 15 and 16 are confined in the hollow interior of the mount pin 12. The device of our invention comprises a

pair of jaws 17 and 18 carrying half sections 19 and 20 respectively of a mold which is brought into engagement with the seal and neck portions of the bulb 10. The jaws 17 and 18 are mounted on pins 21 and 22 respectively in bracket 23 and are operated thereabout by lever 24 which is connected thereto through links 25 and 26 and pins 27—28 and 28—29. As the mold sections are carried into engagement with the bulb, lever 24 is turned about pin 30 in bracket 23 by rod 31 which connects thereto through pin 32 and block 33. The rod 31 is actuated indirectly by rod 34 which engages through block 35 and pin 36 the lever 37 actuated by cam 38. The connection between rod 31 and rod 34 is made through spring 39 which takes up the excess movement of rod 34 after the mold halves have come together. The spring 39 engages rod 34 through collar 40 and rod 31 through collar 41 which is also attached to sleeve 42. The sleeve surrounds the spring 39 and slidably engages the upper end of rod 34. Cam 38 is attached to the cam shaft 43 of the sealing machine and its ways are engaged by roller 44 of lever 37 which turns about a pin 45 in a stationary part of the machine not shown.

The mold, on closing, contacts the solid portion 46 of the neck of the bulb as shown in Fig. 2, causing the lower end thereof, heated by burners 45' and 46', to take a concentric position therein. The size of the hole in the mount pin 12 permits the exhaust tube 14 and the leading-in wires 15 and 16 to shift as required. The mount pin 12 is now dropped to the position shown in Fig. 3 by the removal of plate 47, the supporting means, from below the flange 48 on shoe 49. This movement is followed by a puff of air through exhaust tube 14 to the bulb which is blown out against the mold as shown in Fig. 3. A downward movement of the stem tube also results carrying it down lower in the mold as shown, but not against the mount pin. The mount pin 12 is fastened to spindle 50 to which the shoe 49 is also fastened and in all former positions was held in the up position by a plate or cam 51 which shoe 49 engages. When the sealing head has been moved into this position, the shoe 49 passes over a lower part of the cam 51 but the spindle 50 of the sealing head does not follow the cam as the flange 48 is caught and supported by plate 47. The plate 47 is mounted on slide 52 in bracket 53 and is moved indirectly by engagement of roller 54 on lever 55 with the block 56 attached to cam 38. The slide is attached to lever 57 by pin 58 and is moved when bolt 59 in piston 60 strikes arm 61 of said lever turning it about pin 62 in bracket

53. The piston 60 is attached to lever 55 by pin 63 and on reaching full up position produces the air puff by connecting pipes 64 and 65 by passage 66. Pipe 64 is connected to a source of air at pressure whereas pipe 65 is connected to an aperture in track 51 in alignment with the hollow interior of shoe 49 and spindle 50. The end of screw 67 engages ways cut in piston 60 keeping it from turning out of position. Since the bulb holder 11 only restricts downward movement of the bulb, a shoe 68 is caused to press upon the top of the bulb, holding it in place. The shoe is attached to rod 69 which is slidably mounted in bracket 23 and pin 28 and is caused to fall on the bulb by weight 70 when the end of lever 24 is lowered from engagement therewith.

After the molding operation, the sections of the mold are withdrawn by the return movement of their operating mechanism and the shoe 68 is lifted by lever 24 engaging weight 70 and lifting it. The plate 47 is returned to the in-position after the head is indexed by spring 71 which extends between lever 57 and a post in bracket 53. Most sections of our device are supported by bracket 53 which is attached to the table 72 of the sealing machine. Bracket 53 supports bracket 23 through tube 73 which is attached by bracket 74 to bracket 23.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. The method of sealing a bulb and stem tube together which consists in heating a portion of the neck of said bulb and the end portion of said tube until they are fused together to form a seal, in surrounding the said seal with a mold with its bottom portion separated from the bottom of said seal and then in blowing air into said bulb to force said seal against the said bottom portion of the mold and to move the stem tube longitudinally.

2. The method of shaping the seal portion of an assembly comprising a bulb and a stem tube having a portion of the neck of said bulb and the end portion of said tube fused together to form a seal which consists in heating the seal portion to a plastic state, in holding the bulb in a fixed position, in surrounding said seal portion with a mold with its bottom portion separated from the bottom of said seal and then in blowing air into said bulb to force said seal against the said bottom portion of the mold and to move the stem tube longitudinally.

3. The method of sealing a bulb and stem tube together which consists in holding a bulb in fixed

position, in supporting a stem tube within said bulb, in fusing a portion of the neck of said bulb and the end portion of said tube together to form a seal, in surrounding the seal portion of said assembly with a mold with its bottom portion separated from the bottom of said seal portion, in removing the support for said stem tube and then in blowing air into said bulb to force said seal against the said bottom portion of the mold and to move the stem tube longitudinally.

4. A device for forming a seal between a bulb and a stem tube which comprises means for supporting said bulb, a spindle located adjacent the aforesaid means for supporting the stem tube within said bulb, heating means positioned about said spindle for fusing portions of said bulb and stem together, shaping means having a portion thereof initially spaced from the seal thus formed, means for moving the spindle away from the stem tube and means for delivering air into said bulb to expand said fused portion against the said portion of said shaping means.

5. A device for forming a seal between a bulb and a stem tube which comprises a bulb holder for supporting said bulb, a spindle located adjacent the bulb holder for supporting the stem tube within said bulb, heating means positioned about the spindle for fusing portions of said bulb and stem tube together, a mold adapted to close about the fused portion of said bulb and stem tube with its bottom portion separated from the bottom of said seal portion, means for moving the spindle away from the stem tube and means for delivering air into said bulb to expand said fused portion against said mold.

6. A device for forming a seal between portions of a bulb and a stem tube which comprises a bulb holder for supporting said bulb, a spindle located adjacent the bulb holder for supporting the stem tube within said bulb, means engaging the spindle for supporting it in proper position with reference to the bulb, heating means positioned about the spindle for fusing portions of said bulb and stem tube together, a mold adapted to close about the fused portion of said bulb and stem tube with its bottom portion separated from the bottom of said seal, means for withdrawing the supporting means for the spindle causing the latter to move away from the stem tube and means for delivering air into said bulb to expand the fused portions against said mold.

FRANK J. MALLOY.  
RALPH B. THOMAS.