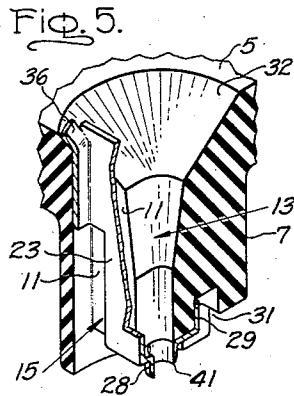
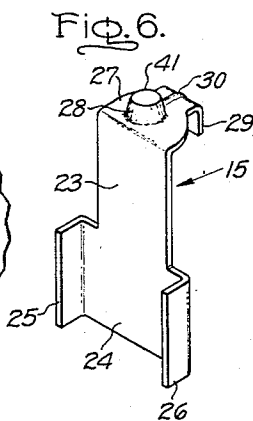
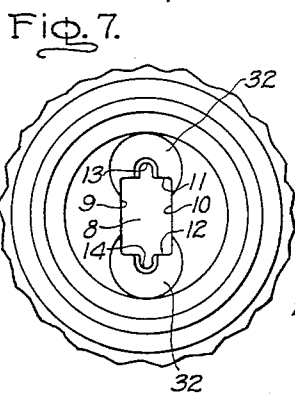
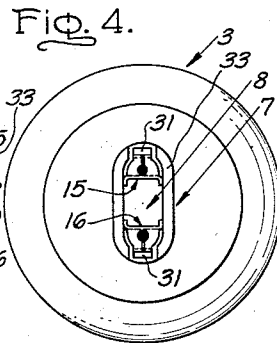
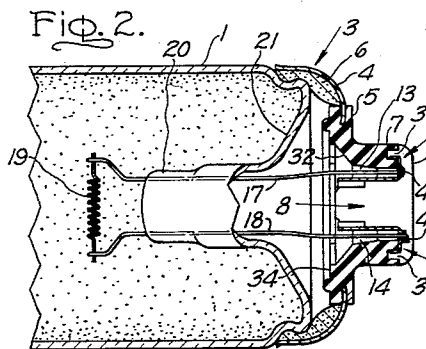
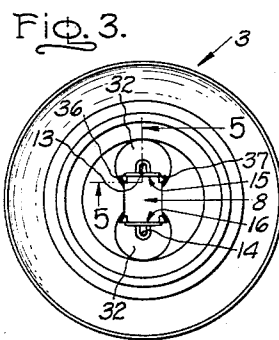
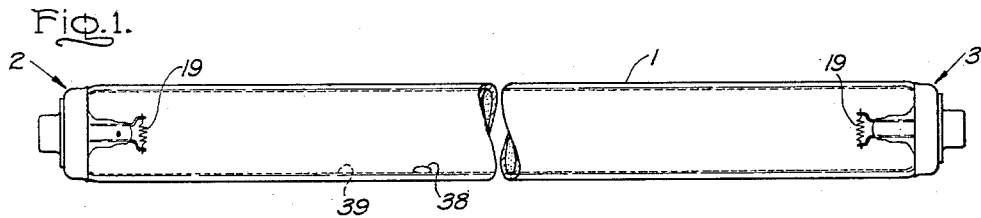


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A. M. KRUPP ET AL
RECESSED DOUBLE CONTACT STRIP BASE
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2,922,137

RECESSED DOUBLE CONTACT STRIP BASE

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The present invention relates to bases for electric lamps and similar devices and especially for double-ended electric lamps of the type having preheatable electrodes mounted at the ends of a tubular glass envelope and a pair of spaced apart current inlead wires for each of the electrodes extending from the ends of the envelope.

In the U.S. Patents 2,716,739, Eugene Lemmers, 2,733,420, Ray E. Marz, and 2,733,421, Dale A. Grovemiller, all of which patents are assigned to the assignee of the present application, bases useful for lamps of the above type are disclosed and claimed. A feature of the patented bases is an increased safety factor obtained by recessing the current inlead wires at each end of the tubular envelope within a base body of electrically insulating material and utilizing the recessed wires as the lamp terminals or contacts. This eliminated the usual outwardly projecting exposed contact pins on the lamp bases.

While such bases have proven eminently satisfactory for safety purposes, difficulties have been encountered in properly mounting lamps equipped with such bases in lamp holders. These difficulties were caused by failure of the lamp holder contacts to engage the wire terminals of the lamps due to the small contact area provided by such wire terminals. Failure to make such contact between the lamp terminals and the lamp holder contacts resulted in failure of the lamps to start and operate. While such difficulties could be overcome and were successfully overcome in most installations of such lamps and lamp holders by precise mounting of the holders on the lighting fixtures and by precise mounting of the bases on the lamps, such precision mounting of these elements is complicated and expensive and adds considerably to the cost of lighting installations of this kind.

The principal object of the present invention is to provide lamp bases of the above type which retain the safety features of such bases and by which the above difficulties are avoided. Another object of the invention is to provide a lamp base of the above type and mountable in existing lamp holders for such bases in which a larger contact area is provided on the base for engagement by the contacts of the lamp holders. A further object of the invention is to provide a lamp equipped with the improved bases of the present invention and which is easily assembled at minimum cost. A still further object of the invention is to provide such a lamp in which the electrical resistance in the electrode heating circuit including the inlead wires of the lamp is no greater than the resistance of such a circuit when the inlead wires are utilized as the lamp terminals or contacts. Further objects and advantages of the invention will appear from the following detailed description or species thereof, from the accompanying drawing and the appended claims.

In accordance with the invention, the above objects are attained without reducing the safety factor of such bases by utilizing as the lamp contacts or terminals metal strips of large area securely fastened and recessed within the insulating body of the base, by utilizing the strip

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contacts to define, in part, a wiring passage for the inlead wires and by securely fastening, as by soldering or welding, the ends of the current inlead wires of the lamp to the strip contacts of the base to make a positive low-resistance electrical connection between the strip contacts and the wires.

In the drawing accompanying and forming part of this specification, an embodiment of the invention is shown in which;

Fig. 1 is a side elevational view of a double-ended electric discharge lamp provided with bases embodying the invention.

Fig. 2 is a fragmentary sectional view on an enlarged scale of one end of the based lamp shown in Fig. 1.

Fig. 3 is a plan view of the base shown in Fig. 2 as seen from the inner end of the base which end is attached to the lamp envelope.

Fig. 4 is a similar view of the base shown in Figs. 2 and 3 as seen from the outer end of the base.

Fig. 5 is a fragmentary isometric view of the portion of the base taken along the lines 5, 5 of Fig. 3.

Fig. 6 is an isometric view of a metal contact member embodying the invention and useful in bases of the structure shown in Figs. 1 to 5 and

Fig. 7 is a view similar to Fig. 3 showing a fragment of the base with the contacts removed to show the interior of the insulating molded part of the base.

Referring to Fig. 1 of the drawing, in which like numbers denote like parts in all figures, the double-ended electric discharge lamp comprises a tubular sealed glass envelope 1 provided with bases 2 and 3 attached to its ends. The bases 2 and 3 are of identical structure and the parts of only the base 3 have been shown in Figs. 2 to 7 for conciseness in description.

The base 3 comprises an annular metal shell 4, which is suitably made of sheet aluminum, and a hollow body member of electrically insulating material, such as an organic plastic, in the form of an embossed disk 5. The disk 5 may be made of commercial plastic molding compounds, such as those comprising phenol-furfural resins or phenolic resins. The inner rim of the shell 4 is embedded in the periphery of the insulating disk 5 to mechanically join these base members, as shown in Figs. 2 to 4. The base 3 is secured to the end of the glass envelope 1 by a body of basing cement 6.

The disk 5 has a raised elongated embossment 7, flattened in cross section, extending across its center and projecting outwardly from the base (Figs. 2 and 4) for engagement with a holder (not shown) for the lamp. The embossment 7 has straight parallel sides and rounded ends in cross section. The embossed portion of the disk 5 is hollow and defines a slot 8 extending through the base and conforming generally in shape in cross section to that of the embossment 7, as shown in Figs. 2, 3, 4 and 7. The slot 8 accommodates the electrical contacts of a lamp holder and has two side walls 9 and 10 and two end walls 11 and 12 (Fig. 7).

Wiring passages extending from the back to the front of the base through the embossed portion of the disk 5 are provided at opposite ends of the slot 8. These passages are defined in part by the rounded walls of the recesses 13 and 14 in the end walls 11 and 12, respectively, of the slot 8 and in part by a pair of metal strip contacts 15 and 16, preferably of brass which may be plated with silver. The strip contacts 15 and 16 are staked to the base within the slot 8 and against the end walls 11 and 12 so as to cover the said end walls and the recesses therein to define with said recesses the wiring passages. The contacts 15 and 16 thus are exposed within the slot 8 and at opposite ends thereof for engagement by lamp holder contacts received within the slot.

The inlead wires 17 and 18 connected to the ends of

electrode 19 and extending through the press 20 of the stem 21 of the glass envelope 1 of the lamp extend into the wiring passages defined by the walls of the recesses 13 and 14 and the contacts 15 and 16, as shown in Fig. 2, and are fastened and electrically connected to the strip contacts 15 and 16 in the completed lamp as described below. The lamp holder contacts received within the slot 8 thus engage the strip contacts 15 and 16 only and not the inlead wires 17 and 18. Since the contact area provided by the strip contacts 15 and 16 is substantially larger than the contact area provided by the inlead wires 17 and 18 used as the lamp contacts or terminals in prior bases of this type, the difficulties previously encountered in bringing the holder contacts and the lamp contacts into effective engagement are completely eliminated by the present base incorporating the strip contacts 15 and 16.

The strip contacts 15 and 16 are identical in structure and the structure of contact 15 is shown in Fig. 6 of the drawing. Also, the contacts 15 and 16 are staked into the base in the same manner. It is sufficient for a complete understanding of the invention, therefore, to describe the structure of the contact 15 and the manner in which this contact is staked to the base, it being understood that the structure of the contact 16, the staking thereof into the base and the structure of the embossed portion of the disk 5 engaged by contact 16 is the same as described in connection with contact 15.

As shown in Fig. 6 of the drawing, the bent metal strip constituting contact 15 has an elongated flat portion 23 which provides a large contact area for engagement by the lamp holder contacts. Upstanding in the same direction at the edges of the widened end portion 24 of the strip are two parallel flanges 25 and 26. The opposite end portion 27 of the strip is bent in the direction opposite that in which the flanges extend and is provided with an upstanding eyelet 28 having an opening large enough to pass therethrough the inlead wire 17. The strip terminates at this end portion 27 in a tab 29 which is bent back parallel with the flat portion 23 of the strip and is provided with a strengthening rib 30 (Fig. 6).

The contact 15 is staked to the base and within the slot 8 as illustrated in Figs. 2 to 5. As shown at 31 and 32 in these figures the center portion of the disk 5 having the embossment 7 is recessed in the front face 33 of the embossment and in the back face 34 of the disk 5. The recesses 31 and 32 are adjacent the end wall 11 of the slot 8. The recess 31 in the front face 33 of the embossment 7 is in the form of a cavity or pocket into which extends the tab 29 on the contact 15. The front face 33 of the embossment 7 is also recessed between the pocket 31 and the slot 8 and around the front end of the wiring passage so that the eyelet 28 of the contact 15 is in back of the front face 33 of the embossment 7 for safety purposes and the opening in the eyelet is coaxial with the wiring passage when the contact 15 is properly staked to the base, as shown in Figs. 2 and 5.

The recess 32 in the back face 34 of the embossed portion of the disk 5 is conical in shape and the flanges 25 and 26 of the contact 15 are flared outwardly as shown at 36 and 37 in Figs. 3 and 5 to engage the sloping sides of the conical recess 32. The contact 15 is thus firmly staked to the disk 5 and within the slot 8 defined thereby.

The conical recess 32 opens at its vertex into the wiring passage defined by the walls of the recess 13 and the contact 15 when the latter is staked to the base. The recess 32 thus provides a widely flaring funnel shaped opening into the wiring passage for facilitating the threading of the inlead wire 17 through the base in assembling the base on the end of the lamp envelope in the usual manner described below.

The contacts 15 and 16 are staked to the base in the manner described above before the base is mounted on the end of the lamp envelope. Preferably, in staking the contacts 15 and 16 to the base the contacts are in-

troduced at the same time, flanged end first, into the slot 8 from the front end of the embossment 7. The tabs 29 are then positioned in the pockets 31 provided in the embossment 7 and thereafter the ends of the flanges 25 and 26 are bent over as shown at 36 and 37, as by being struck with a tool, to engage the sloping sides of the conical recesses 32 in the back face 34 of the embossed portion of the disk 5.

The base 3 with the contacts 15 and 16 thus mounted therein is mounted on the end of the envelope 1 by threading the inlead wires 17 and 18 through the wiring passages defined in part by the contacts 15 and 16, including the eyelets 28 of the contacts, curing the basing cement 6 previously provided on the base until it becomes hardened to fasten the base to the lamp envelope and then fastening the ends of the wires 17 and 18 to the eyelet portions of the base contacts 15 and 16, respectively. This completes the assembly of the base 3 and the lamp envelope 1. The base 2 is then mounted on the opposite end of the lamp envelope 1 in the same manner to complete the manufacture of the lamp.

While the wires 17 and 18 may be fastened to the eyelet portions 27, 28 of the contacts 15 and 16 by cutting off the excess length of the wires extending beyond the eyelets 28 after the wires have been threaded through the base and the base mounted on the envelope as described above and then soldering together the eyelets and the remaining ends of the wires, it is preferred to weld the wires and the eyelets together to form a welded junction therebetween which consists solely of intermingled metals of the wire and the contact.

The method disclosed in the Warren F. Albrecht Patent No. 2,749,528, patented June 5, 1956 and assigned to the assignee of the present application is adapted for welding the wires and the contacts together. In accordance with the method of this patent the excess length of the wire is cut off so as to leave a relatively short stub 40 (Fig. 2) projecting beyond the end of the eyelet 28, the stub is bent over the edge 41 of the eyelet and makes contact therewith. The edge 41 of the eyelet is made thin so as to be of low thermal mass, as shown in Figs. 5 and 6. A welding electrode is then brought into contact with the bent over wire stub 40 and a second electrode engages the contact at a part thereof spaced from the eyelet. A capacitor is discharged through the circuit including the wire which, because of its low thermal mass, melts almost immediately and the heat developed by the discharge very quickly liquifies the wire stub and the thin annular tip 41 of the eyelet 28 to fuse the molten metal from the stub and the eyelet together to form a welded joint, shown at 42 in Fig. 2. Obviously, other methods of welding the lead wire and the contacts together may be used.

The lamp shown in side elevation in Fig. 1 of the drawing may be about 8 feet in length and about 1½ inches in diameter. The electrodes 19 sealed into the ends of the envelope 1 each comprises a tungsten filament coated electron emissive material, such as alkaline earth compounds, and each is of the type requiring preheating to an electron emitting temperature before starting of an electric discharge between the said electrodes at opposite ends of the lamp envelope. The envelope contains a starting gas, such as argon, at a few millimeters pressure and a small measured quantity 38 of mercury, the vapor of which is at a pressure of about 10 microns during operation of the lamp. A coating 39 of fluorescent material is provided on the inner surface of the envelope 1 and this material is excited to luminescence by the intense emission of 2537 A. wave length radiation of the low pressure mercury vapor discharge during operation of the lamp. Such lamps are commercially available and a species thereof is known in the trade as the rapid-start fluorescent lamp. A low-voltage heater circuit is employed to furnish the heating current to the preheat electrodes of such lamps and the strip contacts soldered

or welded to the inlead wires in accordance with the present invention minimize the electrical resistance in the heater circuit.

While a preferred species of the invention has been disclosed above it will be understood that such disclosure is for illustrative purposes and that it is contemplated that changes may be made in the form and details of the base without departing from the invention as defined in the appended claims, for example, the contact strips may be of other shapes and may be molded into the plastic insulating body with the contact areas thereof recessed and exposed within the base for engagement by lamp holder contacts.

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

1. An electric lamp comprising an elongated tubular glass envelope having metal wire inleads extending from each of its ends and a base attached to each end of said envelope, each of said bases comprising an electrically insulating body member in the form of a disk having a raised elongated embossment extending outward from the lamp for engaging a lamp holder, a slot in the front face of said embossment for receiving lamp holder contacts and metal strip contacts affixed to said disk and extending through said slot, the end walls of said slot being recessed and the said contacts engaging said end walls and covering the recesses therein and defining with the walls of said recesses wiring passages extending through the embossed portion of said disk, the outer ends of said strip contacts being bent outwardly from said slot and over the outer ends of said wiring passages, said inleads extending along said wiring passages and being electrically connected to the bent outer ends of said contacts, the front face of said embossment being recessed around the outer ends of said wiring passages and exposing the outer ends of said strip contacts for engagement with lamp holder contacts, the depth of the said recesses in the front face of said embosment being greater than the thickness of the bent portions of said strip contacts to protect said strip portions from accidental contacts.

2. A base for attachment to an end of a double-ended tubular lamp envelope having a pair of inlead wires extending from each of its ends, said base comprising an electrically insulating body member in the form of a disk having a raised elongated embossment flattened in cross section and extending outward from the base for engaging a lamp holder, a slot in the front face of the embossment for receiving lamp holder contacts and metal strip contacts affixed to said disk and extending through said slot, the end walls of said slot being recessed and the said contacts engaging said end walls and covering the recesses therein and defining with the walls of said recesses wiring passages extending through the embossed portion of said disk, the outer ends of said strip contacts being bent outwardly from said slot and over the outer ends of said wiring passages and having openings therein communicating with said passages for threading lamp inlead wires through said base, the front face of said embossment being recessed around the outer ends of said wiring passages and exposing the outer ends of said strip contacts for engagement with lamp holder contacts, the depth of the said recesses in the front face of said embossment being greater than the thickness of the bent portions of said strip contacts therein to protect said strip portions from accidental contacts.

3. A base for attachment to an end of a double-ended tubular lamp envelope having a pair of inlead wires extending from each of its ends, said base comprising an electrically insulating body member in the form of a disk having a raised elongated embossment flattened in cross section and extending outward from the base for engaging a lamp holder, a slot in the front face of the embossment for receiving lamp holder contacts and metal strip

contacts affixed to said disk and extending through said slot, the end walls of said slot being recessed and the said contacts engaging said end walls and covering the recesses therein and defining with the walls of said recesses wiring passages extending through the embossed portion of said disk, the outer ends of said strip contacts being bent outwardly from said slot and over the outer ends of said wiring passages and having openings therein communicating with said passages for threading lamp inlead wires through said base, the bent outer ends of said strip contacts terminating in a tab bent inward of said embossment, the front face of said embossment being recessed around the outer ends of said passages and at the parts thereof on the sides of the outer ends of said passages away from said slot to form a pocket accommodating the contact tabs, the depth of the recesses in the front face of said embossment being greater than the thickness of the bent portions of said strip contacts therein to protect said strip portions from accidental contacts, the back face of said disk having conical recesses therein adjacent the end walls of said slot and communicated at the vertex thereof with said wiring passages, the inner ends of said contacts engaging the walls of said conical recesses to affix said contacts to said disk.

4. A base for attachment to an end of a double-ended tubular lamp envelope having a pair of inlead wires extending from each of its ends, said base comprising an electrically insulating body member in the form of a disk having a raised elongated embossment flattened in cross section and extending outward from the base for engaging a lamp holder, a slot in the front face of the embossment for receiving lamp holder contacts and metal strip contacts affixed to said disk and extending through said slot, the end walls of said slot being recessed and the said contacts engaging said end walls and covering the recesses therein and defining with the walls of said recesses wiring passages extending through the embossed portion of said disk, the outer ends of said strip contacts being bent outwardly from said slot and over the outer ends of said wiring passages, the bent over outer ends of said strip contacts each having thereon an upstanding eyelet defining an opening communicating with the corresponding wiring passage for accommodating a lamp inlead wire threaded through the wiring passage, each of said eyelets being provided with a readily fusible thin annular outer edge for facilitating welding to the strip contact a lamp inlead wire accommodated by said eyelet, the bent over outer end of each of said strip contacts terminating in a tab bent inward of the said embossment, the front face of said embossment being recessed around the outer ends of said passages and at the parts thereof on the sides of the outer ends of said passages away from said slot to form a pocket accommodating the contact tabs, the depth of the recesses in the front face of said embossment being greater than the thickness of the bent portions of said strip contacts therein to protect said strip portions from accidental contacts, the back face of said disk having conical recesses therein adjacent the end walls of said slot and communicated at the vertex thereof with said wiring passages, the inner ends of said contacts engaging the walls of said conical recesses to affix said contacts to said disk.

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