July 28, 1959 H. J. EBERIEL ET AL 2,896,306

LAMP FABRICATION

Filed June 30, 1953 2 Sheets-Sheet 1

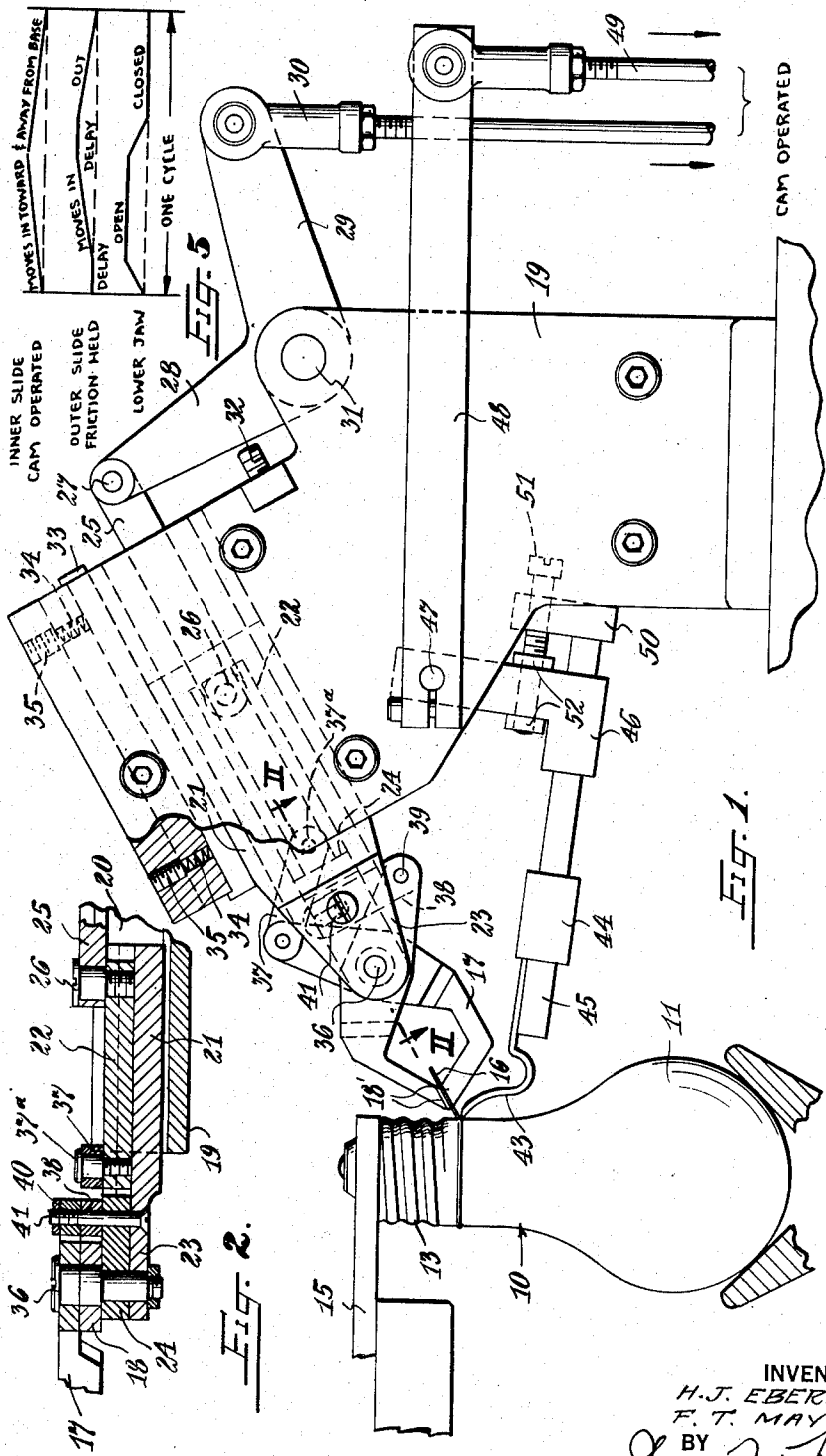


Fig. 5

Fig. 1.

Fig. 2.

INVENTORS
H. J. EBERIEL and
F. T. MAY.
BY
ATTORNEY

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Filed June 30, 1953 2 Sheets-Sheet 2

Fig. 3.

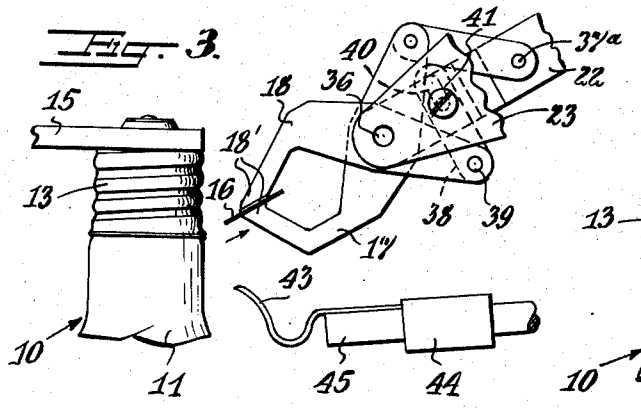
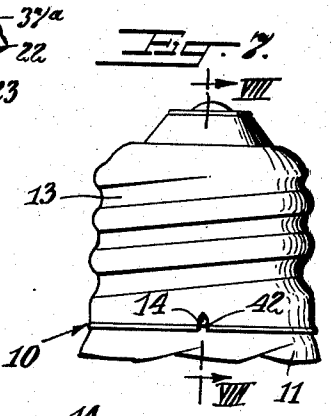


Fig. 7.



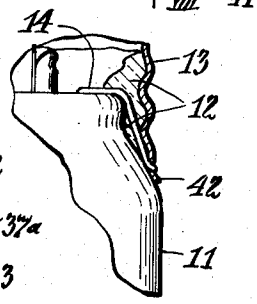
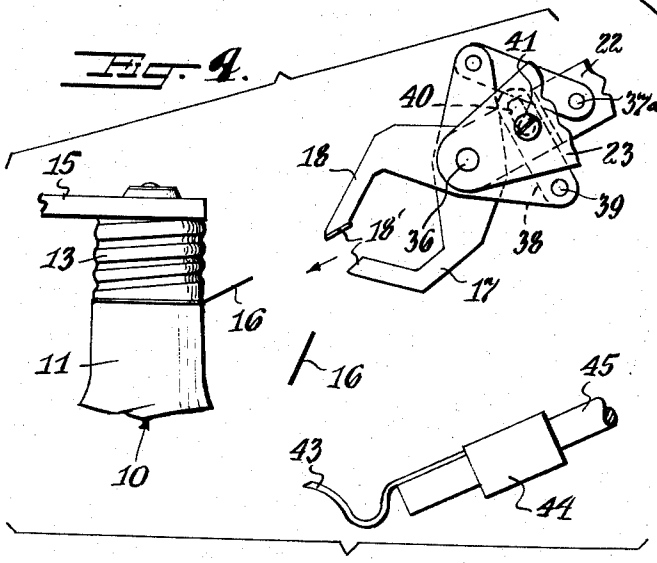


Fig. 8.

Fig. 4.



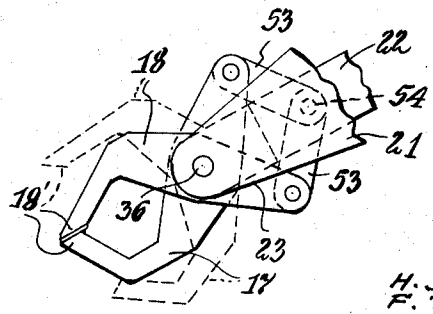


Fig. 6.

INVENTORS
H. J. EBERIEL and
F. T. MAY.
BY
ATTORNEY

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LAMP FABRICATION

Herman James Eberiel, West Orange, and Frederick Theodore May, Verona, N.J., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application June 30, 1953, Serial No. 364,994

2 Claims. (Cl. 29—25.11)

This invention relates to lamp fabrication and, more particularly, to the attachment of the side wire to the base shell and disposal of the excess of wire exterior to said shell.

Heretofore, it has been common practice in lamp fabrication to bring one of the lead-in wires out between the bulb and shell and bend it over the edge of the shell and solder it thereat. Thereafter the operation would snip the wire off as close to the solder as the tool used and care of the operator made possible. These hand operations of soldering and snipping are slow and materially add to the time and expense of fabricating lamps.

In its broad aspects, the present invention contemplates high speed machine fabrication with improved means for attaching and severing the side wire to the rim of the base.

The invention basically proposes elimination of use of solder and yet obtains a permanent and satisfactory electrical connection of the wire with the base.

More specifically, an object of the invention is to tightly wedge the wire in the base material for permanent retention thereby.

A further object of the invention is to form the wire with a hook where wedged to prevent withdrawal of the wire.

Another object of the invention is to invariably sever the wire where hooked and wedged close to the outside of the shell.

Other objects of the invention will appear to persons skilled in the art to which it appertains as the description proceeds, both by direct recitation thereof and by implication from the context.

Referring to the accompanying drawings, in which like numerals of reference indicate similar parts throughout the several views:

Figure 1 is an elevational view showing the mechanism of our invention in operation;

Figure 2 is a section on line II—II of Fig. 1;

Figures 3 and 4 are views similar to Fig. 1, showing successive steps in operation of the mechanism in course of lamp fabrication;

Figure 5 is a diagrammatic graph for showing simultaneous positions of essential parts during operation;

Figure 6 is another view similar to Fig. 1 and showing a modified construction of jaw-manipulating mechanism;

Figure 7 is a front elevation of a lamp, the bulb being partly broken away, and showing the end of the lead wire at the surface of the base; and

Figure 8 is a sectional view on line VIII—VIII of Fig. 7.

In the specific embodiment of the invention illustrated in said drawings, the reference numeral **10** designates a lamp having a bulb **11** held by cement **12** in a base **13**. One of the lead-in wires **14**, known in the trade as side wire, extends from within the bulb into the base as has to be secured to the side shell of the base for purposes of electrical contact. The present invention pertains to the

securing of the side lead to the base shell and to the means and method for effecting its attachment and for effecting the elimination of the excess or otherwise protruding end of the wire. The operations are preferably performed as part of the basing cycle on an automatic indexing basing machine at one of the indexed positions of the lamp-holding head **15** of that machine. In preceding steps of fabrication, the base is applied and cemented to the bulb and the end portion **16** of the side wire **14** is left protruding at the side of the lamp and projects therefrom at a predetermined angle from the axis of the lamp as located in the machine as shown in Fig. 4, and is in that position when the lamp-holding head indexes to the location involved with the operations to be performed in accordance with the present invention. For purposes of this description, the lamp may be considered as fixed and stationary, since the operations here involved transpire at a single indexed position.

Opposite the lamp is mechanism which includes two jaws **17**, **18** that approach the lamp on a path aligned with the angularly disposed end portion **16** of the said side wire. These jaws have cooperating lips **18'** at their forward ends for effecting a biting grip upon said end portion **16** of the wire when said jaws are brought to and start return stroke from their forward position. Either or both jaws may be caused to swing for effecting the bite upon the wire, and Figures 1 to 5 illustrate the structure as involving swinging the lower jaw **17** only, but allowing adjustment for the upper jaw **18**, whereas Figure 6 shows appropriate modification for swinging both jaws.

As shown in Figures 1 to 5, the machine has an upwardly extending bracket or housing **19** the upper portion of which provides a slideway **20** the longitudinal center line of which coincides with the predetermined angularity and disposition of the projecting end of the side wire when the lamp is at its indexed position contiguous to said housing and slideway. In said slideway is a compound slide comprising a frictionally restrained short-stroke outer slide **21** in which is slidably mounted a long-stroke inner slide **22** both being slidable in the longitudinal direction toward and away from the lamp. The forward end of the outer slide is shown longer than the inner slide and has a nose **23** which projects out of the housing and has its sides tapering forwardly toward each other. As seen in Figure 1, the inner slide **22** is located at the rear of the outer slide **21** and the outer slide has a block **24** on the rear side of the nose thereof located in the path of forward movement of the inner slide constituting, inter alia, a stop for limiting forward sliding of said inner slide with respect to the outer slide. When the inner slide comes into engagement with said block, further forward actuation of the inner slide causes the outer slide to also move forwardly therewith.

At the rear end of the inner slide, that is, the end thereof remote from the lamp, is a link **25** pivoted thereto by a stud **26**. The other end of said link is pivoted by another stud **27** to an upwardly projecting arm **28** of a bell crank lever the other arm **29** of which is pivotally connected to a driving link **30** which is appropriately cam-operated in proper synchronization with the indexing of the machine. Said bell crank lever is pivotally mounted at its apex by a pivot **31** carried by the fixed housing **19**. An adjustable stop **32** is shown interposed between said housing and upwardly extending arm of the bell crank lever which will precisely limit the forward movement of the slides.

The invention contemplates frictional means for obtaining delay action in operation of the outer slide from the driving impetus applied thereto from the inner slide and cam-impelled connecting mechanisms. As here shown, a friction bar **33** is juxtaposed to a longitudinal edge of the outer slide and is urged transversely to-

ward said slide by springs 34 appropriately held in the housing by screw plugs 35. The friction thus provided may be adjusted by the plugs 35 to hold the outer slide in a given position until positive actuation is applied thereto.

Jaws 17, 18 are pivotally secured at the forward end portion of nose 23 of the outer slide 21 by a stud 36, said jaws crossing at the stud in scissors arrangement. Consequently the lower jaw 17 has a rear section sloping upwardly rearwardly from the pivotal mounting and from said rear section a link 37 extends to and has pivotal attachment by a stud 37*a* to the forward end portion of the inner slide 22. During the intervals while both the inner and outer slides are moved in unison, the jaw will not swing, but will have a transition corresponding to the simultaneous movement of said slides. However, when one slide has a transitional movement different from the other slide or when one slide moves while the other does not, said lower jaw will be caused to swing on its pivot 36.

In the construction of Figures 1 to 5, the upper jaw 18 in normal operation is intended to have transitional movement only, but has pivotal mounting in order that it may be adjusted as to angularity. It therefore is also provided with a rear section beyond the pivotal mounting 36. This rear section slopes rearwardly downward and has a brace 38 pivoted thereto at its lower end by a stud 39. The brace returns upwardly at a different angle from the angle of the jaw section, and, having a slot 40, receives a clamping screw 41 projecting at the far side of the nose 23 for adjustable retention of the brace and jaw 18. This adjustment, in most instances, will remain fixed after being once set to properly locate the lip of the jaw to overlie the projecting end portions 16 of the successively presented side leads 14 of lamps indexing in the machine.

The operation of the mechanism so far described is illustrated by Figures 1, 3, 4 and 5. When the lamp 10 indexes to its position at which the mechanism is to function, the end portion of the side wire 16 projects toward the jaws at the predetermined angle agreeable to the direction of sliding movement arranged for the slides and jaws functioning as an entity. Cam operation of bell crank arms 28, 29 first moves the inner slide forwardly until it engages block 24, thus effecting a relative movement of the inner slide with respect to the outer slide since friction bar 33 up to that instant holds the outer slide stationary. The relative movement of the inner slide going forward within the outer slide actuates link 37 forwardly which in turn swings the lower jaw to open position. A wire end portion 16 from a previous lamp is thereby released and falls away from the jaws, as shown transpiring in Figure 4. Since the inner slide has now come against block 24 fast on the outer slide, continued forward motion of the inner slide by the cam actuation causes both slides to move forwardly in unison and with the jaws held open for the remainder of the forward impetus applied to said inner slide. The lip of the jaws are then close to the lamp with the upper lip overlying the end portion of the side wire closely proximate thereto. Cam operation then becomes effective to pull back upon the inner slide, but since the outer slide is held by friction bar 33 there is again relative movement between the slides which functions to close the lower jaw toward the upper jaw and wire, which is shown accomplished in Fig. 1. When said lower jaw can close no further, continued retraction upon the inner slide of necessity proceeds to overcome the frictional retention of the outer slide and to then draw both slides rearward with the jaws closed under the imposed tension and securely gripping the wire. The shell metal of the base is of sufficiently yielding character to result in a rupture 42 thereof occurring and producing a slit or crevice into which the wire is pulled and wedged as shown in Figs. 7 and 8. As the wire has been

bent backward over the edge of the base and the tension on the wire is in the same backward direction, the wire is hooked in said crevice. Consequently, the wire is very tightly secured to said shell both by virtue of the hooking and wedging and will remain permanently so held and will maintain a good electrical connection thereat without need for solder or other integrating materials or operations.

It is, of course, undesirable to leave the projecting end portion of the side wire at the outside of the lamp, and we therefore provide mechanism for severing the same close to the shell. As here shown, a spring-blade cutter 43 is provided to approach and nick or cut the said wire closely adjacent to the shell, while the wire is under tension of the retracting jaws. The cutter is in the act of performing this function in the illustration of Figure 1, and is shown as having performed its function in Fig. 3, enabling the slides and jaws to continue their retractive movement.

As one exemplification of of cutter operating means, the same is herein shown as replaceably secured by a sleeve 44 at the end of a rocker arm 45 adjustably supported by a rocker 46 in turn fixed on a rocker shaft 47 suitably actuated by a cam or otherwise in synchronism with the jaw-operating mechanism. According to the present showing, rocker shaft 47 has support and bearing in the housing 19 and is rocked by a lever 48 which has a forked end enabling the same to be gripped on the shaft at proper angularity. At the other end of the lever 48 is appropriate linkage 49 to the cam or other synchronized actuator. The timing of said cutter is arranged to obtain the cutting of the wire while under tension and immediately after the wire has been pulled sufficiently to create the rip or crevice 42 and become wedged and hooked therein.

The above-mentioned adjustable support of rocker arm 45 in rocker 46 may be variously accomplished, the selected embodiment utilizing a sliding fit of the arm through and transversely of said rocker, said arm having a head 50 as a fixed terminus and paralleling the rocker. An adjusting screw 51 is threaded through the head and passes without threaded engagement through the rocker and held for displacement by nuts 52 engaging at opposite sides of the rocker. Rotating the screw one way or the other effects desired movement of the head toward or from the rocker, thereby sliding the arm for proper engagement of the cutter with the side wire next to the shell.

As indicated in the foregoing description, it is contemplated to utilize jaws both of which swing to effect the grip and release of the side wire, and a showing thereof is to be found in Fig. 6. As the slides 21 and 22 are substantially the same as above described, repetition with respect thereto is not necessary. Furthermore, the jaws 17 and 18 are substantially duplicated as to construction of those utilized in Figs. 1 to 5, and are of scissors type with a common pivoting stud 36 mounting the same next to the end of nose 23 of the outer slide. The rear ends of both jaws in this instance have pivoted links 53 extending therefrom to a common pivot or stud 54 fixed at the forward end of inner slide 22 by virtue of which the jaws are simultaneously opened or swung with differential movement of the inner slide forwardly of the outer slide and are both closed or swung by differential movement of the inner slide retracting with respect to the outer slide. Limitation resulting from gripping closure of the jaws again determines the period of differential retracting stroke and a stop or block as heretofore described determines the differential of forward stroke of the slides for accomplishing the closing and opening swinging operations upon the jaws.

We claim:

1. The method of attaching the protruding side wire to the base shell of an otherwise substantially fabricated lamp, which comprises positioning said wire at a predetermined angle away from the lamp bulb and toward

said base shell, tensioning said wire while so positioned, ripping a crevice with said tensioned wire in the peripheral edge of said base shell, wedging said side wire in said crevice to retain same in permanent electrical contact with the material of said base shell, and severing the excess portion of said wire adjacent said crevice and said base shell.

2. The method of attaching the protruding side wire to the base shell of an otherwise substantially fabricated lamp which method comprises positioning said side wire at a predetermined angle toward the base shell, progressively tensioning said side wire in the direction in which it is disposed to cause said wire to rupture the peripheral edge of said base shell and become permanently wedged

in positive electrical contact with the material of said shell, and then severing the excess portion of said side wire at a point adjacent said base shell.

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