No. 629,555. Patented July 25, 1899.

F. FANTA.

TOOL FOR MANUFACTURING GLASS BULBS.

(Application filed Sept. 9, 1898.)

(No Model.)

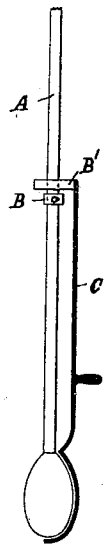


Fig. 1.

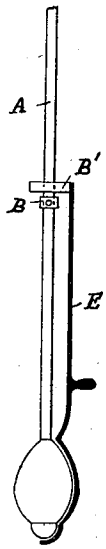


Fig. 4.

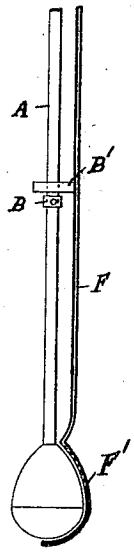


Fig. 5.

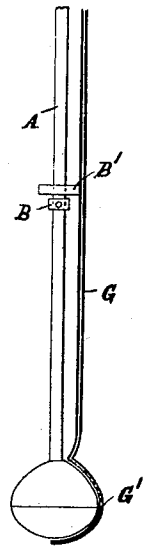


Fig. 6.

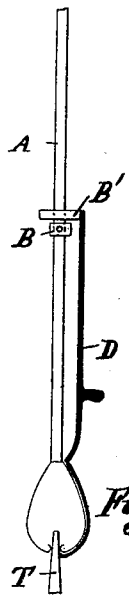


Fig. 2.

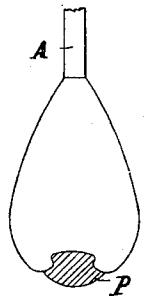


Fig. 3.

Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FERDINAND FANTA, OF LONDON, ENGLAND, ASSSIGNOR TO THE IMPROVED ELECTRIC GLOW LAMP COMPANY, LIMITED, OF SAME PLACE.

TOOL FOR MANUFACTURING GLASS BULBS.

SPECIFICATION forming part of Letters Patent No. 629,555, dated July 25, 1899.

Application filed September 9, 1898. Serial No. 690,581. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND FANTA, a subject of the Emperor of Austria-Hungary, residing at London, England, have invented a new and useful Improvement in Tools for the Manufacture of Glass or Crystal Bulbs, (for which I have made application for Letters Patent in Great Britain under No. 16,643, bearing date July 30, 1898,) of which the following is a specification.

This invention relates to the manufacture of that class of glass bulbs in which a part is intended to be used for the purpose of allowing the rays of light to freely emerge from the bulb, whereas another portion of the said bulb is intended to be used for the purpose of either converging or diverging or reflecting the said light, and this more especially for bulbs used for incandescent electric lamps, wherein it is essential that the vacuum produced should be maintained to a high degree; and this invention consists of an improved process of manufacture and means for carrying the same into effect, whereby a combined, welded, part-transparent, and reflecting globe is produced of precise, definite, and unusual configuration, while the resistance which it is essential that the glass bulb should offer to the outer atmospheric pressure is not impaired. These desiderata are all the more difficult to attain in the case of a reflector-lamp, since it is essential that the outer diameter of the reflecting-surface should be as large as possible and also that the surfaces of the reflecting-surface and of the clear part of the bulb be, respectively, as nearly as possible in such relative positions as to allow the direct rays, as well as the reflected rays, to pass through the clear portion of the bulb at right angles in respect to the surface of the latter.

In carrying out the said invention and in order to overcome the practical difficulties referred to above a special way of treating of glass both for the clear and for the reflecting portion becomes necessary, especially so since the outer edge of the reflector should in every case form a perfectly-straight line and be maintained throughout within a plane at right angles to the axis of the diverging, diffusing, or reflecting surfaces, as the case may be. In order to make this part of the bulb as regular in thickness as possible, I find it necessary to treat each portion of the bulb separately and to treat more especially that portion which it is intended to use as a reflecting-surface, so as to give it the accurate configuration which experience has proved to be most appropriate. The process of manufacture described herein provides for means of molding such portion during the blowing process and at the same time means of annealing the joint which it thus becomes necessary in the process to make between the clear and the reflecting portion of the bulb. It is essential that the compositions of the two crystals be of the same nature, the glass or crystal used for the reflecting portion being rendered opal or colored by the addition of arsenic or other suitable material, as the case may be. I find that crystal is more suitable than glass for the annealing process.

In order that this invention may be the better understood, I will now proceed to describe the same with reference to the drawings hereto annexed and to the letters marked thereon.

Figures 1, 2, 3, 4, 5, and 6 show a composite globe in the different stages of manufacture, with appropriate tools for such manufacture.

Having the two metals in a molten state and as fluid as possible in the two crucibles or furnaces, the workman first dips his blowpipe into the opal crystal and collects at the end of the same in the usual way an appropriate quantity of opal or opaque molten metal, the quantity of which can either be gaged or left for him to determine by practice. He then blows same into the shape of an oblong bulb, the outer form of which is determined by a bent iron C, Fig. 1, provided at its upper extremity with a fork-like extension B′, (at right angles with such rod,) which rests on a ring B, fixed on the blowpipe A, thus determining once and for all the size of this original bulb and enabling the workman to cut off with the usual scissors such superfluous quantity of crystal, if any may protrude. Having done this, the bulb, in the state as described, is introduced into the furnace, so as to raise its temperature, when it is taken out again and pierced at the end by

means of a tool T, as shown in Fig. 2, the object of which is to pierce the bottom of the bulb and thereafter by the use of a turned-up tool D, Fig. 2, to form the edge of the opening as a groove or rabbet to hold the added metal, as hereinafter described, this being necessary for securing a joint with the clear crystal. The bulb is now again put into the furnace and kept above the molten metal therein, and on withdrawing same an appropriate quantity of clear crystal P is joined onto it by a second workman, whereby a solid obturating piece is added onto the first part of the bulb, as in Fig. 3, and is seized in position by the groove or rabbet formed on the edges of the lower aperture as made by the preceding handling. The whole being in this state is placed into a third tool-rod E, which extends over the joint, as shown in Fig. 4, the workman blowing through the blowpipe and causing the combined bulb to take the shape as shown in Fig. 4. The joint is thus made and the outer surface of the bulb kept smooth. The remainder of the operation consists in gradually bringing the bulb to its final form, and this is obtained by three consecutive operations, similar to those described before, by means of special bent tool-rods F and G, Figs. 5 and 6, whereby the said bulb gradually takes the shapes shown in Figs. 5 and 6, respectively. In the case of the shaping-tools F and G, however, the tool is hollow, in the form of a small tube which extends up to the points F′ and G′, respectively, and the inner side of that part of the tube which faces the crystal is provided in that part only with small holes. In this way the workman, blowing through the blowpipe A and simultaneously through the tubes F and G, respectively, cools the upper part of the bulb, thus preventing same from being affected by the inner pressure of the blast, and consequently prevents the upper part of the shape of the bulb from being altered, and by this means the whole of the pressure acts on the middle and lower part of the bulb, which has yet to be extended. It is essential that the bulb be reheated by insertion in the furnace after each blowing—that is, between the change of shaping-tools.

Having now particularly described and ascertained the nature of this invention, what I claim is—

1. A tool for glass-blowing, consisting of the combination with the blowpipe having a collar thereon, of a rod-like shaping attachment, adapted to be revolved about the said blowpipe by one bent end bifurcated laterally, and resting upon the said collar, and the other end located in proximity to the end of the blowpipe, and shaped to form the desired article to be blown, substantially as described.

2. A tool for glass-blowing consisting of the combination with the blowpipe, having a collar thereon, of a tube-like shaping attachment, adapted as to its upper end to rest upon and revolve about the said blowpipe-collar, and having upon the inner face of its lower part conforming to the shape of the article to be blown, perforations to its hollow interior, allowing the impact of the air from the blower through the shaping-tube upon a desired part of the plastic-glass article, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

FERDINAND FANTA.

Witnesses:
RICHARD A. HOFFMANN,
CHARLES CARTER.