Sept. 3, 1957 D. A. GROVEMILLER ET AL 2,805,406

LAMP BASE

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Fig. 1.

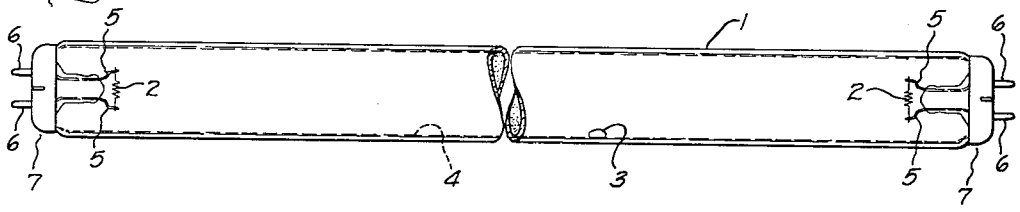


Fig. 2.

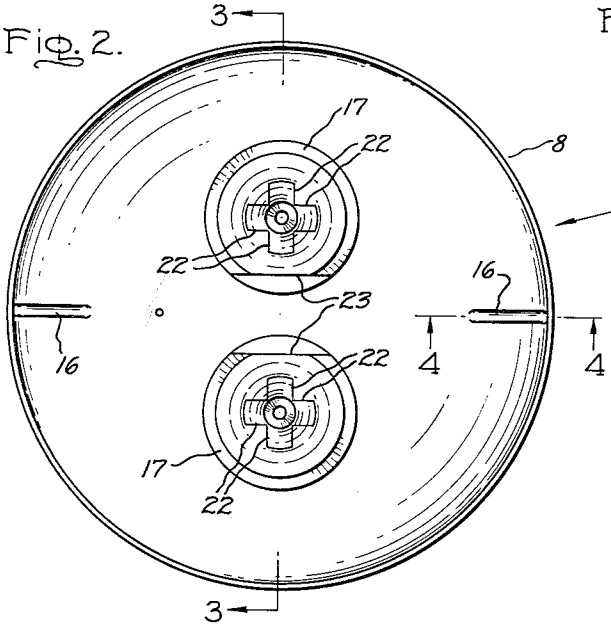


Fig. 3.

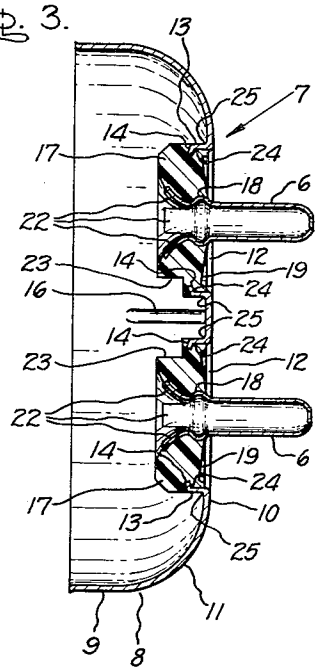


Fig. 4.

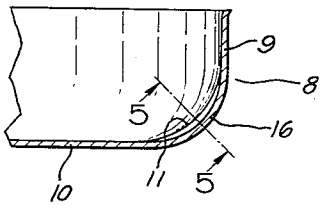


Fig. 5.

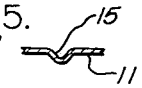
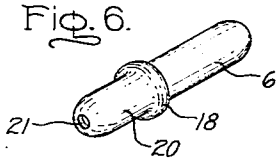


Fig. 6.



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LAMP BASE

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Application November 26, 1954, Serial No. 471,208

5 Claims. (Cl. 339—145)

Our invention relates, in general, to electric lamps and similar devices, and more particularly to a base or terminal structure for such devices. The invention is of especial utility in connection with electric discharge lamps of the well-known fluorescent type in general use at present, which usually comprise a tubular glass envelope having a base structure at each end thereof and a thermionic electrode sealed within each end of the envelope and electrically connected to the contacts or terminals of the adjacent base.

The base construction most commonly employed on fluorescent lamps at present comprises a shallow cap or shell portion having a pair of contact pins each of which is insulatively fastened in place within an aperture in the metal shell by a pair of paper resin-impregnated insulating wafers to which the contact pins are staked to thereby secure the pins thereto and at the same time clamp the insulating wafers to the base shell. Because of the very small size of the contact pins customarily employed for such type bases, the openings into the hollow interiors of the pins, at the inner sides of the base, are not sufficiently large to provide easy threading or insertion of the lamp lead-in wires in the pins during the assembly of the base onto the lamp envelope. Moreover, the strength of such conventional type bases has not been sufficient to prevent occasional breakage of the base on a lamp.

It is an object, therefore, of our invention to provide a novel pin-type lamp base of simple and inexpensive construction and which affords easy threading of the lamp lead-in wires into the hollow contact pins of the base.

Another object of our invention is to provide a pin-type lamp base of improved appearance, and of greater strength and resistance to breakage under impact, than pin-type bases heretofore in use.

Briefly stated, in accordance with one aspect of our invention, a lamp base is constituted of a thin metal cap or shell portion having an insulator button of molded plastic material molded into an aperture in the end wall of the metal shell and having a tubular contact pin molded in the insulator button with its inner end formed with a plurality of tongues which are widely flared out, the material of the insulator button filling the spaces between and lying flush with the inner sides of and completely embedding the tongues of the pin to thereby form, in conjunction therewith, an annularly continuous widely flared out entrance opening leading into the hollow interior of the contact pin.

Further objects and advantages of our invention will appear from the following detailed description of a species thereof and from the accompanying drawing.

In the drawing,

Fig. 1 is a side elevation of a gaseous electric discharge device provided with a base comprising our invention;

Fig. 2 is a plan view of the inside of the base comprising our invention;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view of the base shell taken on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary sectional view on the line 5—5 of Fig. 4; and

Fig. 6 is a detailed perspective view of one of the contact pins employed in the manufacture of the base comprising our invention.

Referring to Fig. 1, the invention is there illustrated as applied to a base for an electric discharge device such as a fluorescent lamp. The electric discharge device comprises an elongated tubular or cylindrical glass envelope 1 having filamentary electrodes 2 sealed into the opposite ends thereof. Each of the electrodes 2 preferably comprises a coiled-coil of tungsten wire coated with a suitable electron-emissive material such as one or more oxides of alkaline earth metal, e. g., a mixture of barium and strontium oxide. The envelope 1 contains a gaseous atmosphere such as a rare gas like neon, argon or mixtures thereof at a pressure of a few millimeters, and a small quantity of mercury 3 which, during the operation of the lamp, vaporizes to produce mercury vapor at a relatively low pressure of the order of 10 microns or thereabouts. Where the device is to serve as a fluorescent lamp, a coating 4 of a suitable fluorescent material may be applied to the inner surface of the envelope 1. Each of the electrodes 2 is connected at its ends to a pair of lead-in wires 5 which are sealed through the adjacent end of the envelope 1 and are electrically connected to the terminals or contact pins 6 of a base structure 7 comprising our invention and suitably secured to the end of the envelope, as by conventional basing cement.

The base 7 according to the invention comprises a shallow, relatively thin metal cap or shell member 8 having a short cylindrical side portion 9 and a flat end wall portion 10 joined by a rounded corner wall portion 11. The end wall 10 of the shell 8 is formed with a pair of pin-receiving apertures 12, preferably of circular shape, as shown, and disposed in an axial plane of the shell, the two apertures being spaced apart a distance corresponding to the desired spacing of the contact pins 6, e. g., one-half inch between centers in the case of the particular base illustrated. The shell 8 is also formed with short re-entrant flanges 13 bordering the rim of the apertures 12 to provide wells in the shell end wall 10. The flanges 13 are provided at their inner ends with inturned edge or lip portions 14. In the particular case illustrated, the re-entrant flanges 13 have a depth of the order of 1/16 inch and the inturned edge portions 14 have a width of the order of .01 inch. The inturned edge or lip portions 14 of the flanges 13 are initially flared inwardly of the shell at an angle of the order of 20° to the plane of the end wall 10 of the shell. The shell 8 is also preferably provided with suitable indicator or locating means, preferably in the form of short outwardly deformed cross ribs or ridges 16 formed in the rounded corner wall portion 11 of the shell and extending diametrically thereof and approximately normal to the axial plane of the flanged apertures 12. The said locating means 16 may be used, for example, to indicate the proper rotational positioning of the lamp in its sockets when inserted thereinto.

Extending through the respective apertures 12, and embedded in insulator buttons 17 molded in the apertures, are the tubular metal contact pins 6 which constitute the terminal contacts of the base. Intermediate their lengths, the said contact pins are formed with small upset collar portions or annular enlargements 18 which, as shown, are embedded in the insulator button 17 adjacent the outer faces 19 of the latter to thereby positively lock the pins in place in the buttons against endwise movement inwardly thereof. Also, as shown in Fig. 6, the contact pins 6 are initially formed, prior to the molding thereof into the insulator buttons 17, with rounded inturned or dome-shaped inner ends 20 which are provided with a

centrally located circular aperture 21 and which, during the molding of the pins into the insulator buttons, are spread or flared out widely by the molding force member or plunger, as shown in Fig. 3, to form a plurality (four in the particular case shown) of separate widely flaring tongue portions 22 at the inner ends of the pins. The small circular aperture 21 at the inner ends of the pins is adapted to receive and form a seal with a small flaring extension on the molding force or plunger which acts to widely flare out the inner ends of the pins during the molding operation.

The insulator buttons 17, which are formed of a suitable plastic molding compound, fill the wells formed by the re-entrant flange portions 13 of the base shell 8 and they extend inwardly beyond the lip portions 14 of the flanges 13 and beyond the innermost extremities of the tongues 22 on the contact pins 6 so as to completely embed the contact pins 6 inwardly from the collar portion 18 thereof, including the tongue portions 22, as well as to completely embed the said inturned edge or lip portions 14 of the re-entrant flanges. The insulator buttons 17 also fill the spaces or interstices between adjacent tongues 22 of each contact pin 6, and the inner surfaces of these interstitial portions of the insulator buttons, between the tongues of the contact pins, are widely flared out concentric and flush with the inner surfaces of the tongues to thereby provide, in conjunction therewith, a continuous smooth widely flaring entrance opening leading into the hollow interior of the pin for guiding and affording easy threading of the lamp leading-in wire into the pin during the assembly of the base onto the lamp envelope. To provide sufficient space between the two insulator buttons 17 for the accommodation of the customary lamp exhaust tip therebetween, the facing sides of the said buttons are correspondingly notched or recessed inwardly from a point closely adjacent the embedded edges or lips 14 of the shell flanges 13, as indicated at 23, to thereby provide a widened space between the buttons for such exhaust tip accommodation purpose.

For the purposes of the invention, the insulating buttons 17 may be formed of a thermosetting plastic molding compound such as those comprising phenol-furfural resins or phenolic resins, or a phenol-furfural resin and formaldehyde to which may be added a plasticizer such as dibutyl phthalate, a lubricant such as hexamethylene tetramine, an accelerator such as benzoyl peroxide, and a filler such as wood flour. The required amount of molding compound to form each insulator button 17 is compressed into a ring-shaped body or preform which is placed in the base molding die, over the projecting inner ends of the contact pins 6 therein, and within the apertures 12 of the base shell 8, and then pressed by the molding apparatus into the final shape of the insulator button.

The inturned edge portions 14 at the inner ends of the reentrant shell flanges 13 extend abruptly away therefrom to form a sharp internal corner with the inner side of the shell flanges 13, as shown at 24 in Fig. 3. The sharp corners 24 provide a more secure or firm anchorage of the shell flanges 13 in the insulator buttons 17 such as affords increased strength against the shell flanges pulling out of the plastic insulator buttons 17 on subjection of the latter to endwise pressure tending to push the insulator buttons 17 inwardly through the shell apertures 12. Also, the shell flanges 13 extend abruptly away from the end wall 10 of the shell 8 to form a sharp corner with the inner side of the base shell end wall 10, as indicated at 25 in Fig. 3. Such a sharp corner 25 enables an effective seal-off to be made to the inner side of the base shell end wall 10 by the molding apparatus whereby leakage or flow of the plastic molding material onto the inner side of the base shell end wall during the molding operation is effectively prevented. In addition, by forming such a sharp corner 25 at the junction between the shell end wall 10 and the shell flanges 13, the inner surfaces of the shell flanges 13 are thereby made to provide continuous cylindrical sealing-off surfaces extending substantially to the outer face of the shell end wall 10 and at right angles thereto, for snugly receiving short cylindrical sealing-off bosses upstanding from the bottom face of the molding die. A secondary sealing-off point is thereby provided against outward flow of the plastic molding compound onto the outer face of the shell end wall 10, the other or main sealing-off point against such outward plastic flow being provided by the abutting engagement of the shell end wall 10 with the upper face of the molding die.

From the above description, it will be apparent that we have provided an improved form of pin-type lamp base which not only affords easy and quick insertion or threading of the lamp lead-in wires into the hollow contact pins of the base during the assembly of the base onto the end of the lamp envelope, but which also possesses materially increased strength and resistance to breakage or separation of the base insulation from the base shell under impacts such as tend to push the contact pins and base insulation inwardly of the base shell.

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

1. A lamp base comprising a metallic shell having an end wall provided with an aperture and a short re-entrant flange normal to said end wall and bordering said aperture to provide a well in said end wall, said flange being formed at its inner end with an inturned edge portion extending abruptly away from said flange, the width of said inturned edge portion being less than the depth of said well, an insulator button of plastic molding material substantially filling said well with the said inturned edge portion of said flange completely embedded in the said button, and an outwardly protruding tubular contact pin embedded at one end in said button, the wall of said contact pin being multiply split open at the embedded inner end thereof to form a plurality of tongues, said tongues being widely flared out to define an approximately circular widely flaring entrance opening into the hollow interior of said pin, and the material of said insulator button embedding the side and end edges of said tongues, extending beyond the inner end of said contact pin and having widely flared out inward surfaces concentric and flush with the inner sides of said tongues to provide, in conjunction therewith, a continuous widely flaring entrance opening leading into the hollow interior of said pin for guiding a leading-in wire thereinto.

2. A lamp base substantially as set forth in claim 1 wherein the said contact pin is provided with an annular enlargement embedded in the said plastic insulator button at the outer face thereof.

3. A lamp base comprising a metallic shell having an end wall provided with a pair of side-by-side circular apertures and short re-entrant approximately cylindrical flanges normal to said end wall and bordering each of said apertures to provide wells in said end wall, said flanges being formed at their inner ends with inturned annular edge portions extending abruptly away from said flanges, the width of each of said inturned edge portions being less than the depth of the respective wells, insulator buttons of plastic molding material substantially filling respective ones of said wells with the said inturned edge portions of said flanges completely embedded in the said buttons, and outwardly protruding tubular contact pins embedded at one end in respective ones of said buttons, the wall of each of said contact pins being multiply split open at the embedded inner end thereof to form a plurality of tongues, said tongues being widely flared out to define an approximately circular widely flaring entrance opening into the hollow interior of said pins, and the material of the respective insulator button embedding the side and end edges of said tongues, extending beyond the inner ends of said contact pins and having widely flared out inward surfaces concentric and flush with the inner

sides of said tongues to provide, in conjunction therewith, a continuous widely flaring entrance opening leading into the hollow interior of said pin, said contact pins further having annular enlargements located immediately adjacent the outer faces of and engaging the respective insulator buttons to thereby lock the pins in place therein against endwise movement inwardly of the base.

4. A lamp base substantially as set forth in claim 3 wherein the facing sides of said insulator buttons, inwardly beyond the inturned inner edges of said flanges, are correspondingly notched to provide a widened space therebetween for the accommodation of an exhaust tip on an associated lamp.

5. A lamp base substantially as set forth in claim 3 wherein the said contact pins are disposed centrally of

said insulator button and in an axial plane of said shell, and wherein said shell is formed with a rounded corner wall portion joining the end and side wall portions of the shell and provided with narrow ridge-like projections extending approxmiately diametrically of the shell and normal to the plane of said contact pins.

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