Jan. 2, 1940. C. W. HALLER 2,185,981

CONTACTOR BASE FOR ELECTRIC LAMPS, TUBES, AND THE LIKE

Filed April 10, 1939 2 Sheets-Sheet 1

Fig. 1.

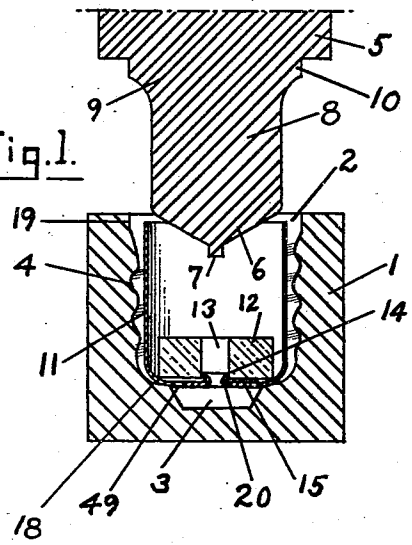
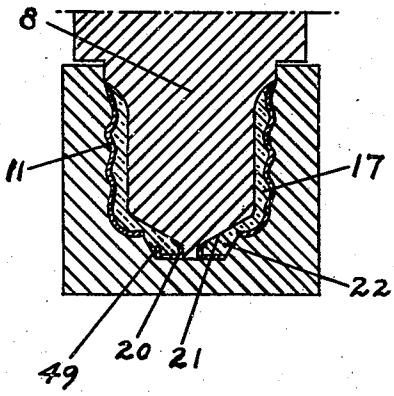


Fig. 2.



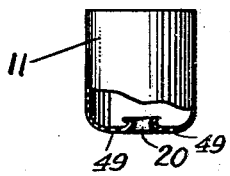


Fig. 3.

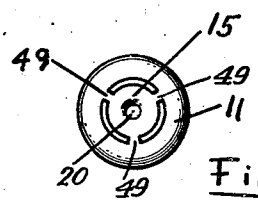
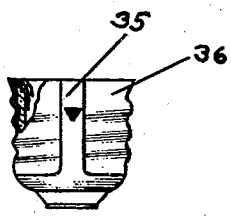


Fig. 4.

Fig. 5.



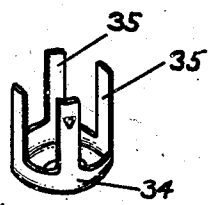
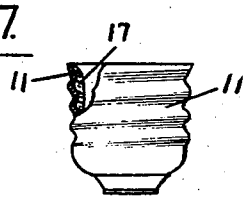


Fig. 6.

Fig. 7.



CYRUS W. HALLER,
INVENTOR.

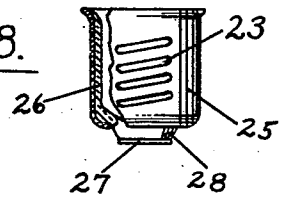
BY Lawrence Brown,
ATTORNEY.

Jan. 2, 1940. C. W. HALLER 2,185,981

CONTACTOR BASE FOR ELECTRIC LAMPS, TUBES, AND THE LIKE

Filed April 10, 1939 2 Sheets-Sheet 2

Fig. 8.



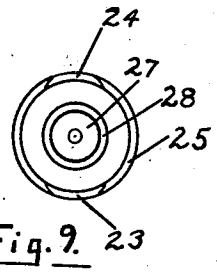


Fig. 9.

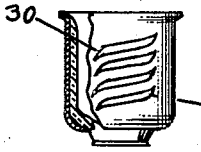


Fig. 10.

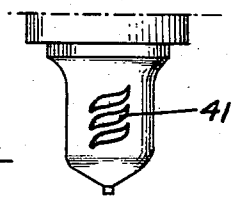


Fig. 11

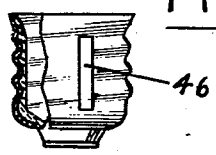


Fig. 13.

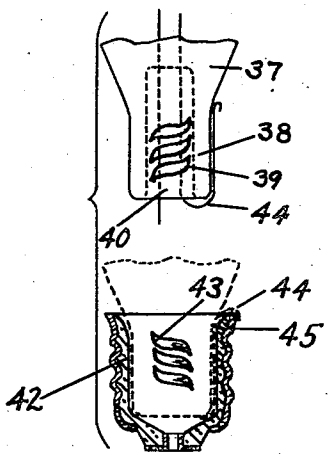


Fig. 12.

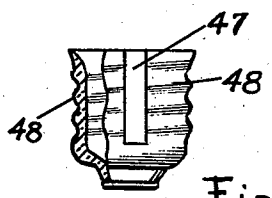


Fig. 14.

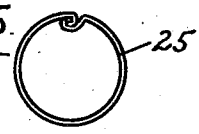


Fig. 15.

CYRUS W. HALLER,
INVENTOR.

BY Lawrence Brown,
ATTORNEY.

Patented Jan. 2, 1940 2,185,981

UNITED STATES PATENT OFFICE

2,185,981

CONTACTOR BASE FOR ELECTRIC LAMPS, TUBES, AND THE LIKE

Cyrus W. Haller, Marblehead, Mass., assignor to Hygrade Sylvania Corporation, Salem, Mass., a corporation of Massachusetts

Application April 10, 1939, Serial No. 267,025

6 Claims. (Cl. 176—32)

This invention relates to contactor bases and more particularly to bases for electric lamps, radio tubes and similar devices.

A principal object of the invention is the provision, for such devices, of a screw base in which an insulating cup is the main support of the base and carries the necessary metal contact pieces intimately bonded to its surface.

Heretofore in the manufacture of incandescent electric lamps of the conventional screw-base type, the base consists of a previously threaded metal shell insulatingly carrying at the bottom a metal contact button. This button is usually insulated from the shell by a relatively shallow vitreous cup-like ring which is fused to the shell and to the contact button. The finished base is then usually cemented to the lamp bulb by a relatively narrow ring of cement, thus leaving the greater part of the inner face of the shell exposed. When such a base is employed in connection with a fused lead-in wire there is considerable danger of the gases and vapor released by the blowing of the fuse, causing a destructive arc within the base. There is disclosed in U. S. Patent No. 2,141,146, issued December 20, 1938, to R. M. Zabel, a method of protecting the normally exposed inner face of the shell by extending the glass skirt upwardly. Accordingly, another object of the present invention is to provide an improved method of insulating substantially the entire inner face of the usual threaded metal contactor base, while at the same time improving the mechanical construction and appearance of the base.

The improvement in mechanical construction is obtained by using the insulation for the interior of the shell as the main supporting member of the base. This is done by molding a cup-shaped insulating member to substantially the shape of the finished base and intimately bonding to its surface metal contact pieces thin enough to conform closely to said surface. This can be accomplished by molding the insulation and the metal pieces simultaneously in a single unit as described hereinafter; by molding the insulating cup and then depositing the metal on it by electrolysis or by spraying; or by any similar process.

Such a construction permits the use of a thinner metal contact piece than does the old construction in which the contact shell must be heavy enough to maintain its shape without the aid of a molded backing. The smaller quantity of metal required tends to reduce the cost of the base. By new construction also permits greater dimensional accuracy in the finished product because the dimensions are fixed by the molding process.

A further object of the invention is the provision of a lamp or tube base with a threaded metal contact supported or embedded in insulating metarials which have hitherto not been found practicable for this purpose. Among such materials may be mentioned particularly, the plastics of the thermosetting type, such as Bakelite and similar phenolic condensation products. Such insulators will not chip or crack, and are capable of more accurate molding, than is the usual glass insulator.

A feature of the invention is a base in which can readily be incorporated continuous, discontinuous or special threads for identification or theft-proof purposes.

A further feature relates to a cup-like contactor base for electric lamps, radio tubes and the like which permits higher voltages being employed without danger of short circuiting either interiorly or exteriorly of the base.

A still further feature relates to the novel organization, arrangement and relative location of parts which go to make up an improved and highly efficient yet cheaply manufacturable contactor base for electric lamps, radio tubes and the like.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following detailed descriptions and the appended claims.

While the invention will be described herein in connection with the manufacture of a screw-base for lamps, it will be understood that the base is equally well adaptable to radio tubes, resistors, fuses, plugs and similar electric devices which are designed to be connected into the conventional screw-threaded lamp socket or the like. Accordingly in the drawings:

Figure 1 is a vertical cross-sectional view of a typical molding device for carrying out the method according to the invention.

Figure 2 is another view of the apparatus of Figure 1 showing the molding die in its molding position.

Figure 3 is a partial sectional view of a typical form of thin walled metal shell that is used with the molding device of Figures 1 and 2.

Figure 4 is a bottom plan view of Figure 3.

Figure 5 shows one form of base according to the invention.

Figure 6 is a perspective view of the particular type of shell blank that is used in producing the base of Figure 5.

Figure 7 shows a type of base produced using the shell blank of Figures 2 and 3.

Figure 8 shows a modified form of base according to the invention, with discontinuous screw threads.

Figure 9 shows a bottom plan view of Figure 8.

Figure 10 shows a further modification of the base.

Figure 11 is a view of a modified form of die that may be used in the manufacture of bases for certain types of mechanically based bulbs.

Figure 12 is an exploded view of a bulb and its co-operating base formed in accordance with the invention and using the die of Figure 11.

Figure 13 shows a base similar to the base of Figures 1 and 2 and provided with a locking recess therein.

Figure 14 shows a modification of the base of Figure 5.

Figure 15 shows a modification of the shell blank of Figure 3. Referring to Figures 1 and 2, the numeral 1 represents a mold made of any suitable material and is provided with a substantially cylindrical smoothfaced mold cavity 2, the bottom of which is recessed as indicated by the numeral 3, and the cylindrical wall of which is provided with a round screw-thread 4. Preferably the thread 4 is designed so that when the base is formed as described below, the base threads are of the pitch and shape ordinarily employed on incandescent lamp bases. The mold 1, may be of one piece but is preferably of two pieces suitably fastened together. Co-operating with the mold 1, is a specially shaped die or plunger having its forward end tapered as indicated by numeral 6, and terminating in a cylindrical tip 7. The main body portion 8 of the die is preferably cylindrical and joins a flared portion 9, which in turn joins a shouldered portion 10. The cylindrical portion 8 is of smaller diameter than the inside diameter of the mold cavity, the difference in diameters depending upon the thickness of the insulation wall desired in the finished base. Any well-known form of heating means (not shown) may be provided for bringing the mold to the proper temperature for setting. For Bakelite this temperature is about 350° C.

In order to form the base, there is positioned within the mold cavity a thin-walled metal shell or cup 11 (Figs. 3 and 4) of brass or other suitable metal such as is ordinarily employed in the manufacture of screw-bases for incandescent lamps. After the metal shell is placed in the mold, a cylindrical pellet 12 of a suitable heat-hardening, often called thermosetting, plastic insulation material may be employed. As examples of materials that are useful for this purpose may be mentioned, powdered Bakelite or similar condensation product either alone or mixed with a ceramic powder, asbestos powder or the like. If desired the pellet may consist entirely of a suitable compressed powdered ceramic such as porcelain, Isolantite or the like, to which has been added a heat-hardening, often called thermosetting, binder which becomes plastic when subjected to the molding temperature and pressure. Preferably, although not necessarily, the pellet is provided with a central opening 13, and the bottom face of the pellet is recessed at 14 to receive the usual eyeletted metal inset 20. When the mold is heated to the proper temperature the die is moved downwardly and subjected to suitable pressure to cause the pellet to become plastic and fill the space between the die and the inner face of shell 11. At the same time, the die forces the button 15 down against the bottom of recess 3, breaking the ribs 49, which join the eyelet button to the remainder of the metal shell, and also forces a quantity of the plastic insulation through the circular opening 16 in shell 11 causing this insulation to assume the shape of the said recess as shown clearly in Figure 2. The pellet is so proportioned in volume that when the die reaches its lower-most position as shown in Figure 2, there is a sufficient quantity of the plastic insulation to provide the desired thickness to the wall 17. It will be understood that when the die first engages the pellet it causes the shell 11 to be firmly held against the portion 18 of the mold so that further downward movement of the die forces the plastic insulation upwardly between the die face and the shell. Furthermore the close fit between the shoulder 10 on the die, and the cylindrical wall-portion 19 of the mold, prevents the plastic insulation from being forced upwardly beyond the rim of shell 11.

I have found that if the shell 11 is of sufficiently thin metal stock, the die pressure is transmitted through the insulation 17 to cause the wall of the shell to conform itself to the threaded surface of the mold, consequently the shell is formed with the screw-thread at the same time that a corresponding thread in the insulating wall 17 is formed. Preferably the die tip 7 is of about the same length as the eyelet 20 so that the die engages the rim of the eyelet and prevents the plastic insulation from flowing through the eyelet. When the base has been formed as described, the die is removed and the insulation is allowed to harden whereupon the two halves of the mold may be opened and the finished base removed. The base will then be found to consist of an internal cup-like insulating shell the outer surface of which is appropriately threaded and the correspondingly threaded metal shell 11 is in intimate bonding contact with the insulating shell over its entire threaded area. The contact button 15 is also bonded to the insulating shell and the eyelet 20 is accurately centered on the vertical axis of the base. Also the insulating shell is formed with a smooth conically inclined wall 21 communicating with the eyelet, and the slant of wall 21 may be such as to facilitate the insertion of the usual lead-in wire through the eyelet thus enabling the base to be conveniently used on any well-known type of automatic machine for applying the base to a suitable lamp or tube bulb.

From the foregoing it will be seen that by choosing a suitable insulation material for the pellet 13, it is possible to impart a very pleasing appearance to the finished base as the insulation may be made in any desired color or combination of colors. Furthermore, it is possible to form the base with greater accuracy than is possible where a pre-threaded metal shell is employed and fastened to the eyeletted button by the usual shallow glass ring. It is also possible by this method of base formation to employ insulating materials which are not adaptable to the usual methods of forming bases. Thus it is possible to produce a base wherein the exteriorly exposed portion of the insulation is substantially chip-proof. Furthermore, the portion 22, being integral with the wall portion 17 provides a rigid support for the shell 11, both against vertical as well as against radial crushing. It will be understood, of course, that if desired the recess 3 in the mold may be made as deep as is found necessary to provide the requisite spacing between the lower rim of shell 11 and the metal button 15.

The above-described method of forming contactor bases has the additional advantage that it is possible to provide the base with discontinuous or sector threads instead of continuous threads. Thus the mold instead of having its molding face provided with a continuous thread may be provided with a series of spaced thread-sectors so that the finished base will be as shown for example in Figs. 8 and 9, wherein the metal shell is formed with a series of thread-sectors 23 on one side and a similar series of thread-sectors 24 on the opposite side, it being understood that the sectors are in effect sectors of what would otherwise be a single continuous thread such as is shown, for example, in Figs. 2 and 14, the intermediate unthreaded portions of both the metal 25 and the insulator shell 26 being cylindrical. The eyeletted metal contact button 27, is integrally bonded to the extension 28, of the insulator shell as described in connection with Figs. 1 and 2.

If desired, the thread sectors may be so formed during the molding process that the base is capable of being turned readily in one direction into the usual threaded socket, but is incapable of being turned in the opposite direction. Thus, as shown in Fig. 10, the thread sectors are formed with pointed inclined ends 29, 30, which do not interfere with the rotation of the base into the usual threaded socket, but which lock against the socket threads when the base is turned to remove it from the socket. It will be understood, of course, that the base may be molded with any other form of mutilated thread, and while the drawings show each turn of the usual thread formed in two sectors a greater or less number of sectors may be formed.

In Figure 2, the ribs 49, which unite the eyeletted button to the main metal shell of Figs. 3 and 4, have been broken by the molding process to separate the eyeletted contact button and the cylindrical metal shell. The portion of the ribs remaining with the contact button will be set into the molded insulation shell, serving as additional anchors for the contact button.

Instead of employing a metal shell in the form of a complete cylinder, as shown in Figs. 3 and 4, the shell may be made in skeleton form, such as shown in Fig. 6 comprising a rim 34 formed with a set of spaced strips 35. The manner of using this skeleton shell is the same as that described in connection with Figs. 1 and 2, and the finished base thus produced is shown in Fig. 5. In this embodiment the vertical strips 35 are imbedded in the insulation shell 36 and each strip is molded at the same time the insulation shell is formed so that both the shell and the strips have the required threads therein. It will be obvious that instead of employing the strips 35, as integral extensions of the rim 34, the strips alone may be employed and held in the mold in any suitable manner in circumferentially spaced relation so that when the insulation pellet is subjected to heat and pressure the strips imbed themselves in the molded insulation shell, and are flush with the outer face of the insulation shell.

In the foregoing embodiments of the invention the insulator portions 21, 26 etc., are molded with a substantially smooth inner surface and the bases are capable of being fastened to the lamp or bulb by a bonding cement or the like in the usual manner. However, the process is also applicable to the control of the configuration of the internal surface as well as the external surface of the insulator shell. For example, in lamps of the so-called mechanically based type, the portion of the lamp bulb adjacent the seal may be provided with integral screw threads, depressions, beads or the like which are arranged to interlock with corresponding threads, depressions, beads, etc., on the internal surface of the metal shell base. Examples of such mechanically based lamps are illustrated in U. S. Patent No. 2,028,884, issued January 28, 1936 to R. B. Thomas. Referring to Figs. 11 and 12, a description will be given of the manner of applying the process to the manufacture of one illustrative form of mechanically based bulb.

As shown in Fig. 12, the bulb 37 has its butt portion 38 provided with raised thread sectors 39 preferably, although not necessarily, of the configuration shown. While the drawings show only one set of thread sectors, it will be understood that a similar set or sets may be provided around the periphery of the butt 38 and these sectors may, if desired, be molded at or during the operation of sealing the reentrant stem 40 into the bulb. The base which is shown in section in the lower part of Fig. 12 may be similar to the bases shown in Figs. 5, 7, 9, 10, 13, 14, and may be manufactured in accordance with the process described in detail in connection with Figs. 1 and 2. The only difference is that in place of the smooth-faced die 8, there is employed a die such as shown in Figure 11 which has its cylindrical face provided with recessed thread sectors 41 to correspond to the thread sectors 39 on the lamp butt 38, thus forming the insulator shell 42 with correspondingly raised sectors 43. The base may then be threaded on to the butt 38 and fastened in any suitable manner. Thus the lead-in wire 44 may be bent back upon itself and the free end soldered to the rim of the metal shell 45. It will be obvious that instead of molding the internal face of the insulator shell 42 with thread sectors the die may have its cylindrical face formed with a continuous recessed plural turn screw-thread and the butt 38 may likewise be provided with a continuous plural turn raised screw-thread with a transverse slot to receive the bent back lead-in wire 44 in the manner illustrated, for example, in Patent No. 1,650,289 to J. B. McGinley. In carrying out the process in connection with the type of base shown in Figure 12, it may be necessary to make the die in sectors which may be collapsed or removed in order to allow for the removal of the finished base from the die. It will be understood, of course, that the embodiment of Figure 12 is merely illustrative of one particular configuration for the internal wall of the insulator shell.

In certain cases, it is desirable to provide a bulb with a base that is capable of receiving a locking member when the bulb is inserted in the receptacle. Thus, as shown in Figure 13, the base which may be of any of the forms disclosed in the preceding figures has its external threaded surface molded with a recess or slot 46 to receive a locking screw or projection (not shown) for preventing the bulb being removed from its threaded receptable in the ordinary manner. In making the type of base shown in Figure 13, it will be understood that the internal face of the mold will, in addition to being provided with the molding threads, also be provided with a projection to form the recess 46 or any other suitably shaped recess.

Instead of employing a cylindrical shell or

skeleton shell (Figure 5), the side contact of the base may consist of a simple strip of metal 47, which may be held in the mold in any convenient manner so that when the die forces the plastic insulation to shape, the strip will be embedded in the plastic and the base will consist for the most part of an externally threaded shell 48, of the insulation having embedded in its outer face the correspondingly threaded metal strip 47. Instead of employing a seamless metal shell 11 (Figures 3 and 4), for forming the base, this shell may be made from a strip of the metal having its edges overlapped as indicated in Figure 15.

As an alternative method, the metal shell 11 may be omitted and after the insulation is molded to the desired formation with the button or eyelet 20 thereon, as described in connection with Figures 1 and 2, the desired portion or portions of the outer surface of the molded insulator shell may be provided with a coating of conductive material as by spraying, dipping, electrolytic deposition, painting or the like.

It will be understood that the invention is not limited to the use of metal sheet stock for the shells 11, 25, 34, and that the metal mesh, perforated metal or any form of foraminous metal stock may be employed. Other changes and modifications may be made in the embodiments disclosed, without departing from the spirit and scope of the invention.

This application is in part a continuation of my application Serial No. 52,286, filed November 30, 1935, and issued May 9, 1939, as U. S. Patent No. 2,158,044.

What I claim is:

1. A contactor base for lamps and the like, said base comprising a main hollow cup-like thin-walled member of thermally-set insulation, the cylindrical portion of said member containing screw threads on the cylindrical portion of its external surface, a correspondingly threaded thin metal cylindrical shell integrally bonded to said surface, said metal shell extending to but not beyond the top of the cup-like member and extending toward but spaced from the bottom of said cup-like member, an eyeletted flat metal contact disk integrally bonded to the bottom of said cup-like insulating shell and out of contact with said metal shell, the eyelet in said disk being in register with a small hole in the bottom of the insulating shell and being flared outward in the insulating shell for bonding purposes, the eyelet extending upward into the circumference of the hole, the disk having small ribs extending from its circumference upward into the insulating cup for bonding purposes, the cup-like shell of insulation being flared outward at its top to meet the top of the cylindrical metal shell.

2. The combination of claim 1, in which the metal shell is too thin to be rigidly self-supporting of itself, the insulating cup combining with it to form an integrally self-supporting structure in combination.

3. The combination of claim 1, in which the metal shell is too thin to be rigidly self-supporting of itself, the insulating cup combining with it to form an integrally self-supporting structure in combination, and in which the combined structure is integrally slotted transversely of its threads.

4. The combination of claim 1, in which the metal shell is too thin to be rigidly self-supporting of itself, the insulating cup combining with it to form an integrally self-supporting structure in combination, and the combined structure is integrally slotted transversely of the threads, and in which the insulating cup-like member bears parts of threads on its interior surface, the parts of threads being arranged to fit corresponding parts of threads on the neck of an incandescent lamp bulb.

5. The combination of claim 1, in which the main hollow thin-walled member of thermally-set insulation has its hollow interior in the form of a cylinder terminating at its bottom in a cone providing a slanted surface to facilitate the insulation of a lamp lead-in wire.

6. A metal blank for use in lamp base manufacture comprising a thin walled cylindrical metal shell terminating in a substantially flat surface at one end of the cylinder, the other end being open to form a cup-like shell, the bottom of the flat surface being slotted to form an eyeletted disk held to the main member by a few narrow connecting ribs.

CYRUS W. HALLER.