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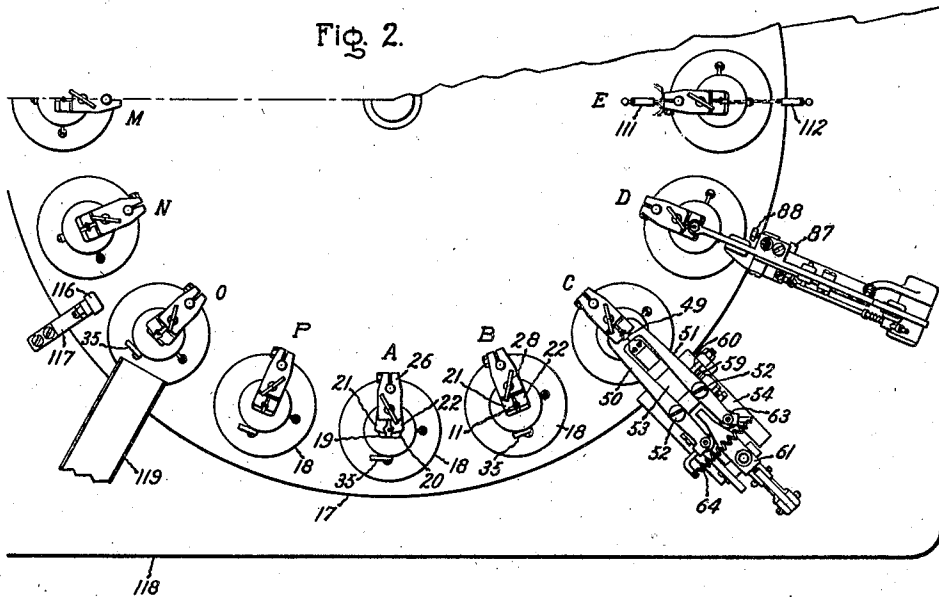
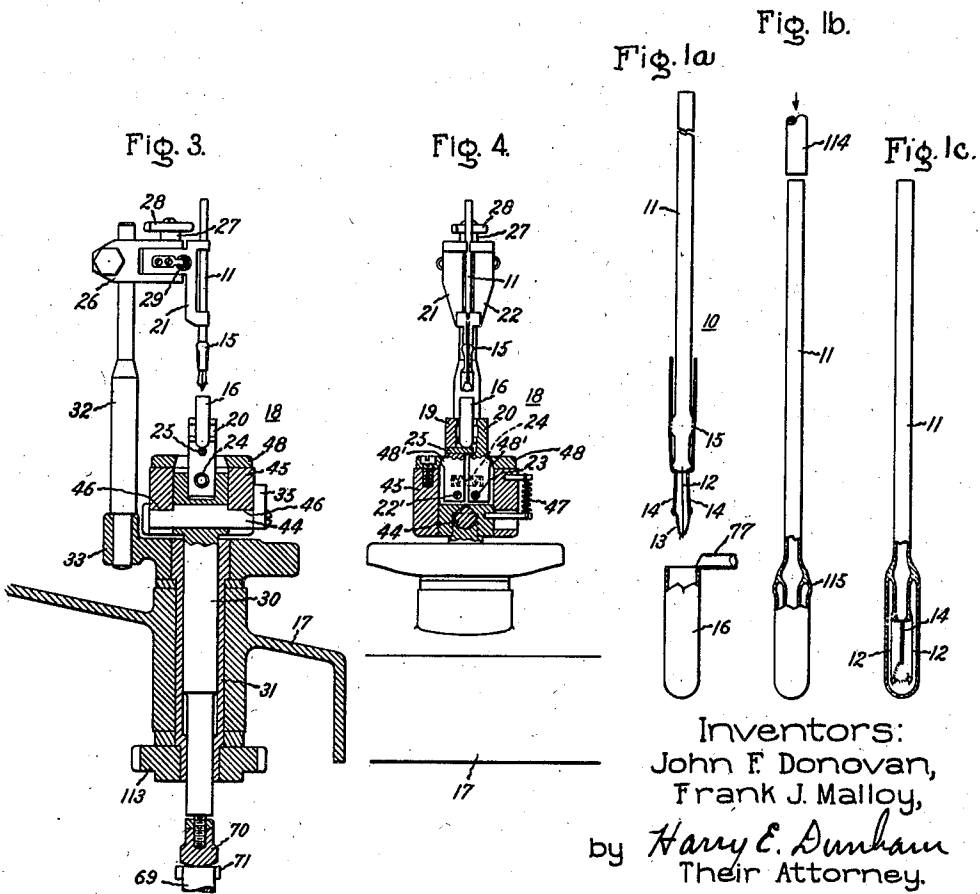
J. F. DONOVAN ET AL

2,153,370

APPARATUS FOR SEALING ELECTRIC LAMPS AND SIMILAR ARTICLES

Filed March 26, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

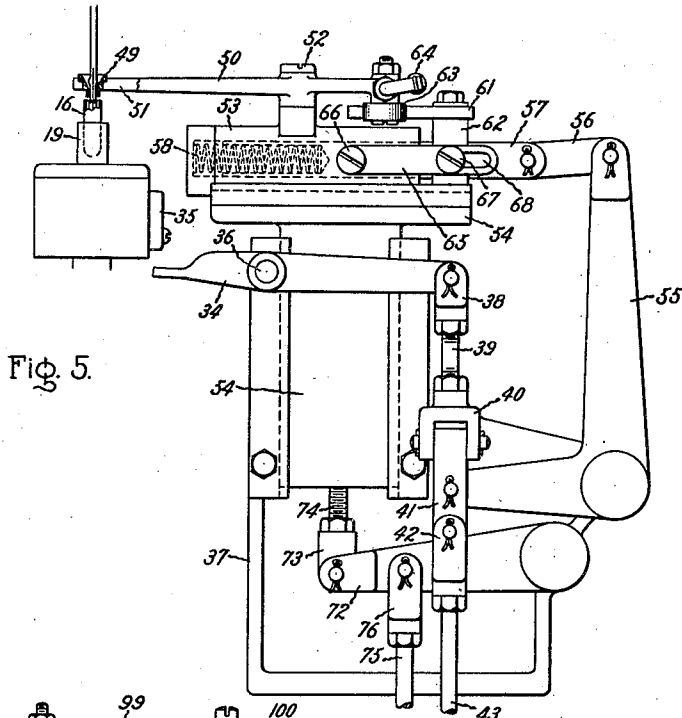


Fig. 5.

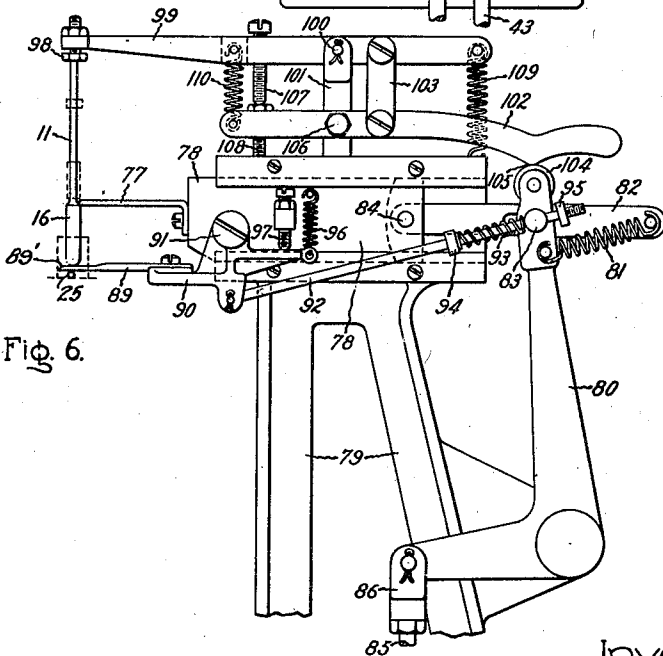


Fig. 6.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR SEALING ELECTRIC
LAMPS AND SIMILAR ARTICLES

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6 Claims. (Cl. 49—2)

Our invention relates to machines for manufacturing electric incandescent lamps and similar devices and more particularly to sealing machines for sealing the bulbs to the mounts of such devices.

According to our invention we provide an intermittently moving, preferably rotating, turret on which is mounted a plurality of heads or holders adapted to receive a lamp bulb and mount. The bulb holder is so constructed as to center the bulb and hold it in axial alignment with the mount. Means are also provided for definitely positioning the bulb and for moving the mount a predetermined distance into the bulb, after which the said bulb and mount are sealed together. Further features and advantages of our invention will appear from the following description of species thereof.

In the drawings, Figs. 1a, 1b and 1c are side views of a lamp bulb and mount at successive stages of the sealing-in process; Fig. 2 is a plan view of approximately one half of a machine comprising our invention; Figs. 3 and 4 are side elevations, partially in section and at 90° to each other, of one of the heads; Fig. 5 is a side elevation of jaw closing and mount guiding mechanism; Fig. 6 is a side view of bulb and mount positioning mechanism.

The type of lamp for which the machine illustrated in the drawings was designed is shown in Figs. 1a, 1b and 1c. The mount 10 comprises a glass tube 11 having the ends of a pair of support wires 12 fused in the end thereof and extending substantially axially of said tube. The opposite ends of said support wires 12 engage a filament 13 which is secured at each end to a leading-in wire 14. Portions of said leading-in wires 14 are embedded in the end of the tube 11 on opposite sides thereof while other portions are preferably also embedded partially in a bulbous portion 15. The machine is adapted to seal the mount 10 in a cylindrical bulb 16, the upper end or neck of the said bulb being fused to the bulbous portion 15 of the tube 11 and the adjacent portions of the leading-in wires 14 being sealed in the joint thus formed as shown at Figs. 1b and 1c.

Referring to Fig. 2, the machine comprises a carrier or turret 17 which is adapted to be rotated and which has a plurality (sixteen) of heads 18 located adjacent the periphery thereof. The turret 17 is preferably indexed intermittently in a counter-clockwise direction to advance the heads in order through each of the positions. The cycle of operation begins at position A where a bulb 16 is placed in centering jaws 19 and 20 on the head 18, and a mount 10 is inserted between jaws 21 and 22. The jaws 19 and 20, as shown in Figs. 3 and 4, are pivotally mounted on pins 22' and 23 respectively and are held in the open position by a spring 24 located therebetween. The end of the bulb 16 rests against a stud 25 extending from jaw 19 and is kept from falling sideward by the edges of V-notches in the faces of said jaws until the jaws are closed at position C. Jaws 21 and 22 are mounted on pins in a block 26 and are opened to permit the mount 10 to be inserted therebetween by rotation of a pin 27. The operator of the machine turns a cross arm 28 on the end of the pin 27, causing an enlarged portion of said pin 27 to be brought into position between the jaws. A spring 29, which is attached to the jaws and extends through apertures therein, causes them to close after the cross arm 28 is released.

The supporting structure for the jaws 19 and 20 comprises a spindle 30 which supports the ends of the pins 22' and 23 and is located in a bushing 31. The supporting structure for the jaws 21 and 22 comprises a post 32 to which the block 26 is attached and which is mounted in a collar 33 on the end of the bushing 31. The bushing 31 is rotatably mounted in the turret 17. The mount 10 is preferably placed in the jaws so that the bulbous portion 15 thereof is against the lower ends of said jaws.

Position B is an idle position and may be used by the operator to feed the lamp parts into the machine if desired.

Position C is used to close the jaws 19 and 20 against the bulb 16 and to move the mount 10 into said bulb. The jaws 19 and 20 are closed by a lever 34, shown in Fig. 5, which lifts an arm 35 to an upright position as shown in the drawings. Lever 34 is pivoted on stud 36 extending from a standard 37 and is operated in proper time relation through yoke 38, rod 39, yoke 40, block 41, yoke 42 and rod 43 by appropriate cam-operated mechanism (not shown). The arm 35 is attached to a pin 44 which is rotatively mounted in the spindle 30 and holds up a sleeve 45 on said spindle. When the arm 35 and pin 44 are rotated, flat end portions 46 on the said pin 44 are brought to the top, thereby allowing the sleeve 45 to be pulled down a slight distance by a spring 47. In moving down, the sleeve 45 carries the inwardly tapering or beveled edge of a ring 48 thereon against protuberances 48' on the jaws 19 and 20, causing the said jaws to close on

the bulb 16. This construction assures that the bulb will be held at the center of the head.

In order that all portions of the filament-supporting structure of the mount 10 will be carried into the bulb 16 without injury, a funnel 49 (Fig. 5) may be provided to guide it into the bulb 16. The funnel 49 consists of two halves which are mounted on levers 50 and 51 respectively and are carried to a position nearer the head before being brought together. The levers 50 and 51 are each mounted on a screw 52 extending from a slide 53 which is mounted in a bracket 54 slidably mounted in a standard 37. The slide 53 is moved forward in the bracket 54 to carry the funnel halves into position by a lever 55 which is connected thereto through a link 56, a rod 57 partially contained within the slide, and a spring 59 within the slide. The slide 53 reaches its advanced position when a screw 59 (Fig. 2) extending therefrom strikes a stud 60 extending from a portion of the bracket 54. The levers 50 and 51 are then operated by an additional forward movement of the rod 57 as a wedge 61 mounted thereon through a block 62 is carried between the rollers 63 mounted on the ends of said levers to pivot said levers on their screws 52. During this movement of rod 57 the spring 58 is contracted. The ends of the levers 50 and 51 carrying the rollers 63 are normally pulled together by a spring 44 located between posts in each of the levers. A bar 65 prevents the slide 53 and rod 57 from becoming separated at other times as it is fastened to the slide by a pin 66 and to the block 62 by a pin 67. A slot 68 in the bar 65 permits the relative movement of the rod 57 already described.

With the funnel halves together and located above the bulb 16, the jaws 19 and 20 are raised so that the end of the funnel enters the bulb a short distance. This movement of the jaws is produced by an upward movement of the spindle 30 which in turn is moved upward by a rod 69 which engages a nut 70 on the lower end of the spindle 30 and is moved vertically as required by mechanism which is not shown. The spindle is normally supported by a track 71 which is located below all the heads and which is elevated as much as required to hold the bulb at the desired position. Both the bulb 16 and the funnel 49 are now raised until the filament and the supporting members therefor are well within the bulb whereupon the funnel 49 moves up a little more so that it is carried out of the bulb 16. The parts are then located as shown in Fig. 5. The funnel 49 is moved upward with the bulb 16 as bracket 54 is moved upward in standard 37. The bracket 54 is moved by a lever 72 which is connected thereto through a block 73 and a stud 74 and is pivoted about a pin in the standard 37 by mechanism (not shown) through a rod 75 and yoke 76. The funnel 49 is then separated and moved back out of the way, whereupon the bulb 16 is raised farther to approximately the sealing position. This latter movement is again produced by movement of the rod 69.

The head is now indexed into position D at which is located the mechanism shown in Fig. 6. This mechanism is comprised of two parts, one of which positions the bulb vertically and the other of which positions the mount vertically. The former mechanism comprises a stop or positioning finger 77 which is fastened to a slide 78 and is carried to a position just above the edge of the bulb 16 by movement of the said slide 78 in a standard 79. The slide 78 is moved by a lever 80

which is connected to it through a spring 81, link 82 and pins 83 and 84 and which is operated by mechanism (not shown) through a rod 85 and yoke 86. The pin 83 lies in a slot in link 82 and is kept back at the end of said slot by the spring 81 during the movement of the slide 78. When the slide reaches the correct position, a stud 87, as shown in Fig. 2, strikes the end of a bolt 88 in the standard 79. The movement of the slide 78 also carries a finger 89 under the bulb 16, the tapered end 89' of said finger 89 being inserted between the pin 25 and the end of said bulb to raise the bulb slightly within the jaws 19—20, and then the said finger 89 is moved upward, to lift the bulb until the edge of the neck thereof strikes the very edge of the other finger 77 as shown in Fig. 1a. The finger 89 is mounted on a lever 90 which is pivotally mounted on a screw 91 on the slide 78 and is turned to raise the finger 89 by a rod 92. The rod 92 is actuated when the slide 78 stops. An additional movement of lever 80 applies pressure on a spring 93, causing it to actuate the rod 92 through a collar 94. During this interval, the pin 83 moves in the slot in the link 82. At the rest position of this mechanism a collar 95 on the rod 92 engages the pin 83 and a spring 96 keeps the lever 90 against the end of a screw 97 protruding from the slide 78. The mount 10 is positioned by being pushed down to the proper location by the head of a bolt 98 in the end of a lever 99. The bulbous portion 15 of the exhaust tube 11 is of slightly smaller diameter than the inside of the bulb 16 so that there is ample clearance for inserting the mount into the bulb past the end of the finger 77. The lever 99 is pivotally mounted on a pin 100 on an arm 101 protruding from the standard 79 and is actuated by a lever 102 to which it is connected by a link 103. The last part of the movement of lever 80 causes a roller 104 mounted thereon to strike a cam portion 105 of lever 102, turning it about a screw 106 in the arm 101. The movement of the lever 99 is limited by the engagement of a screw 107 carried thereby with the head of a bolt 108 in the standard 79. Levers 99 and 102 are returned to their former positions after the lever 80 swings back by springs 109 and 110. Spring 109 is connected between posts in the lever 99 and the standard 79 and spring 110 is connected between posts in levers 99 and 102.

The lamp parts are now properly positioned in the machine for sealing and the head, when indexed into position E, carries said parts into the path of flames from burners 111 and 112. The heads are preferably caused to revolve at this position by means (not shown) engaging a gear 113 (Fig. 3) which is attached to the lower end of the bushing 31, so that the flames will play on all parts of the lamp seal. Burners like those shown at position E are also preferably located at the next eight positions to effectively seal the bulb 16 to the bulbous portion 15 of the mount 10 as shown in Fig. 1c. The process consists in taking the bulb 16 and the mount 10 as shown in Fig. 1a, positioning them with respect to each other, sealing them together and blowing air into the lamp through the tube 11 to expand the seal as shown in Fig. 1b and in forming the seal as shown in Fig. 1c. The seal is expanded at one of the seven positions of the head which is not shown and occurs as the end of the tube 11 comes under a pipe 114 which emits a stream of air. The air passes into the bulb and expands the seal at 115, causing it to be worked and formed so that the strains are taken out. The flames at the following positions reduce

the expanded portion to a more regular shape as shown.

Positions M and N are idle positions at which the seal is allowed to cool, and midway between positions N and O the lower jaws 19 and 20 are opened to permit the lamp to be discharged at position O. The jaws 19 and 20 are opened by the indexing motion which carries the arm 35 against a roller 116 which is mounted on an arm 117 extending from table 118 and which swings said arm 35 to a horizontal position. The lamp is taken from the machine at position O by the operator who turns the cross arm 28, opening jaws 21 and 22, and then pushes the lamp into the chute 119.

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

1. A sealing machine comprising a movable carrier, a plurality of heads on said carrier each comprising a bulb holder and a mount holder disposed to hold a bulb and a mount in axial alignment, bulb and mount positioning means disposed adjacent the path of movement of said heads and comprising a positioning stop, means for moving said stop to a position adjacent a bulb in one of said holders and between the neck end of said bulb and the adjacent end of said mount, means for moving said bulb axially toward said mount to cause the open neck end thereof to engage said stop and means for moving said mount axially toward said bulb to cause it to enter said bulb a predetermined distance, and heating means for fusing the neck of said bulb to a portion of said mount.

2. In a device of the type described, a bulb holder and a mount holder disposed to hold a bulb and mount in axial alignment, a positioning stop located adjacent said bulb holder and between the neck end of said bulb and the adjacent end of said mount, means for moving said bulb axially toward said mount to cause the open neck end thereof to engage said stop, and means for moving said mount axially toward said bulb to cause it to enter said bulb a predetermined distance.

3. In a device of the type described, a movable carrier, a plurality of heads on said carrier each comprising a bulb holder and a mount holder disposed to hold a bulb and mount in axial alignment, a lever and a positioning finger and a movable finger located adjacent the path of said bulb holders, means for moving said fingers to a position adjacent a bulb in one of said heads so that said positioning finger is located between the neck end of said bulb and the adjacent end of said mount, means for actuating said movable finger to cause it to engage said bulb and move it axially in its holder toward said mount to cause the open neck end thereof to engage said positioning finger, and means for actuating said lever to cause it to engage the end of said mount and move it toward said bulb to cause said mount to enter said bulb a predetermined distance.

4. A device of the type described comprising in combination a movable carrier constructed and

arranged to be intermittently indexed, a plurality of heads on said carrier each comprising a bulb holder and a mount holder, a split funnel mounted adjacent the path of movement of said heads at an indexing position of said carrier, means for moving said funnel to bring it in alignment with the open end of a bulb in one of said heads, means for moving said bulb holder relatively to said mount holder to cause a portion of the mount to enter said bulb through said funnel, and means for separating the sections of said funnel and moving it away from said head.

5. In a device of the type described, the combination of a movable carrier, a plurality of heads on said carrier each comprising a bulb holder and a mount holder arranged to hold a bulb and mount in axial alignment with the open neck end of said bulb toward said mount, and means disposed adjacent to the path of travel of said heads for locating the mount in each of said heads in definite relation to the bulb therein comprising a positioning finger, a movable finger and a lever, means for moving said positioning finger toward a head so that the end thereof is between the neck end of the bulb and the adjacent end of the mount in said head, means for moving said movable finger to cause it to engage the opposite end of said bulb and then move said bulb toward the mount in said head so that the edge of the neck end of said bulb engages the end of said positioning finger, and means for moving said lever to cause it to engage said mount and move it toward and into said bulb a definite distance.

6. In a device of the type described, the combination of a rotatable turret, a plurality of heads on said turret each comprising a bulb holder and a mount holder, the bulb being held with its open end uppermost and the mount holder being arranged above the bulb holder to hold a mount in axial alignment with said bulb, and means disposed adjacent to the periphery of said turret for locating said mount in definite relation to said bulb comprising a standard, a slide mounted on said standard to reciprocate toward and away from the heads on said turret, a positioning finger extending from said slide and arranged so that the end thereof is between the edge of the upper end of a bulb and the lower end of a mount in one of said heads when said slide is in its forward position, a movable finger also mounted on said slide and arranged to engage the lower end of said bulb, means for moving the end of said finger upward to move said bulb in its holder and cause the edge of the upper end thereof to engage the end of said positioning finger to definitely locate said bulb, a lever mounted on said standard and extending above the mount in said head, and means for moving said lever downward a predetermined distance to engage said mount and move it downward a definite distance into said bulb.

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