No. 882,257. PATENTED MAR. 17, 1908.

M. M. MERRITT.

INCANDESCENT LAMP.

APPLICATION FILED FEB. 11, 1907.

Fig. 1.

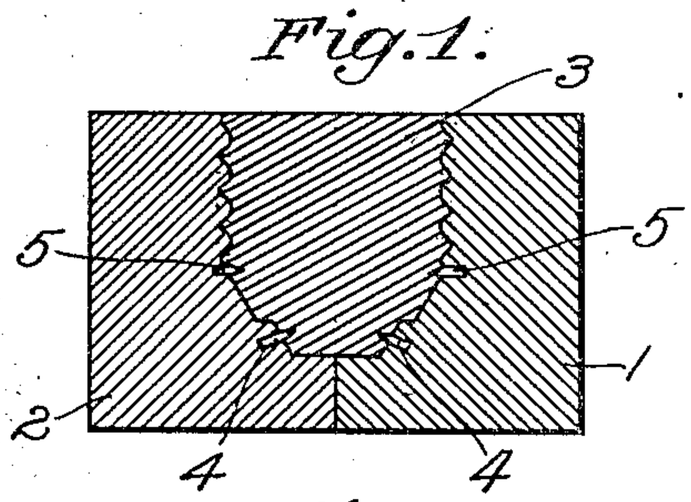


Fig. 2.

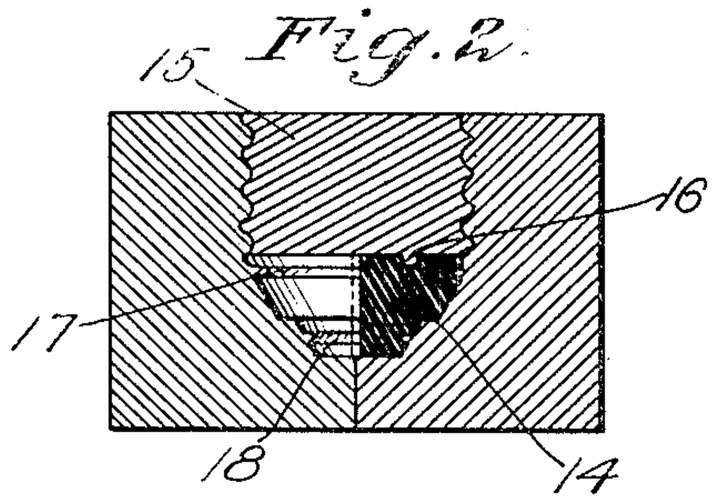


Fig. 3.

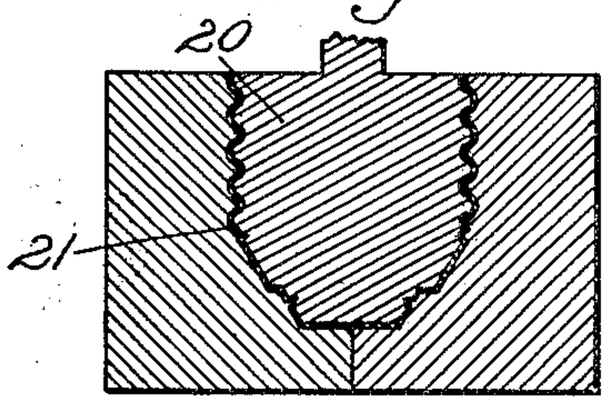


Fig. 4.

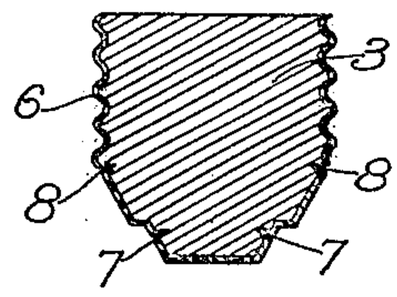


Fig. 5.

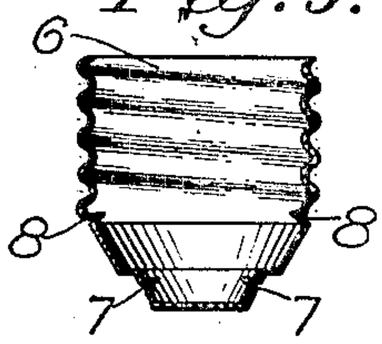


Fig. 6.

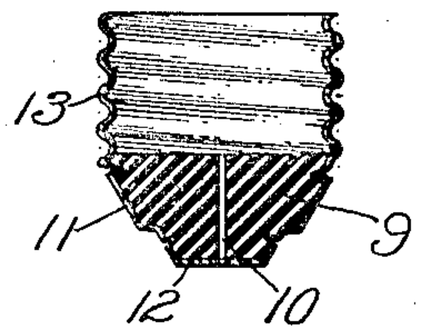


Fig. 7.

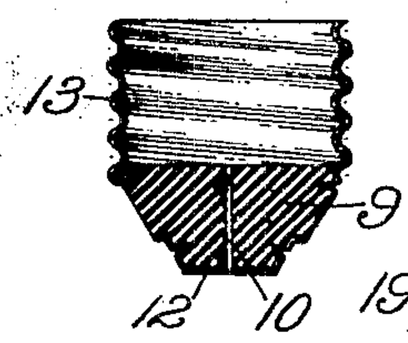


Fig. 8.

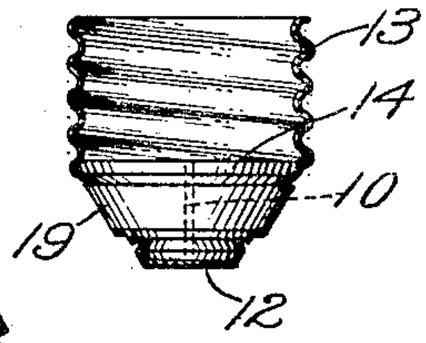
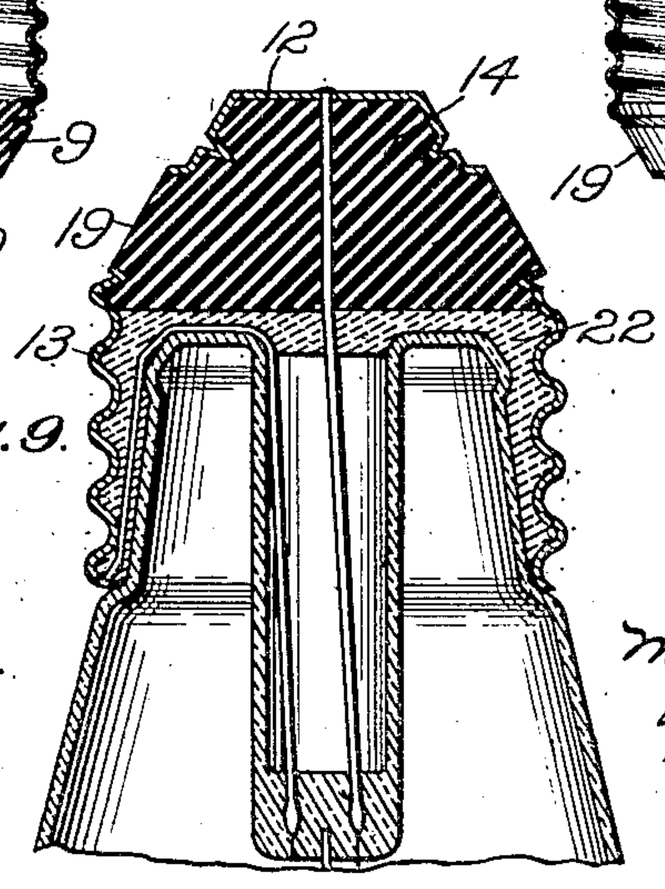


Fig. 9.



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UNITED STATES PATENT OFFICE.

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INCANDESCENT LAMP.

No. 882,257. Specification of Letters Patent. Patented March 17, 1908.

Application filed February 11, 1907. Serial No. 356,666.

To all whom it may concern:

Be it known that I, MATTHEW M. MERRITT, a citizen of the United States, residing at Middleton, county of Essex, and State of Massachusetts, have invented an Improvement in Incandescent Lamps, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to incandescent lamps and is more particularly concerned with the production of a new and improved lamp base and a novel process for the manufacture of the same.

My invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment of the same.

In the drawings:—Figure 1 shows in section a form of mold for molding a dummy or false base of fusible metal or other like material; Fig. 2 shows a like mold where a solid insulating button is employed for the tip of the dummy base; Fig. 3 shows a modified form of mold for casting the metal in the form of an outer shell; Fig. 4 shows the dummy base electro-plated with conductive material; Fig. 5 shows the shell of conductive material with the fusible metal removed; Fig. 6 shows the shell illustrated in Fig. 5 with an inserted end filling of insulating material; Fig. 7 shows the completed base with a strip of conducting material removed from the sides of the insulating filling; Fig. 8 shows a completed base made with the aid of the false base shown in Fig. 2, and, Fig. 9 shows a completed lamp having attached thereto a base of the type shown in Fig. 8.

Referring to the drawings and to the embodiment which I have there shown for the illustration of my invention, the construction of the lamp base, in accordance with the principles herein described, comprehend generally the production of a shell of conducting material by the electrolytical depositing of metal upon a core or body of suitably formed filling material, which latter may afterwards be removed, as by fusion, such filling material, by way of example, being of ordinary fusible metal fusing at a low temperature,—or some of the harder waxes, such as paraffin. Such procedure leaves a shell of copper, or such other conducting metal as may be employed, and this shell may be formed with walls suitably threaded to fit the lamp socket, and this shell may be then subjected to various operations, resulting in the final production of a lamp base similar in general appearance to the standard type of base now employed, but consisting of a threaded portion and a tip portion, each consisting of electrolytically deposited conducting metal and the two separated by insulating material.

In carrying out my invention I preferably provide a mold, such as is represented in Fig. 1, comprising two split or separated portions 1 and 2, which mold is provided with a recess having the shape of the desired lamp base, and suitably dimensioned to allow for the subsequent shrinkage of metal, and the deposition of copper. This mold may be of any desired material, such as metal, paper or other suitable substance, and may be constructed in any well-known and usual way, and the shape of the mold may, of course, be varied to suit the desired requirements and conditions.

The mold having been prepared, it is then filled with some material, which, after the deposition of the copper, may be readily withdrawn or extracted. For such material, in the present instance, I have taken a fusible metal, such as babbitt metal having a low melted point, for example at or about 200°. Instead of fusible metal, wax, paraffin or other like substance may be employed, or any substance may be used which is capable of ready removal. This substance when hardened forms the false or dummy base 3, having substantially the outline of the finished lamp base.

In order to provide suitable anchorage for the subsequently deposited conducting material, provision of some kind is preferably made. In the described embodiment of my invention the mold is provided near its bottom with inwardly projecting pins 4—4, and just below the threaded portions with other pins 5—5, so that the false base when taken out is provided with corresponding recesses. The base is then preferably dipped in or coated by some substance which will prevent the copper from clinging to it too tenaciously when it is desired to separate the same. This substance may be, for example, bronze powder or graphite, which assists the

metal in dropping away from the copper when it is melted. If a non-conducting substance, such as wax or the like, is employed for the false or dummy base, it is of course necessary to coat the base with a substance like bronze powder or graphite as a prerequisite to the electro-plating operation.

For coating the base with metal by electro-plating, any suitable apparatus or process may be employed. A large number of bases may be coated at the same time by placing them in an electrolytic bath of suitable nature in contact with the terminals of an electric circuit passing through the bath and containing a battery or other suitable source of electro-motive force. The nature of the bath will of course depend upon the nature of the metal which it is desired to deposit. If copper, the usual bath employed is an acid solution of copper sulfate, but it will be obvious that nickel, silver or any desired metal may be utilized. The bases are subjected to the action of the electro-plating bath as long as may be necessary to secure a deposit of conducting material of sufficient or desired thickness, and the latter, when formed, will provide a thin, tenacious skin of conducting material over the exposed portions of the false base and conforming to the irregularities in the surface of the latter. This leaves a deposit of copper which is represented by the heavy outline upon the base indicated at 6 in Fig. 4. Having formed the shell of conducting metal in this fashion, the false base is withdrawn from the shell by fusing the same at a relatively low temperature, which, of course, has no effect upon the copper or other conducting material employed for the shell, which material has a relatively high fusing point. This leaves the shell of conducting material as represented in Fig. 5, the same being provided, however, with the inwardly directed anchoring points 7—7 and the other anchoring points 8—8. With the shell formed as shown in Fig. 5, the bottom is then filled or partly filled with a plug or button 9 of the insulating material having the axial passage 10 for the lead wire of the lamp. Such button may consist of any desired material and be inserted in any suitable way, but preferably the same is formed of some plastic substance which can be pressed in either by hand or by machinery, if desired, and about a suitable form to leave the passage 10 and there allowed to harden.

Any desired substance may be employed for the insulating plug or button 9, such as glass, artificial stone, or the like, or any of the usual cements employed in this art, but the substance should preferably have a heat resistance of not less than 400° in order to withstand the probable steps of the lamp manufacture. I preferably, though not necessarily, employ some substance which is plastic at a low temperature, but will harden through standing, such, for example, as a mixture of silicate of soda, sand and cement.

In order to leave separate metallic coatings to act as contacts for the lead wires the portion 11 of the metallic shell is then removed from the truncated conical side of the insulating plug 9, leaving the finished base ready for application to the lamp, as represented at Fig. 7, the remaining end portion 12 of the shell comprising the metallic terminal or contact for one lead wire of the lamp and the threaded portion 13, separated from the end portion by the insulating plug 9, forming the terminal or contact for the other lead wire.

Prior to inserting the insulating button the inner surface of the shell thereat is preferably coated with some substance, such, for example, as collodion, which will assist the copper in separating from the button when it is removed. The metal portion 11 may be removed in any desired way and may be ground off from the insulating button or cut away by suitable machinery.

When the base is completed, as shown in Fig. 7, it will be seen that the anchors 7 effectively retain the shell portion 12 in position upon the insulating plug, while the threaded shell portion 13 has firm engagement with the plug by means of the anchors 8.

Instead of forming the insulating plug or button in the shell as described, a previously formed button, such as 14 (Fig. 2) may be placed in the bottom of the mold, which latter is shaped accurately to receive the same, and the false base is then cast on top of this button, as represented at 15, Fig. 2. Suitable interlocking surfaces 16 may be provided between the button and the fusible metal portion of the base to cause adherence between the two.

The button 14 may be formed of any suitable substance, such as glass, lava, bone, slate, artificial stone, porcelain, white enamel, or any other suitable insulating material, and may be given some such shape as shown whereby there is provided the neck or groove 17 and the smaller neck or groove 18 nearer the tip, these grooves acting effectively to anchor the subsequently deposited metal shell thereto. This false base with the insulating button 14 attached is then electro-plated as above described, the fusible portion 15 of the base melted out and the strip of metal overlying the truncated conical portion 19 of the base cut or ground away, as described, leaving the finished base as represented in Fig. 8.

In order to diminish the amount of fusible metal required, a core may be employed in connection with the mold shown in Fig. 1, so that the false base is formed in the shape of a shell instead of a solid plug. Furthermore, if desired, a mold, such as shown in Fig. 3, may

be used where a core 20 of about the size of the completed base is used, and a shell 21 of fusible metal formed between it and the core. The core is subsequently removed by unscrewing it from the shell 21, the latter then receiving a thin coating of conducting material by electrolytically depositing the same thereon in the manner described. After this conducting shell has been formed upon the interior of the fusible metal shell, the latter is melted away as before.

In electro-plating the false base shown in Fig. 2 it will be understood, of course, that the insulating button is coated with graphite or bronze powder before being placed in the electrolytic bath in order that the deposit of copper may take place upon its entire surface. If desired, instead of cutting away the strip or area of metal intervening between the two terminal contacts of the lamp, the metal may be deposited, in the first instance, upon separated areas, if desired, by omitting the coating of bronze powder or other conducting material along the portion 19 of the button, or wherever the deposit of metal is not required. The same result may be accomplished in the forming of the base shown in Figs. 1, 4, 5, 6, and 7 by coating over the portion 11 of the base, where no deposit of copper is required, with some insulating substance, such as wax or paraffin.

The base after completion may be applied to the lamp in any desired way, such, for example, as is shown in Fig. 9, where it is cemented thereto by a body 22 of cementitious material consisting of plaster, cement, or any other suitable substance, the lead wires being secured to the end contacts and the threaded shell portion, respectively, in the manner above described.

A shell for the base of an incandescent lamp constructed as defined herein has many physical characteristics whereby it may be distinguished from a shell or sleeve of material such as shown in the prior art. It is necessary in the formation of the screw threads shown in the references to resort to a spinning operation by which the material is compacted or compressed and thus rendered more dense at the points operated upon in such spinning operation. A shell constructed in accordance with my invention may be of uniform density throughout. The spinning operation referred to spreads the metal and as it draws the ductility thereof, the completed product has remaining a less degree of ductility in the spun portion than any portion not spun. In a shell constructed as herein defined, all portions may be of equal ductility and in no portion thereof is the metal artificially spread or compacted. Moreover, in the prior art, it is necessary that all portions of the shell, including the threaded portion, be smooth. In a shell constructed as herein defined, I may render the threaded portion smooth and may provide irregularities or anchoring conformations upon the portion thereof that is in contact with the plug or button 9 if desired. Furthermore, that portion of the shell that is in contact with the button conforms to all irregularities, whether natural or otherwise, of such plug or button and may even penetrate the larger pores thereof. In other words, the surface character of the threaded portion of the shell, when constructed in accordance with my invention, may if desired be similar to or it may be differentiated from that of the portion of the shell that contacts with the plug or button. It may also be stated that the shell, when constructed in accordance with the present disclosure, may be of exceeding thinness, so as to be truly defined as a film or membrane or on the other hand of considerable thickness if desired.

While I have shown and described one form of my invention and one mode of carrying the same into effect, it is to be understood that the same is not limited to the details of construction here described or to the exact steps of the process herein set forth, but that extensive modifications therein may be made without departing from the spirit of the invention.

Claims.

1. An incandescent lamp having a bulb and a base portion, the latter comprising a thin shell of electrolytically deposited conductive material in which the neck of said bulb is secured by an intervening body of cementitious material, said shell having threaded sides to adapt it to fit a threaded lamp holding socket, a body of insulating material at the bottom of said shell, the end of the latter being secured by physical adherence to the adjacent surface of said insulating body and conforming to the contour and irregularities of the surface thereof, conductive material secured to the tip end of said insulating body, but separated from the threaded shell by the intervening and exposed surface of said insulating body, and lamp terminals connected one to said shell and the other to the conductive material at the tip of said insulating body.

2. As a new article of manufacture, an incandescent lamp base comprising a thin shell of electrolytically deposited conductive material in which the neck of an incandescent lamp bulb is adapted to be secured, said shell having threaded sides to fit a threaded lamp holding socket, a body of insulating material at the bottom of said shell, the end of the latter being secured by physical adhesion to the outer surface of said insulating body thereby to conform to the contour and irregularities thereof for preventing displacement thereof and conductive material secured to the tip end of said body, but separated from said threaded shell by an inter-

vening and exposed surface of said insulating body.

3. As a new article of manufacture, a base for incandescent lamp bulbs, comprising a body 9 of insulating material, a thin shell 13 of electrolytically deposited conductive material secured by physical adherence to the outer surface of said insulating body conforming to the contour and irregularities thereof, and provided with auxiliary anchoring means 8 for retaining it thereon, said shell extending above said insulating body to present a socket in which the stem of an incandescent lamp bulb may be secured, conductive material 12 upon the opposite end of said body, but separated from said shell by an intervening and exposed surface of said insulating body, and anchoring means for said end conductive material.

4. An incandescent lamp having a bulb and a base portion, the latter comprising a thin shell of electrolytically deposited conductive material in which the neck of the bulb is secured, said shell having threaded sides to adapt it to fit a threaded lamp holding socket, there being a body of insulating material connected to said shell, conductive material secured to the tip end of said insulating material, but separated from the threaded shell by the intervening and exposed surface of said insulating material, and lamp terminals connected one to said shell and the other to the conductive material at the said tip of said insulating body.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MATTHEW M. MERRITT.

Witnesses:
WALTER J. LANE,
THOMAS B. BOOTH.