(No Model.)

R. HAINES.

INCANDESCENT ELECTRIC LIGHT BULB.

No. 372,313. Patented Nov. 1, 1887.

Fig. 1.

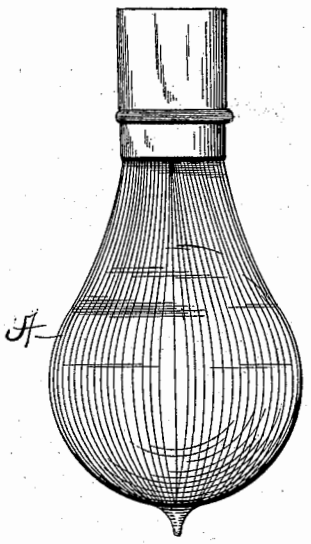


Fig. 2

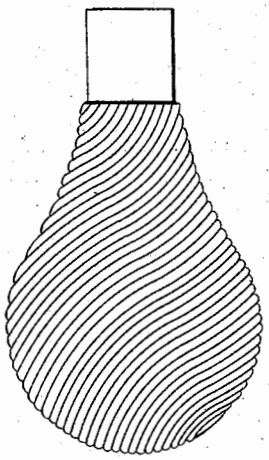


Fig. 3

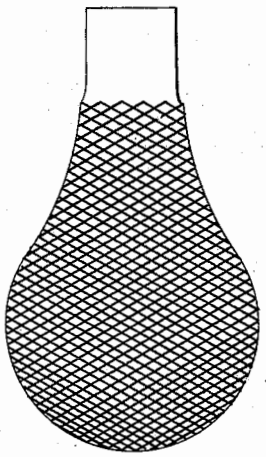


Fig. 7.

Fig. 4

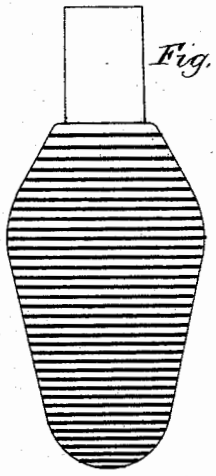


Fig. 6

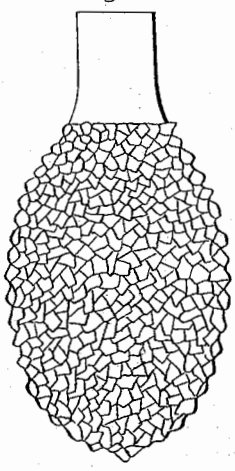
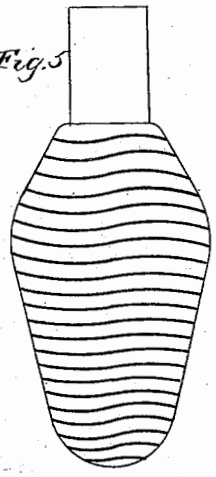


Fig. 5



WITNESSES

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ROBERT HAINES, OF CORNING, NEW YORK, ASSIGNOR OF ONE-HALF TO THOMAS G. HAWKES, OF SAME PLACE.

INCANDESCENT-ELECTRIC-LIGHT BULB.

SPECIFICATION forming part of Letters Patent No. 372,313, dated November 1, 1887.

Application filed September 10, 1886. Serial No. 213,235. (No model.)

To all whom it may concern:

Be it known that I, ROBERT HAINES, of Corning, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Incandescent-Electric-Lamp Bulbs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture of incandescent-electric-lamp bulbs, the object sought being to render these ovate vitreous bulbs more durable by compensating for unequal expansion and contraction of their material, and also to accomplish a softening of the light rays and an equalized diffusion of the same in a less costly and more perfect manner than has heretofore been effected.

With these ends in view my invention consists in certain features of construction of the device, as will be hereinafter described, and pointed out in the claim.

Referring to the drawings making a part of this specification, Figure 1 is a view in side elevation of one form of my improved electrolier bulb, showing one style of ribbed body producing longitudinal corrugations. Fig. 2 is a modification showing serpentine corrugation on the surface of the bulb. Fig. 3 is another modification in which the surface is roughened by check-work or diamond formation of protuberances regularly distributed over the surface of the bulb. Fig. 4 shows a bulb having ribs or ring-shaped corrugations that are located at a right angle to the longitudinal diameter of the ovate glass bulb. Fig. 5 is another modification in which the parallel rings shown in the last figure are waved or regularly corrugated throughout their horizontal length. Fig. 6 exhibits a bulb with a studded or mottled surface formed by slight pyramidal protuberances on the outer surface of the glass bulb, and Fig. 7 is a view in section of a portion of a bulb.

In the use of incandescent electric lamps considerable inconvenience has been occasioned by frequent breakage of the glass globes or bulbs that contain the incandescing filament or loop. This objectionable feature is a vexatious source of trouble on account of deprivation of the light, and also an item of positive loss from the inopportune destruction of the electrolier. It has been found that the principal cause of breakage of the bulbs lies in the inequality of distribution of heat and consequent unequal expansion of material of the thin wall or body. This is caused in part by the contact of the heated leading-in wires with the body of material in the neck of the glass bulb, and is also due to sudden drafts of cold air to which the sides of the bulbs may be subjected.

To obviate this defect in the present form of electrolier-bulb is the primary object of my present invention, as before mentioned.

Referring to the drawings, A represents the body of the glass bulb of an incandescent lamp. The exterior surface in part or in whole is made up of a series of parallel longitudinal ribs having intervening V-shaped grooves, the ribs and grooves being preferably made of equal dimension in cross-section at any point on the face of the bulb. It is important that these longitudinal corrugations should have a corresponding conformation on the interior surface of the bulb, so that there will be no undue thickening of the wall of the same at any point on its surface. To effect this I provide a metallic mold that is made separable on a center line. Equal-sized concavities are formed in the equal sections of the mold and of a form and size corresponding to the required dimension of the electrolier-bulb, the line of section of the mold lying in the same plane with the longitudinal center of the bulb to be produced. The interior surface of the mold is carved or indented with a precise introversion of form of the design to be produced on the body of the glass bulb.

It is evident that in practical use of the mold in the ordinary way by blowing a bulb therein the interior of the bulb will be a reflex of its outer surface, and a cross-section of the body will show an equality of distribution of material in all parts of the convolute surface.

Reference to the remaining figures will exhibit modification of the essential feature of corrugation as embodied in the figure just described, and it is manifest that various other

combinations of these analogous designs can be produced that will have ornamental effect and be within the scope of my invention.

An important incidental advantage obtained by the foregoing-described improvement is that the light rays from the incandescent filament, when they impinge upon the undulating interior surface of the bulb, are broken up from parallel lines of projection and are refracted by the inclined surfaces, so as to render the volume of light more evenly diffused from the entire surface of the bulb; and it should be stated that this important advantage is obtained without a material loss in power of the light, although the even diffusion of the same effects a softening or mellowing of the incandescent rays that is restful and agreeable to the eye of the observer.

The method now in use for blending the rays consists in grinding the exterior surface of a bulb, so as to give it a frosted appearance. The removal of the vitreous polished surface that is necessary to produce the semi-opacity of the same is objectionable, in that it weakens the bulb, causes a diminution of the light emitted, and renders the surface a dust-retainer. None of these defects exist in my improved form of bulb.

From the foregoing it is evident that the heat incident to the use of the electrolier for considerable periods of time will not injuriously affect a corrugated bulb, as the undulating surface permits an unequal expansion and contraction of the material to be taken up or compensated for without rupture of the wall of the bulb; neither will lateral currents of air be so liable to cause breakage if the bulbs are constructed in the manner hereinbefore set forth.

The refractive distribution of the light, so as to qualify its objectionable intensity and modify liability to produce marked shadows, accomplished by my improvement is attained without any additional work and consequent increased cost, and in this way a better article is produced and at a less initial cost to the manufacturer.

I am aware that a glass shade or globe open at top and bottom and having the inner surface smooth and the outer surface formed of abutting pyramidal projections is not new, and, also, that lamp shades and chimneys open at top and bottom have been provided with transverse and spiral corrugations, and therefore I make no claim to such construction. So far, however, as my knowledge and information extend, a glass bulb for incandescent electric lights having a molded, corrugated, or otherwise waved or roughened surface was not known in the art at the date of my invention.

I do not limit myself to the exact form of bulb or corrugations shown. As before stated, these corrugations, checks, or protuberances may be varied, so as to produce many different modifications embodying the spirit of my invention.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is—

As a new article of manufacture, a glass bulb for an incandescent electric light, having a molded, corrugated, checked, or otherwise waved or roughened outer surface, and also a corresponding molded inner surface, substantially as set forth.

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

ROBERT HAINES.

Witnesses:

THOMAS G. HAWKES,

H. P. SINCLAIRE, Jr.