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K. W. REYNOLDS

2,765,002

LAMP LEAD WIRE FORMING APPARATUS

Filed May 2, 1955

2 Sheets-Sheet 1

Fig 1

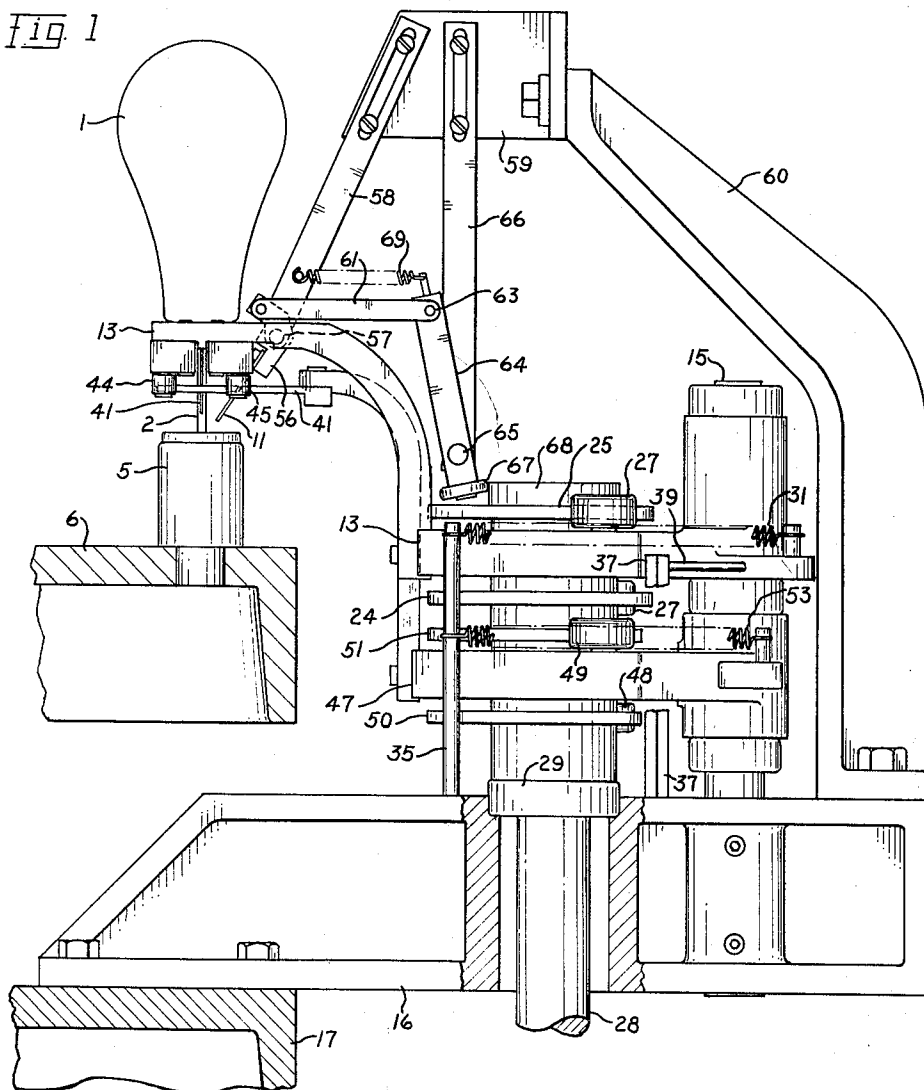


Fig 6

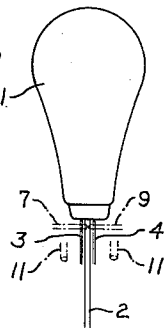


Fig 7

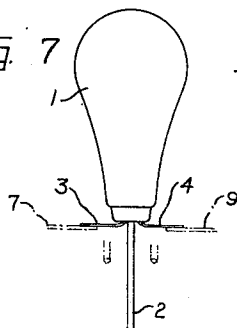
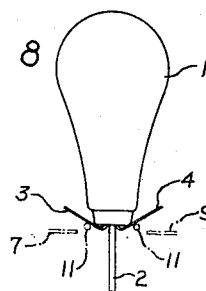


Fig 8



Inventor:
Kenneth W. Reynolds
by *Vernon A. Kauffman*
His Attorney

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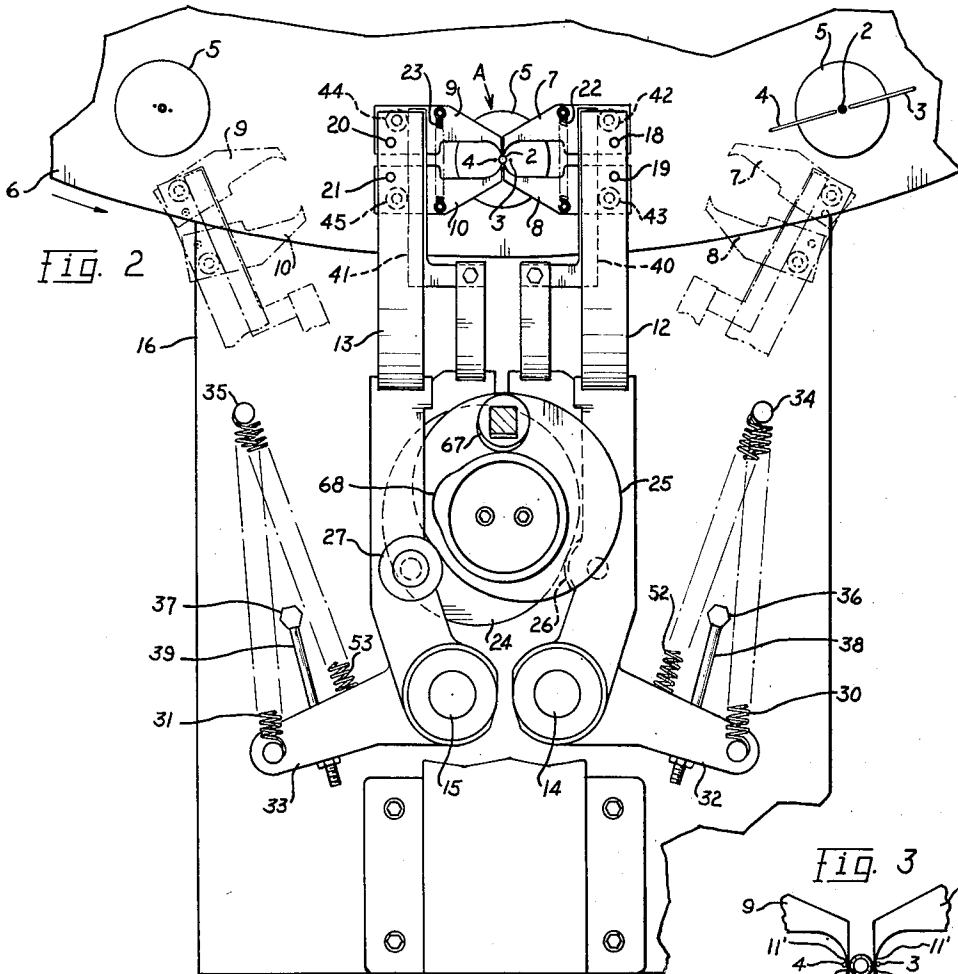
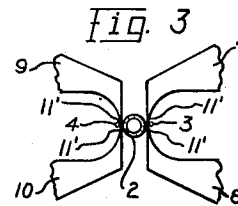
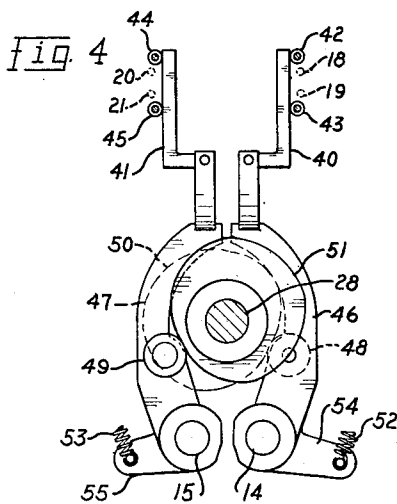
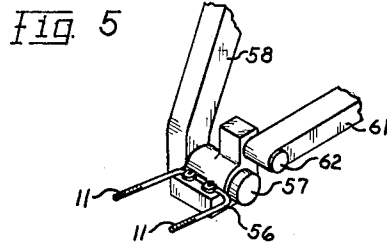
K. W. REYNOLDS

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Inventor:
Kenneth W. Reynolds
by *Vernon C. Kaufman*
His Attorney

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LAMP LEAD WIRE FORMING APPARATUS

Kenneth W. Reynolds, Willoughby, Ohio, assignor to General Electric Company, a corporation of New York

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3 Claims. (Cl. 140—71.5)

My invention relates to apparatus for manufacturing electric lamps or similar devices comprising a bulb having an exhaust tube extending therefrom and a pair of lead-in wires extending from the bulb alongside the exhaust tube, and more particularly to apparatus for repositioning the lead-in wires preparatory to sealing of the exhaust tube.

In the course of manufacturing electric lamps, they are exhausted on machines generally comprising a rotatable indexing turret having a plurality of heads at the periphery thereof with exhaust ports or holders in which the lamps are held upright by insertion of the lower end of the downwardly extending exhaust tube into the exhaust port with the lead-in wires extending downwardly from the bulb along opposite sides of the exhaust tube. During the travel of the heads about the exhaust machine, the bulb is evacuated and optionally filled with gas, after which it is sealed by a tipping off operation wherein the glass exhaust tube is heated by gas flames to the softening point until it collapses and is severed. Prior to the tipping off operation, it is necessary that the lead-in wires be formed and repositioned to remove them from the path of the gas flames. It is this forming or repositioning operation with which the present invention is concerned.

It is an object of my invention to provide apparatus for forming and repositioning the lead-in wires which is more effective and reliable than devices heretofore employed for that purpose. It is a further object to provide a device which will effectively grasp and reposition the wires even when they lie extremely close to the exhaust tube. It is a still further object to provide a device which will bend the wires laterally outward in opposite directions, rather than in the same direction as is the case with certain devices heretofore employed generally in the incandescent lamp art, and thereby better prepare the lead wires to escape burn off at exhaust tube tipping and for reception of a lamp base.

My invention will be better understood from the following description taken in connection with the accompanying drawings and its scope will be pointed out in the appended claims.

In the drawings, Figs. 1 and 2 are an elevation and a plan view, respectively, of a lead wire forming device comprising my invention;

Fig. 3 is a fragmentary plan view of two pairs of pincer jaws forming part of the device;

Fig. 4 is a plan view of a mechanism for controlling the opening and closing of the pincer jaws;

Fig. 5 is a perspective view of a supplementary forming mechanism;

Figs. 6, 7 and 8 are elevation views of a lamp and illustrate successive phases of the lead wire forming operation.

The invention is illustrated herein as applied to the manufacture of an incandescent lamp comprising a glass bulb 1 having a glass exhaust tube 2 extending therefrom and a pair of lead-in wires 3, 4 extending downwardly

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from the bulb 1 closely along opposite sides of the exhaust tube 2. The lamp is carried by its exhaust tube 2 which is inserted into an exhaust port 5 of which there is a plurality mounted at the periphery of the turret 6 of an exhaust machine. The turret 6 is adapted to index the ports 5 to a plurality of stations at which the bulb 1 is evacuated, optionally filled with gas, and ultimately sealed by tipping off the exhaust tube 2. Prior to the tipping off operation, the lamp 1 is carried to a station A (Fig. 2) which is occupied by the lead wire forming apparatus.

Generally speaking, the forming apparatus comprises two pairs of pincer jaws 7, 8 and 9, 10 which are normally located in open position as indicated by the dot-dash lines in Fig. 2. Upon indexing of a lamp into station A, the two pairs of jaws are moved toward each other to bring them a distance apart less than the diameter of the exhaust tube 2 after which the jaws of each pair are permitted to close to cause their sharp meeting edges 11' (Fig. 3) to engage the exhaust tube 2 and slide thereabout to a closed position behind the respective lead wires 3 and 4, the said pairs of jaws then being moved apart to wipe the respective lead wires laterally outward in opposite directions as indicated in Fig. 7. The said lead wires are then bent further upward by pivotal movement of the prongs 11 (Figs. 1 and 5) of a forked member straddling the exhaust tube.

Referring more specifically to the structure of the forming device, the pairs of jaws 7, 8 and 9, 10 are mounted on respective arms 12 and 13 which are pivotally mounted on respective posts 14 and 15 mounted in a bracket 16 carried by the stationary frame 17 of the exhaust machine. The jaws 7 and 8 are pivotally mounted on respective pins 18 and 19 on the free end of arm 12, while the jaws 9 and 10 are similarly mounted on pins 20 and 21 on the arm 13. The said jaws are normally urged to a closed position by respective springs 22, 23.

The arms 12 and 13 are pivoted about the posts 14 and 15 by respective cams 24 and 25 which engage respective rollers 26 and 27 on said arms and which are mounted for rotation on a vertical cam shaft 28 supported by a ball bearing 29 in the bracket 16. The said cam shaft 28 is connected by suitable gear and chain drive to the cam shaft of the exhaust machine so as to operate in synchronism therewith and to make one complete revolution during the dwell of a port 5 at station A. The rollers 26, 27 are held against the respective cams 24 and 25 by springs 30, 31 connected between arm portions 32 and 33 of respective lever arms 12 and 13 and posts 34 and 35 extending upwardly from the bracket 16. The spacing of the pairs of jaws 7, 8 and 9, 10 in their closed position may be accurately controlled by the provision of stop members 36 and 37 extending upwardly from the bracket 16 and engageable by studs 38 and 39 extending from respective arms 32 and 33.

The opening of the jaws of each pair 7, 8 and 9, 10 is controlled by respective finger members 40 and 41 which are engageable, respectively, with pins 42 and 43 on jaws 7 and 8 and pins 44 and 45 on jaws 9 and 10 to cause the said jaws to be pivoted about their respective pins 18 to 21.

The fingers 40 and 41 are mounted on respective lever arms 46 and 47 (Fig. 4) which are pivotally mounted on the posts 14 and 15. The said arms 46 and 47 are actuated by engagement of rollers 48 and 49 thereon with respective cams 50 and 51 on the cam shaft 28, and are maintained thereagainst by springs 52 and 53 extending between arms 54 and 55 of levers 46, 47 and the posts 34 and 35.

The supplementary bending prongs 11 are mounted on a lever member 56 (Fig. 5) which is pivotally mounted on a pin 57 in the lower end of an arm 58 secured to a plate 59 (Fig. 1) mounted on a bracket 60 extending

upwardly from the bracket 16. The said prongs 11 are pivoted by a link 61 pivotally connected at one end to a pin 62 on member 56 and, at its other end pivotally connected at 63 to an arm 64 which is pivoted on a pin 65 in the lower end of an arm 66 extending downwardly from the plate 59. The arm 64 carries at its lower end a roller 67 which engages with a cam 68 mounted on the cam shaft 28. The said roller 67 is held against the cam 68 by a spring 69 extending between the arm 64 and the stationary arm 59.

In operation, during indexing of a lamp 1 into station A, the pairs of jaws 7, 8 and 9, 10 are held in open position, as indicated by the dot-dash lines in Fig. 2, by virtue of the cams 24 and 25 acting on the respective arms 12 and 13 carrying said jaws. The individual jaws of each pair are also held in open position, in the case of jaws 7, 8 by pressure of finger 40 on the pins 42 and 43 which cause the jaws 7 and 8 to be pivoted about pins 18 and 19 against the action of spring 22, the said finger 40 being urged outwardly by the cam 50. Similarly, the jaws 9 and 10 are held in open position by engagement of the finger 41 with the pins 44 and 45 to cause the said jaws to be pivoted about pins 20 and 21, the finger 41 being urged to that position by cam 51.

Upon rotation of the cams 24, 25, 50 and 51 the arms 12 and 13 are brought toward each other while the fingers 40 and 41 continue to maintain the jaws of each pair in open position until they reach the position shown in Fig. 2 wherein the respective pairs of paws are separated by a distance less than the diameter of the exhaust tube 2. Preferably the separation of the pairs of jaws is only slightly less than the diameter of the exhaust tube so that they close virtually tangentially of the tube. Thereupon the fingers 40 and 41 continue to move closer together so as to disengage from the respective pins 42, 43 and 44, 45, thereby permitting each pair of jaws to be urged to closed position by the respective springs 22 and 23. The arms 12 and 13 are then urged apart by the respective cams 24 and 25 while the pairs of jaws 7, 8 and 9, 10 close upon the exhaust tube 2 and slide therearound to a closed position behind the respective lead in wires 3 and 4 as illustrated in Fig. 3. Upon continued outward movement of the arms 12 and 13 the respective pairs of jaws cause the lead wires 3 and 4 to be wiped laterally outward in opposite directions, as indicated in Fig. 7. Immediately thereafter, the prongs 11 are pivoted upwardly to bend the lead wires 3 and 4 upward as indicated in Fig. 8. The end portions of the prongs 11 are preferably roughened in any suitable manner, as by forming threads thereon, in order to prevent slippage of the lead wires upon engagement therewith.

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

1. In combination with means for supporting an electric lamp comprising a bulb having an exhaust tube depending therefrom and a pair of lead wires extending from said bulb closely along opposite sides of said exhaust tube, a wire forming mechanism comprising two pairs of pincer jaws arranged to be located at opposite sides of the exhaust tube of the lamp in said supporting means and having sharp meeting edges, means mounting the respective pairs of pincer jaws for movement, while open, toward each other to bring their meeting edges a distance apart less than the diameter of the said exhaust tube, means for then resiliently closing the jaws of each pair to cause their meeting edges to engage the said ex-

haust tube and slide thereabout to a closed position behind the respective lead wires, and means for then moving the pairs of jaws apart to wipe the respective lead wires laterally outward in opposite directions.

2. In combination with means for supporting an electric lamp comprising a bulb having an exhaust tube depending therefrom and a pair of lead wires extending from said bulb closely along opposite sides of said exhaust tube, a wire forming mechanism comprising a pair of arms mounted to pivot in a horizontal plane, a pair of pincer jaws pivotally mounted on the free end of each of said arms and having sharp meeting edges, spring means normally resiliently urging the jaws of each pair to closed position, cam means arranged to effect pivotal movement of said arms to first move them toward each other to bring the meeting edges of the respective pairs of jaws thereon a distance apart less than the diameter of the said exhaust tube and to then again move them apart, and means operable to normally hold the jaws of each pair in open position during the said movement of said arms toward each other and to release said jaws for closing movement by the respective spring means upon termination of the said movement of the arms toward each other and during their subsequent movement apart whereby the meeting edges of the jaws of each pair are caused to first engage the exhaust tube and slide thereabout to a closed position behind the respective lead wires and to then wipe the respective lead wires laterally outward in opposite directions.

3. In combination with means for supporting an electric lamp comprising a bulb having an exhaust tube depending therefrom and a pair of lead wires extending from said bulb closely along opposite sides of said exhaust tube, a wire forming mechanism comprising a pair of arms mounted to pivot in a horizontal plane, a pair of pincer jaws pivotally mounted on the free end of each of said arms and having sharp meeting edges, spring means normally resiliently urging the jaws of each pair to closed position, cam means arranged to effect pivotal movement of said arms to first move them toward each other to bring the meeting edges of the respective pairs of jaws thereon a distance apart less than the diameter of the said exhaust tube and to then again move them apart, and means operable to normally hold the jaws of each pair in open position during the said movement of said arms toward each other and to release said jaws for closing movement by the respective spring means upon termination of the said movement of the arms toward each other and during their subsequent movement apart whereby the meeting edges of the jaws of each pair are caused to first engage the exhaust tube and slide thereabout to a closed position behind the respective lead wires and to then wipe the respective lead wires laterally outward in opposite directions, the last named means comprising a pair of fingers mounted to pivot in a horizontal plane and each engageable with a respective pair of jaws to hold them open and including cam means operable to hold said fingers in engagement with the respective pairs of jaws during movement of said arms toward each other and to then move said fingers out of engagement with said jaws.

References Cited in the file of this patent

UNITED STATES PATENTS

2,120,877	Uber	June 14, 1938
2,554,013	Cooper	May 22, 1951
2,711,791	Bechard	June 28, 1955