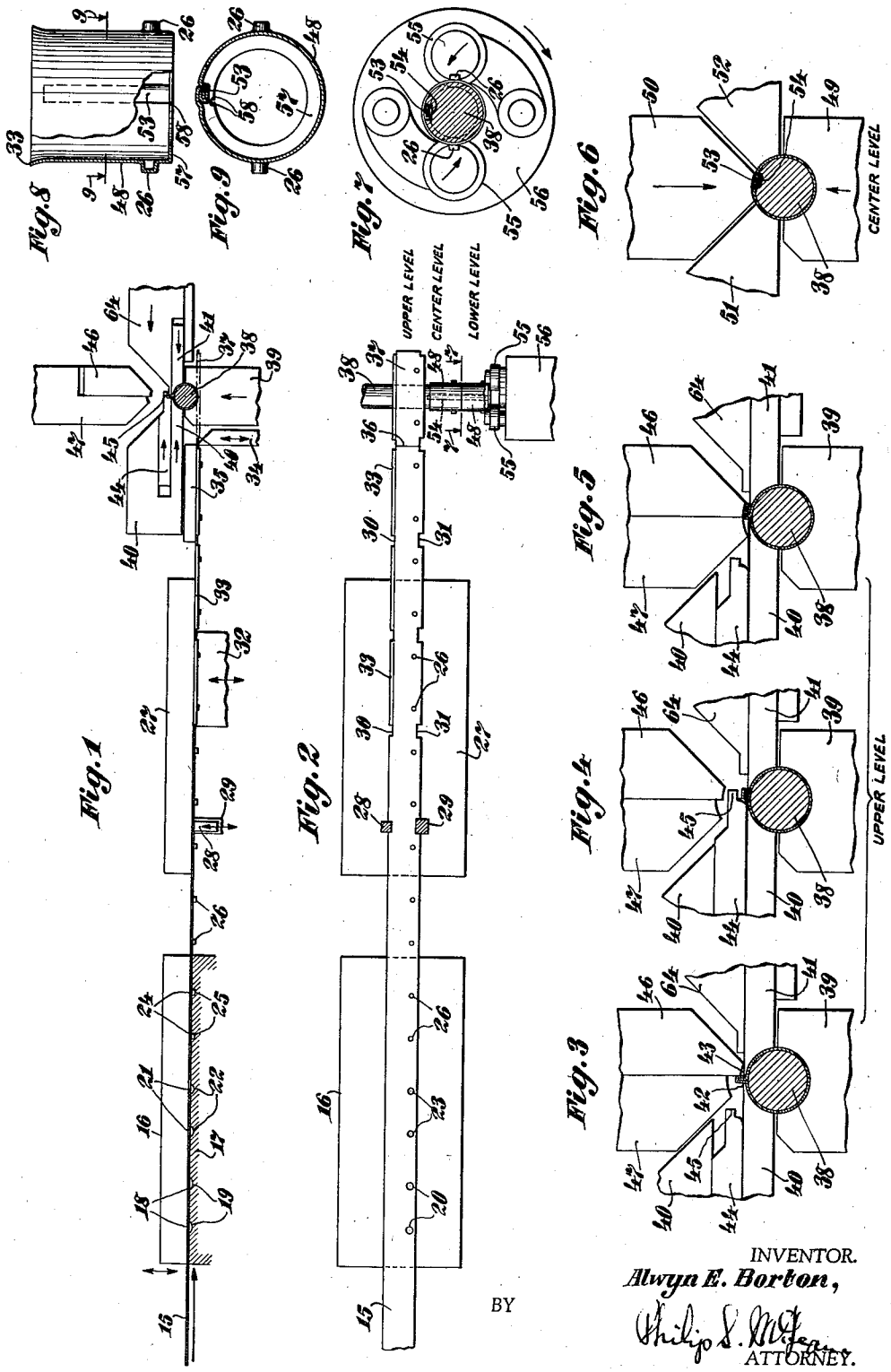
Dec. 2, 1941. A. E. BORTON 2,264,613

METHOD OF MAKING LAMP BASE FERRULES

Filed Dec. 3, 1938 2 Sheets-Sheet 1



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METHOD OF MAKING LAMP BASE FERRULES

Filed Dec. 3, 1938 2 Sheets-Sheet 2

Fig. 10

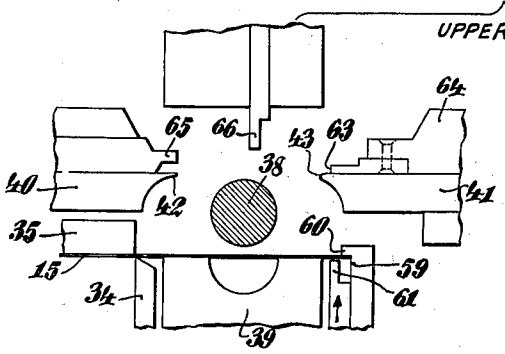


Fig. 11

STARTING POSITION

UPPER LEVEL

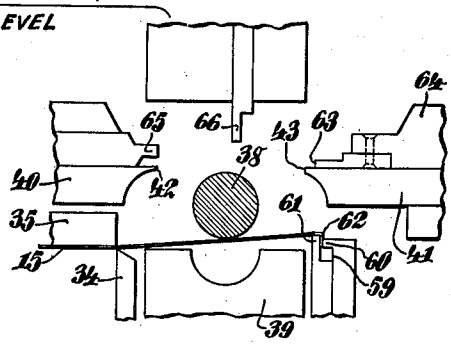


Fig. 12

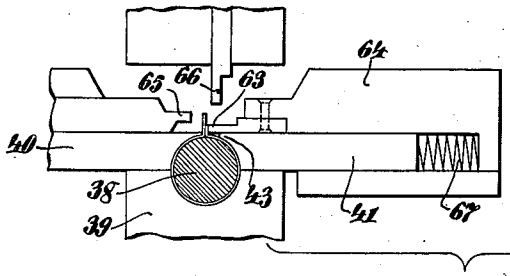
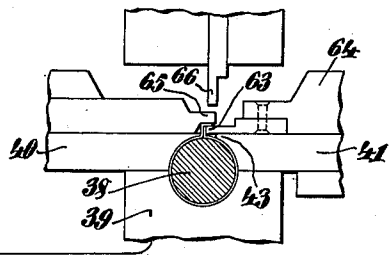


Fig. 13



UPPER LEVEL

Fig. 14

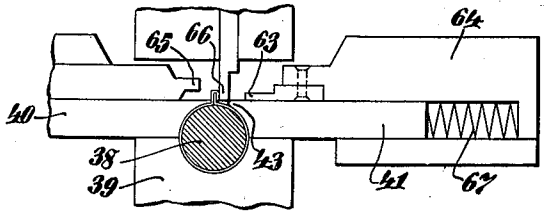


Fig. 15

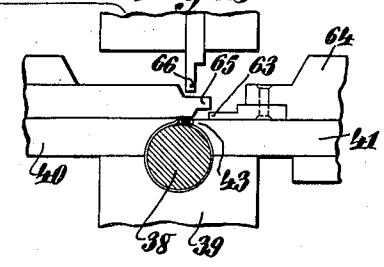
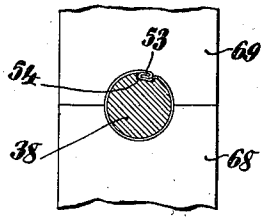


Fig. 16



CENTER LEVEL AND LOWER LEVEL

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2,264,613

UNITED STATES PATENT OFFICE

2,264,613

METHOD OF MAKING LAMP BASE FERRULES

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Application December 3, 1938, Serial No. 243,753

5 Claims. (Cl. 113—116)

Special objects of the present invention are to reduce the cost of lamp base ferrules, to make the projecting pins as integral parts of the ferrule and to construct the complete base ferrule from strip stock, all in the one continuing operation.

Further desirable objects and the novel features of invention by which the same are attained are set forth or will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate practical commercial embodiments of the invention, but it will be appreciated as the inveniton is understood that various changes and modifications may be made all within the true spirit and broad scope of the invention as hereinafter defined and broadly claimed.

Fig. 1 is a plan view with parts broken away and in section illustrating the successive steps of extruding the pins from the strip stock, trimming and edge bending the strip and then severing, rolling and lock seaming the severed blank in tubular form.

Fig. 2 is a broken part sectional side view illustrating the same sequence of operations and indicating further the indenting of the lock seam at a center level and the rolling of the bottom flange at a lower level.

Figs. 3, 4 and 5 are broken detail views illustrating successive steps at the upper level in the forming of the lock seam.

Fig. 6 is a similar view illustrating action of the dies at the center level for finally closing and indenting the seam.

Fig. 7 is a part sectional detail of the rotary die for spinning the flange at the lower level.

Figs. 8 and 9 are part sectional details of the completed ferrule, Fig. 8 being a broken part sectional side view and Fig. 9 being a cross section as on line 9—9 of Fig. 8. Figs. 10–16 illustrate successive stages in a modified form of machine.

In the general views, Figs. 1 and 2, strip stock is indicated at 15, being advanced step-by-step between cooperating die members 16, 17, having companion die elements 18, 19, for extruding spaced rounded protuberances 20, a second advanced set of companion die elements 21, 22, for drawing the rounded protuberances into smaller more nearly conical projections 23, and a third set of companion die elements 24, 25, for reducing the protuberances to substantially cylindrical sharply angled pin projections 26.

The die member 16, may be mounted on the reciprocating slide and the cooperating die 17 be mounted in relatively stationary relation on the bed of a "multi-slide" machine like that shown in Patent 1,883,513 and the advance of the strip be effected by a reciprocating feed slide or by intermittently acting feed rolls as disclosed in that same patent.

From the drawing dies the strip is shown passing over the face of a bed 27, with which cooperates trimming dies 28, 29, for cutting oppositely disposed relatively narrower and wider notches 30, 31, in the edges of the strip between adjoining pairs of integral pin projections and a stamp 32, for bending a flaring flange 33, on the edge of the strip between the narrower notches 30.

After leaving the trimming and edge bending dies, the partially formed strip passes between cooperating cutters 34, 35, Fig. 1, which sever the strip on the line 36, Fig. 2 across the notches 30, 31.

The severed blank, indicated at 37, has at such time reached a position in front of the vertically extending mandrel 38, where a substantially semi-cylindrical front bending die 39, and two substantially quarter-cylindrical side bending dies 40, 41, form it around the mandrel to the generally cylindrical shape indicated in Figs. 1 and 3.

The side bending dies 40, 41, have abruptly angled tips 42, 43, to bend the ends of the blank radially outwardly and operating in the left side bender 40 is a small bending slide 44, having a projecting tip 45, overstanding the angular tip 43, of the right side bender 41, in the Fig. 1 position, to turn the longer end of the blank at the left over the shorter right hand end (Fig. 1).

Immediately following the lapping of one end of the blank over the other as in Fig. 1, the left hand side bender 44, is retracted as in Fig. 3, and a back bender 46, comes forward at the right to turn the lapping portion of the joint in over the other end of the blank.

Fig. 4 shows the left side bender 44, advanced again to turn the overlapped parts of the seam over into interlocking relation and as this is completed, slide 44 is retracted and both back benders 46, and 47, come forward as in Fig. 5, to bend the parts inward in rounded fully interlocked relation.

After the formation of the blank into a ferrule 48, and completion of the lock seam, all at the upper level as described, the ferrule is slipped down over the mandrel to the intermediate or center level position indicated in Fig. 2, and

there the front, back, and the two side die members 49, 50, 51, 52, come together as shown in Fig. 6, to indent the completed lock seam 53, into a groove 54, extending from the center level down to the lower end of the mandrel. These cooperating dies thus have the effect of reducing the seamed ferrule to an externally cylindrical form to fit a lamp socket, with the integral hollow pins or studs 26, in diametrically opposite relation, Fig. 9, to engage in the bayonet slots in such a socket.

Upon completion of the final shaping operations at the center level, the ferrule is shifted down to the lower level indicated in Fig. 2, and at this station, the spring pressed rolls 55, carried by rotary support 56, spin that portion of the lower end of the ferrule between the notched portions 31, adjoining the seam, into a substantially rectangularly extending annular base flange 57. During such spinning operation, the ferrule is keyed to the mandrel against rotation, by the engagement of the inwardly projected seam 53, with a groove 54 in the mandrel. The wider notches 31, are of a size and so located that with completion of the lock seam and the inward spinning of the flange 57, the ends of such flange will come together substantially in abutting relation at one side of the seam, as indicated at 58, Figs. 8 and 9.

The flaring flange 33, at the top and the inwardly angled flange 57, at the bottom stiffen and reinforce the ferrule, providing sufficient rigidity and strength, with light inexpensive strip stock, thin enough to be easily worked. The extrusion of the integral hollow pins further has a reinforcing effect and these pins being integral provide for the best electrical conductivity between the lamp base and socket. By drawing these pins in several stages and while the stock is in the flat condition, the desired sharply angled projection of the pins is readily attained. Also with formation of these pins first, there only remain the bending, lock seaming and end flanging to be performed and which can be accomplished in the relatively simple, easy stages disclosed. By working in the three levels illustrated, the flat strip stock can be quickly transformed into completed pin ferrules, all in the one machine. While particularly light and inexpensive, these lamp base ferrules are sufficiently rigid and strong for all purposes, and because of their integral character are actually better electrically than the more expensive forms of bases now in general use. The proportions, positions and relations of parts forming the one piece ferrule are typical and may be varied to suit different lamps or to fit different sockets. The angle of the flaring flange 33, at the upper end of the ferrule may be varied to suit the flare of different globe shapes with which the base is used.

Figs. 10 to 16 illustrate certain possible modifications in the bending and forming operations.

In Fig. 10, the strip is shown as advanced against a front stop 59, behind a shoulder 60, so that slide 61, as it then advances, will bend the front end of the stock over the shoulder at a sharp angle as indicated at 62, Fig. 11. The cutter 34 may be of the shear type and be timed so that it will not have severed the stock while this preliminary bending is taking place, thus to prevent the stock from creeping during such operation.

Fig. 12 shows the front slide 39 as having advanced to break the strip around the mandrel and the side benders 40, 41, as having come in to complete the circular formation of the stock. In this closing movement, the small shoulder 63, on the slide 64, which carries the right hand side bender 41, comes to a position in back of the angular seam bend 62, to accurately locate said bend on the mandrel and to back it up as the bender 65, at the left comes in and turns the other projecting end portion of the stock over the end of the first formed bend and over the top of the right hand bender 63, as in Fig. 13. Then while the stock is still held by the front and the two side benders 39, 40, 41, as in Fig. 14, a slide 66, at the back comes in and folds the projecting part of the second mentioned end of the stock inward over the projecting tip of the first end of the stock.

The final operation at the upper level is shown in Fig. 15, involving retreat of the back bender 66, and advancing of the left hand bending slide 65, which previously had retracted out of the way of the back bender, inward against the hooked together ends of the stock, thus to flatten them down into fully interlocked relation.

Details of the slides are not shown, because the mounting and the actuation of the same are conventional. Fig. 1 shows how slide 44 at the left and slide 41 at the right may be mounted to operate in the main side slides 40 and 64, respectively and separately actuated when required by individual cams and springs. Thus the right hand slide 41 is shown as backed up by a spring 67, which as indicated in Figs. 12 and 14, will hold it up to the work while the main slide 64 is retracted to provide clearance for the back slide 66.

After being shifted from the upper level to the center level, the front and back slide members 68, 69, come together as in Fig. 16, to force the completed seam 53, inwardly into the groove 54, in the mandrel and thus leave the tubular blank with a substantially cylindrical exterior. These slide members may be portions of or be carried by the front and back slide members at the upper level.

The shifting of the tubular blanks from the upper, to the center, then to the lower level and finally off the lower end of the mandrel may be accomplished by lifting the mandrel at the end of each cycle and by the provision of a relatively stationary stripper in position over the top of the upper tubular blank. Thus with each upward stroke of the mandrel (Fig. 2), the upper tubular blank, held by the stripper will be slipped down over the mandrel into engagement with the upper end of the second blank forcing the latter down to the lower end of the mandrel and causing the second blank to strip the bottom blank which has just previously been flanged, off the end of the mandrel.

The locked seam stiffens and reinforces the ferrule, enabling light, inexpensive and easily formed strip stock to be used. The displacement of the seam inward within the circular outline of the ferrule, leaves the ferrule with a truly cylindrical shape, which will properly fit into a lamp socket. Further, this inward displacement, in addition to providing an internal key which will fit the groove in the mandrel to hold the blank against rotation while the rolls are spinning the bottom flange, also provides a permanent interlock between the ferrule and the plastic material usually employed in mounting the lamp globe in the ferrule. This is a distinct advantage in overcoming the tendency to twist the bulb

away from the ferrule in replacing and removing a lamp in respect to a socket.

While usually desirable to extrude and form the integral holding pins on the ferrule, it may be preferable at times to construct the ferrule otherwise as here shown and to form up or apply these pins later, either as integral or as separately attached elements.

What is claimed is:

1. The method of manufacturing lamp base ferrules, which comprises striking spaced integral hollow projections from flat strip stock, rolling said stock to substantially cylindrical form with said projections located at the outside and disposed substantially diametrically opposite, overlapping the ends of the stock in a seam and holding said substantially cylindrical structure by said seam against rotation while turning the end of the structure inwardly in an angularly projecting flange.

2. The method of manufacturing lamp base ferrules, which comprises punching spaced integral hollow projections in flat strip stock, severing the strip stock in blanks and bending about a mandrel and securing said blanks in substantially cylindrical formation on said mandrel, longitudiually, shifting the cylindrical structure to a different position on said mandrel and there finishing the structure to externally cylindrical formation, and then shifting the structure to another position near the end of the mandrel and flanging the same inwardly over the end of the mandrel at said last mentioned position.

3. The method of manufacturing lamp base ferrules, comprising punching spaced integral hollow projections in strip stock, bending the stock about a grooved mandrel with said projections at the outside, joining the ends of the stock in a lock seam, forcing said seam inwardly into the groove of the mandrel and rolling a flange inwardly on the end of the structure while the same is held against rotation by engagement of the seam in the groove of the mandrel.

4. The method of manufacturing lamp base ferrules, which comprises punching spaced integral hollow projections in strip stock, notching the opposite edges of the stock between pairs of the projections, severing the stock across the notches into blanks, bending the blanks into substantially cylindrical formation with the projections at the outside and in substantially diametrically opposite relation, seaming together the notched end portions of the blanks and bending the edges of the blank inwardly between said notched end portions circumferentially into flanges while holding the ferrule by engagement with the seam so produced.

5. The method of manufacturing lamp base ferrules, which comprises punching spaced integral hollow projections in strip metal stock, notching one edge of said stock between pairs of said punched integral projections, severing said stock into blanks on lines intersecting intermediate portions of said notches, to thereby leave said blanks with ends of reduced width, bending said blanks to substantially cylindrical formation and securing said end portions of reduced width together with the hollow integral projections at the outside of the article and then angularly bending the full width portion of the stock intermediate said notched and seamed reduced width end portions inwardly into an integral annular flange at the end of the article.

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