

July 23, 1940.

W. J. GEIGER ET AL

2,208,970

FILAMENT MOUNTING APPARATUS

Filed July 29, 1938

Fig 1.

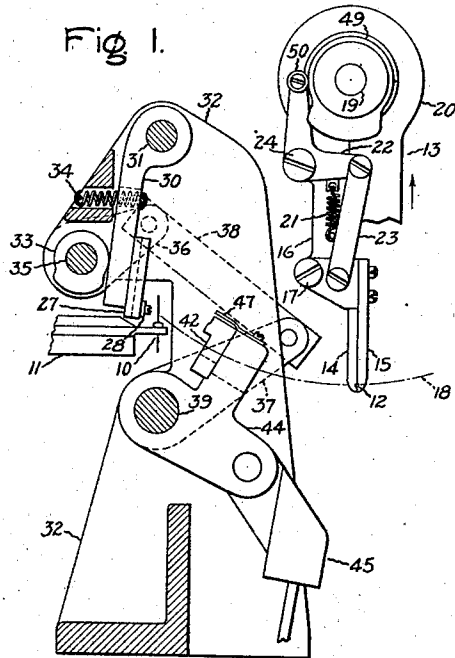


Fig 2.

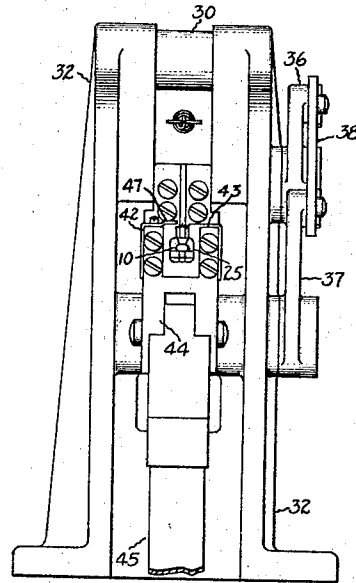


Fig 4.

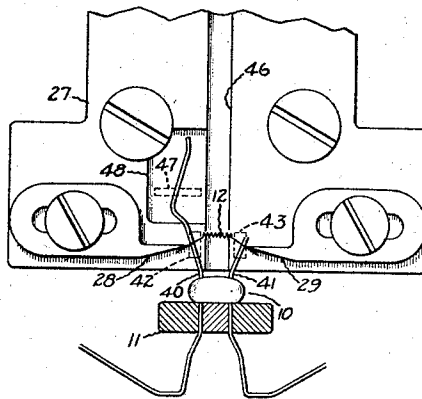


Fig 3.

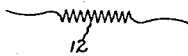
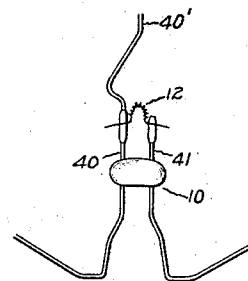


Fig 5.



Inventors:
Walter J. Geiger,
Reginald J. Ayres,
by *Harry C. Dunham*
Their Attorney.

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FILAMENT MOUNTING APPARATUS

Walter J. Geiger and Reginald J. Ayres, Cleveland Heights, Ohio, assignors to General Electric Company, a corporation of New York

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8 Claims. (Cl. 176—4)

Our invention relates to apparatus for mounting the filaments of electric lamps and other like devices, and more particularly to the automatic mounting of a filament in a definite relation to the lead wires of such a device.

According to present practice, the filament is usually transferred automatically into mounting relation with the leads of an incandescent lamp and there attached to said leads by welding the ends of the filament thereto or by pressing and embedding said ends into the leads or by forming hooks on the leads which are closed on the ends of the filament. In the manufacture of certain types of lamps, such as projection lamps, it is desirable that the filament be attached to the leads in predetermined relation thereto in order that the filament may have a definite relation to optical apparatus, such as lenses or reflectors, with which the lamp containing the filament is associated. To so locate the filament at the mounting position is difficult because of the small size of both the filament and the leads and the tendency of the ends of the coiled filament to curl. Since the filament is often reshaped after transfer and mounting, it is also desirable to partly form and position the ends thereof at an angle to the leads at mounting to avoid sharp bends in said ends at the final forming thereof which reduce their resistance to shocks.

An object of our invention is to provide relatively simple and efficient apparatus for positioning the ends of the filament at a definite point along the leads and for locating said filament ends angularly to the leads during the mounting of the filament. Other features and advantages of our invention will appear from the following description of a species thereof and from the accompanying drawing.

In the drawing, Fig. 1 is an elevation of a filament mounting apparatus embodying our invention; Fig. 2 is an elevation at right angles to Fig. 1 of the clamping portion of the apparatus showing the jaws in their closed position; Fig. 3 is a side view of the coiled filament prior to mounting; Fig. 4 is an elevation, on an enlarged scale, of a rear clamping jaw having positioning fingers thereon and showing the lamp mount prior to the fastening of the filament thereto; and Fig. 5 is an elevation, also on an enlarged scale, of the mount after the filament has been attached thereto and said mount and filament have been finally shaped.

The particular apparatus shown in the drawing is preferably embodied in mount-making

apparatus of the type disclosed in Illingworth Patent 1,733,831, issued October 29, 1929, and is located at the filament mounting station of the heads which carry the lamp mount from one operation to another. The mount 10, as shown in Fig. 1, is supported by the head 11, and the filament 12, which is preferably coiled at a position adjacent said head 11, is carried into mounting relation thereto by the transfer mechanism 13. The filament 12 is held by the jaws 14 and 15 of the transferring mechanism 13 which are attached to the arm 16 and are caused to grip said filament 12 by movement of the jaw 15 which is pivoted on the screw 17 extending from said arm 16. During the transferring movement of the mechanism 13 which carries the filament 12 along the path indicated by dot-dash line 18, the arm 16 turns about the axis of the shaft 19 which is supported by the bracket 20, partially shown, and the movable jaw 15 is caused to grip said filament 12 by the contracting force of the spring 21 which is connected to said jaw 15 through the lever 22 and the link 23. The lever 22 is pivoted on the screw 24 extending from the arm 16.

The movement of the filament 12 and the transfer jaws 14 and 15 carries them through the opening 25 (Fig. 2) in the clamping apparatus whereupon said clamping apparatus is placed in operation and the rear clamping jaw or anvil 27 and positioning fingers 28 and 29 on the front face thereof (Fig. 4) are carried into operative relation to the mount 10 before said filament 12 comes into engagement therewith. This movement of the anvil 27 and positioning fingers 28 and 29 is brought about by a pivotal movement of the arm 30, on which said anvil 27 is mounted, about the pin 31 in the standard 32 of the clamping apparatus and occurs when the rise portion of the cam 33 is turned into position behind said arm 30. The arm 30 is held against the cam 33 by the contracting force of the spring 34 which is located in apertures in the arm 30 and the standard 32 and which extends between pins engaging said arm 30 and standard 32. The cam 33 is mounted on the shaft 35 which is supported by the standard 32 and which is turned by another portion of the clamping apparatus connected thereto through the levers 36 and 37 and the link 38. Levers 36 and 37 are attached to shafts 35 and 39 respectively.

The filament 12, in this instance as shown in Fig. 3, is comprised of a center coiled section and end sections slightly curled and not necessarily aligned with the coiled section and is moved along

line 18 (Fig. 1) until the ends thereof are carried into engagement with the separated leads 40 and 41 of the mount 10 at a point just below the fingers 28 and 29. An upward movement of the entire transfer mechanism 13 now takes place and the ends of the filament 12 are carried into engagement with the fingers 28 and 29. This latter movement of the transfer mechanism is produced by means (not shown) engaging the bracket 20. The fingers 28 and 29 are located at opposite sides of the mount 10 and adjacent the leads 40 and 41 and engage the ends of the filament 12 while the midportion thereof is carried to a position above said fingers 28 and 29. Both the mount 10 and head 11 have a definite relation to each other so that the fingers 28 and 29 also take a definite relation to the leads 40 and 41. The movement of the center portion of the filament 12 upwardly beyond the fingers 28, 29, causes it to be bent upward and the ends thereof to change their angular relation to the leads 40 and 41 so that said filament 12 is partially formed into the inverted U-shape shown in Fig. 5 and desired in the finished article. This means of positioning the ends of the filament 12 has two desirable advantages in that it definitely locates the ends of said filament 12 even though said ends were originally curled or out of alignment with the coiled portion thereof, and it places the said ends at an angle to the leads 40 and 41 so that they do not have to be as sharply bent when the filament 12 is finally shaped.

The ends of the filament 12 are attached to the leads 40 and 41, in this instance, by the front clamping jaw comprising anvils 42 and 43 which are mounted on the lever 44 and are moved thereby toward the anvil 27 so that said leads and the filament ends are squeezed between said anvils 42, 43 and anvil 27. In this manner the ends of the filament 12 are pressed into said leads 40 and 41.

The lever 44 is mounted on the shaft 39 which indirectly causes the anvil 27 and the positioning fingers 28 and 29 to move in and out of position and is operated in proper time relation to the movements of the transferring mechanism 13 and the movements of the head 11 of the mount making machine by the customary cam operated mechanism (in this instance not shown) connected thereto through the link 45. The opening 25 between the anvils 42 and 43 and the groove 46 in the anvil 27 provides clearance for the transfer jaws 14 and 15. In the instance shown, lead 40 extends upward beyond the filament 12 and is located adjacent the finger 47 on the lever 44 and the recess 48 in anvil 27 as the pressing operation occurs. This extended portion of the lead 40, which bears a definite relation to the mount 10 and assists in locating said mount in the lamp bulb, is prevented from moving forward out of position by the finger 47. The recess 48 provides clearance for the upper portion of the lead 40.

The anvils 27, 42 and 43 are moved back away from the leads 40 and 41, and the transfer jaw 15 is moved to the open position, before the mount 10 and head 11 are removed from the mounting position. The movement of the jaw 15 is brought about by a rotation of the shaft 19 relatively to the arm 16 which carries the rise portion of cam 49 into engagement with the roller 50 on the end of lever 22 and is followed by the movement of the entire transferring apparatus to the filament pick-up position after the mount 10 is removed from the mounting position. Although the filament 12 is attached to the leads 40 and 41 by

pressing portions of said filament 12 therein, the apparatus can also be used to close preformed hooks in said leads 40 and 41 onto said filament 12 and, if a suitable source of welding current is supplied, to weld said filament 12 to said leads 40 and 41. In the instance shown, the filament 12 is finally formed and the lead 40 is finally positioned after being removed from the mounting position by the bending of the leads 40 and 41 toward each other. The filament 12 is then located a definite predetermined distance from the end 60 of the lead 40 which engages a definite portion of the bulb in which the mount is sealed to correctly locate the filament in accordance with the disclosure of Patent 1,983,362, W. J. Geiger et al. After the bending of the leads 40 and 41, the mount appears as in Fig. 5 which shows the bend that is made in the ends of the filament 12 when said filament 12 is mounted according to our invention. It is undesirable to bend the ends of the filament 12 more than shown, as was formerly required when the filament 12 was mounted straight across with its ends perpendicular to a pair of parallel leads.

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

1. In apparatus of the class described, the combination of means for supporting a lamp mount having leads extending therefrom in a definite direction, spaced opposed positioning fingers definitely located with respect to said support means so that each finger will be adjacent one of said leads, transfer mechanism for engaging a filament intermediate its ends and moving it into position adjacent to said mount so that the ends of said filament engage the leads and the said positioning fingers whereby said filament ends are definitely positioned along the leads, and means for securing the ends of the filament to said leads at said position while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

2. In apparatus of the class described, the combination of means for supporting a lamp mount having leads extending therefrom in a definite direction, spaced opposed positioning fingers definitely located with respect to said support means so that each finger will be adjacent one of said leads, transfer mechanism for engaging a filament intermediate its ends and moving it into position adjacent to said mount so that the ends of said filament engage the leads and the said positioning fingers whereby said filament ends are definitely positioned along the leads, and means for pressing the ends of the filament into said leads at said position to cause them to be secured thereto while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

3. In apparatus of the class described, the combination of movable means for supporting at a mounting position a lamp mount having leads extending therefrom in a definite direction, spaced opposed positioning fingers located adjacent the said mounting position and movable in and out of a definite relation to said support means and the leads of the mount located at said mounting position so that each finger may be positioned adjacent one of said leads, transfer mechanism for engaging a filament intermediate its ends and moving it into position adjacent to said mount to cause the ends of said filament to engage the leads and the positioning fingers at said position whereby said filament ends are definitely positioned along the leads, and means also at said mounting position for securing the ends

of the filament to said leads while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

4. In apparatus of the class described, the combination of means for supporting a lamp mount having a pair of leads extending therefrom in a definite direction, a pair of spaced opposed positioning fingers definitely located with respect to said support means and at opposite sides of the leads of a mount therein, transfer mechanism for engaging a filament intermediate its ends and moving it to a position between said fingers and in the plane passing through said leads to cause the ends of said filament to engage the leads and the said fingers, said transfer mechanism being arranged to further move the midportion of said filament in the said plane passing through the leads to arch it and cause the ends thereof retained by said fingers to be definitely positioned along said leads and angularly thereto, and means for securing the ends of the filament to said leads at said position while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

5. In apparatus of the class described, the combination of movable means for supporting at a mounting position a lamp mount having leads extending therefrom in a definite direction, an anvil located adjacent the said mounting position and movable in and out of operative relation to a portion of the leads of a mount located at said mounting position, spaced opposed positioning fingers mounted on said anvil and arranged to take a definite position with relation to said supporting means and said portions of the leads of said mount so that each finger will be adjacent one of said leads, transfer mechanism for engaging a filament intermediate its ends and moving it into position adjacent to said mount to cause the ends of said filament to engage said positioning fingers and said portions of the leads so that said filament ends are definitely positioned, and at least one other anvil located adjacent the said mounting position and arranged to move toward the first anvil to press the ends of the filament into the adjacent portions of the leads to attach them together while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

6. In apparatus of the class described, the combination of movable means for supporting at a mounting position a lamp mount having a pair of leads extending therefrom in a definite direction, a pair of spaced opposed positioning fingers located adjacent the said mounting position and movable in and out of a definite relation to said support means to be on opposite sides of the leads of a mount therein, transfer mechanism for engaging a filament intermediate its ends and moving it to a position between said fingers and in the plane passing through said leads to cause the ends of said filament to engage the said leads and fingers, said transfer mechanism being arranged to further move the filament in the said plane passing through the leads to arch it and cause the ends thereof retained by said fingers to be definitely positioned along said leads and angu-

larly thereto, and means for pressing the ends of the filament into said leads at said position to cause them to be secured thereto while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

7. In apparatus of the class described, the combination of means for supporting in a vertical position a lamp mount having a pair of leads extending upwardly in a definite direction, an upstanding rear clamping jaw located behind a mount in said support means, a pair of spaced laterally opposed positioning fingers mounted on the front face of said rear clamping jaw in definite relation to said mount supporting means and on opposite sides of the leads of a mount therein, transfer mechanism in front of said mount supporting means for gripping a filament at its middle and moving it to a position between said fingers and in the vertical plane passing through said leads to cause the ends of said filament to be brought under the ends of said fingers and in engagement with said leads, said transfer means being arranged to then move upward to arch the filament and cause the ends thereof retained under said fingers to be held across the leads at an angle to the horizontal, and a front clamping jaw arranged to be closed against said rear clamping jaw to clamp the leads and the ends of the filament therebetween to secure them together while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

8. In apparatus of the class described, the combination of means for supporting in a substantially vertical position a lamp mount having a pair of leads extending upwardly in a definite direction, a standard located adjacent said mount supporting means, a pair of clamping jaws pivotally mounted on said standard, one of said jaws being located to the rear of a mount in said supporting means and the other jaw being located in front of said mount, a pair of spaced laterally opposed positioning fingers mounted on the front face of said rear clamping jaw, transfer mechanism in front of said mount supporting means arranged to grip a filament at its middle and move it through an opening in said front clamping jaw toward the mount in said supporting means, means for moving said rear clamping jaw up to the said mount with the positioning fingers thereon on opposite sides of said mount closely adjacent its leads, the said filament being carried by said transfer mechanism to a position between said fingers with its ends under the ends of said fingers and in engagement with said leads, said transfer mechanism being arranged to then move upward to arch the filament and cause the ends thereof retained under said fingers to be held across the leads at an angle to the horizontal, said front clamping jaw being arranged to then close against said rear clamping jaw to clamp the contacting portions of said leads and filament therebetween to secure them together while said filament is held by said transfer mechanism in engagement with said leads and positioning fingers.

WALTER J. GEIGER.
REGINALD J. AYRES.