

2 Sheets—Sheet 1.

H. A. BENHAM & W. H. TOMSON.

CANDLE LAMP FOR USE IN PHOTOGRAPHIC DARK ROOMS.

Patented Apr. 26, 1892.



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(No Model.)

2 Sheets—Sheet 2.

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CANDLE LAMP FOR USE IN PHOTOGRAPHIC DARK ROOMS.  
No. 473,814. Patented Apr. 26, 1892.

Fig. 2.

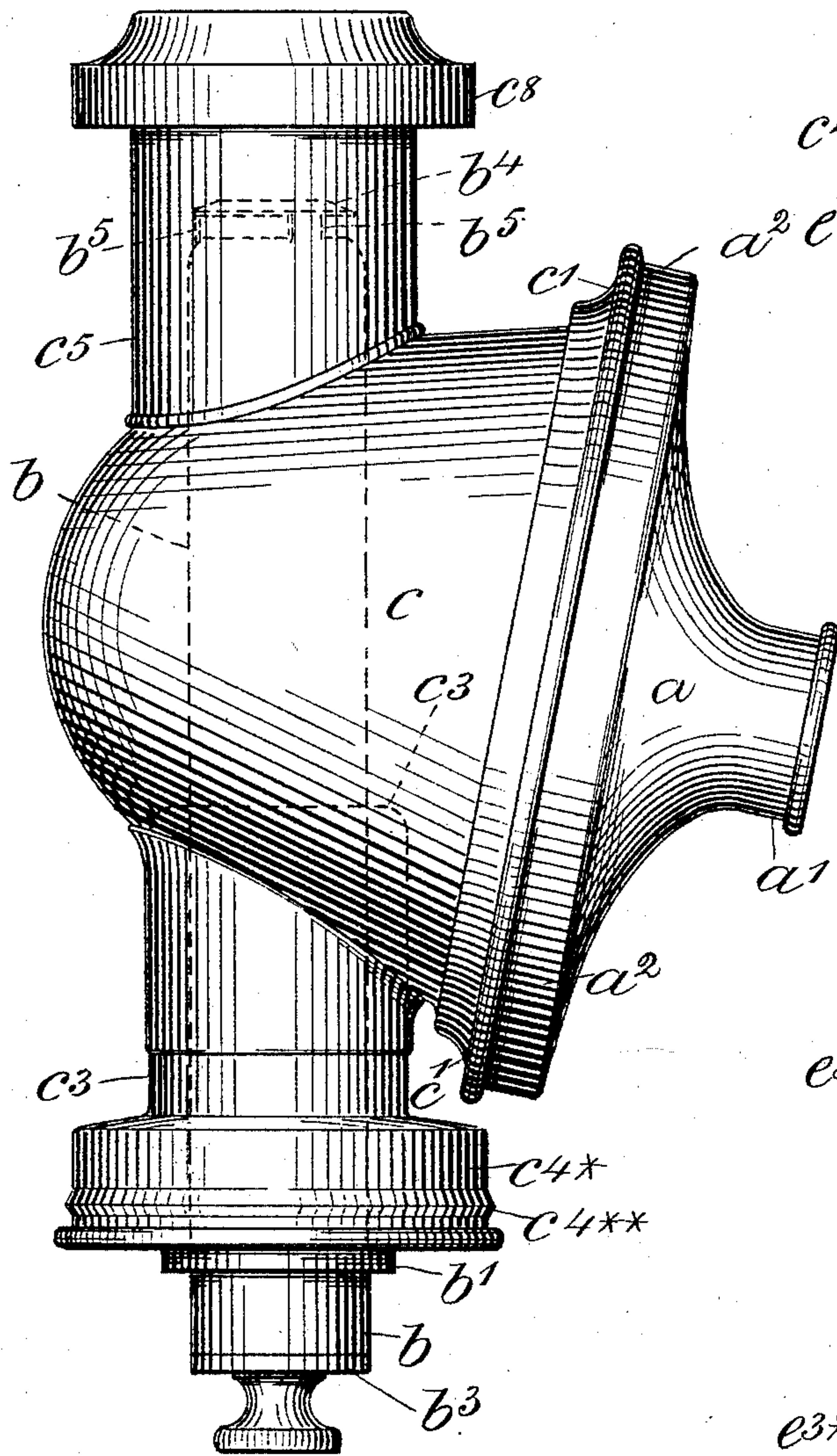


Fig. 3.

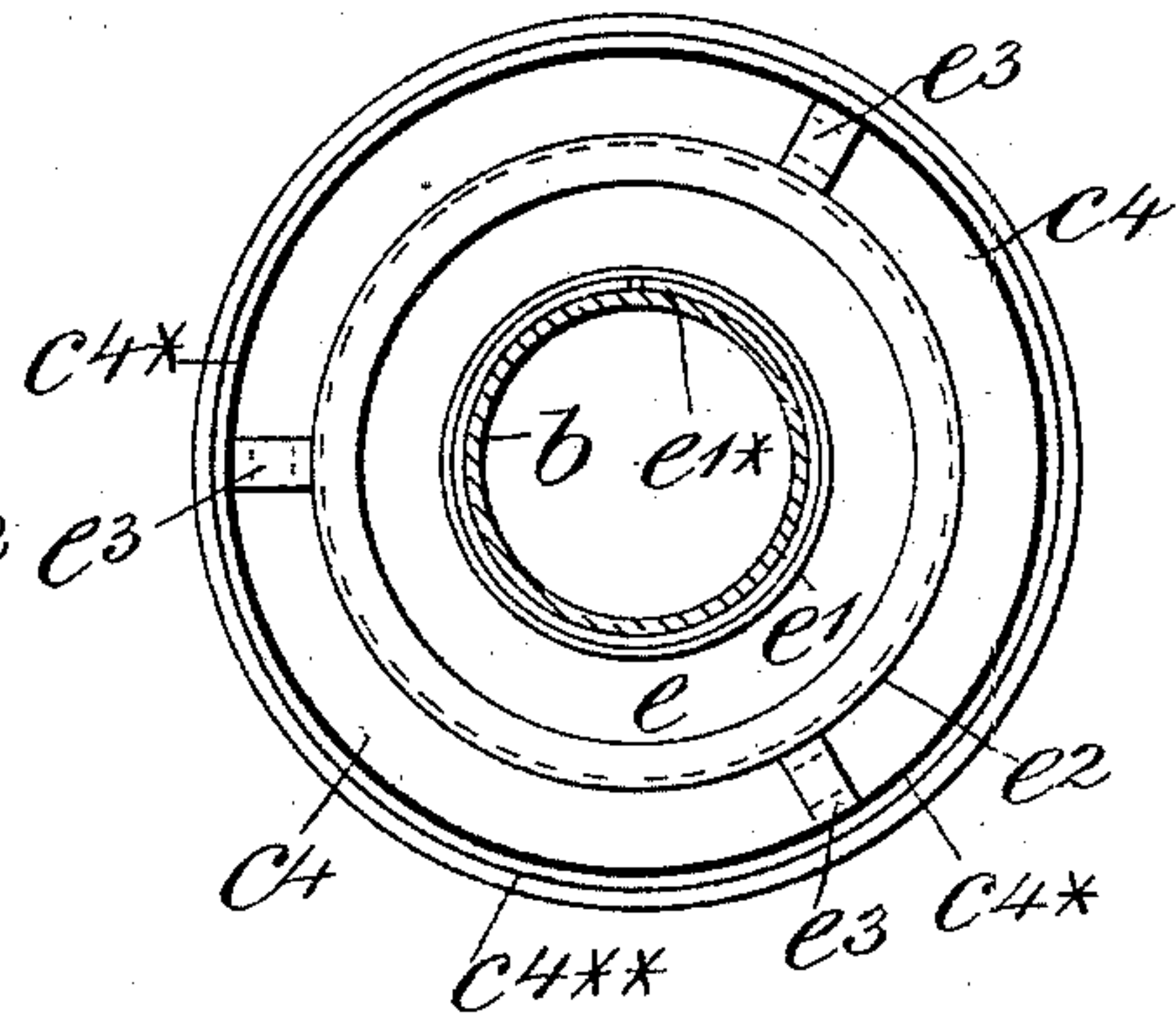


Fig. 4.

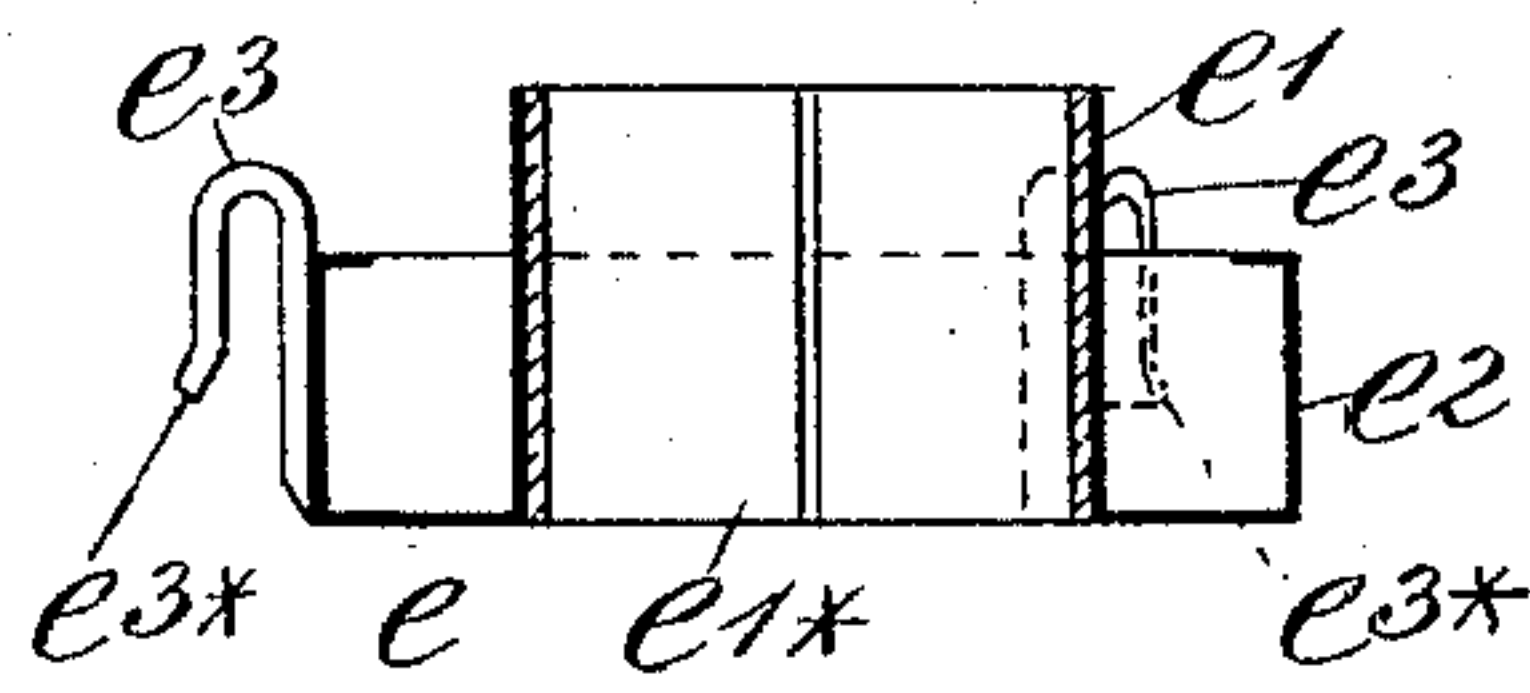


Fig. 5.

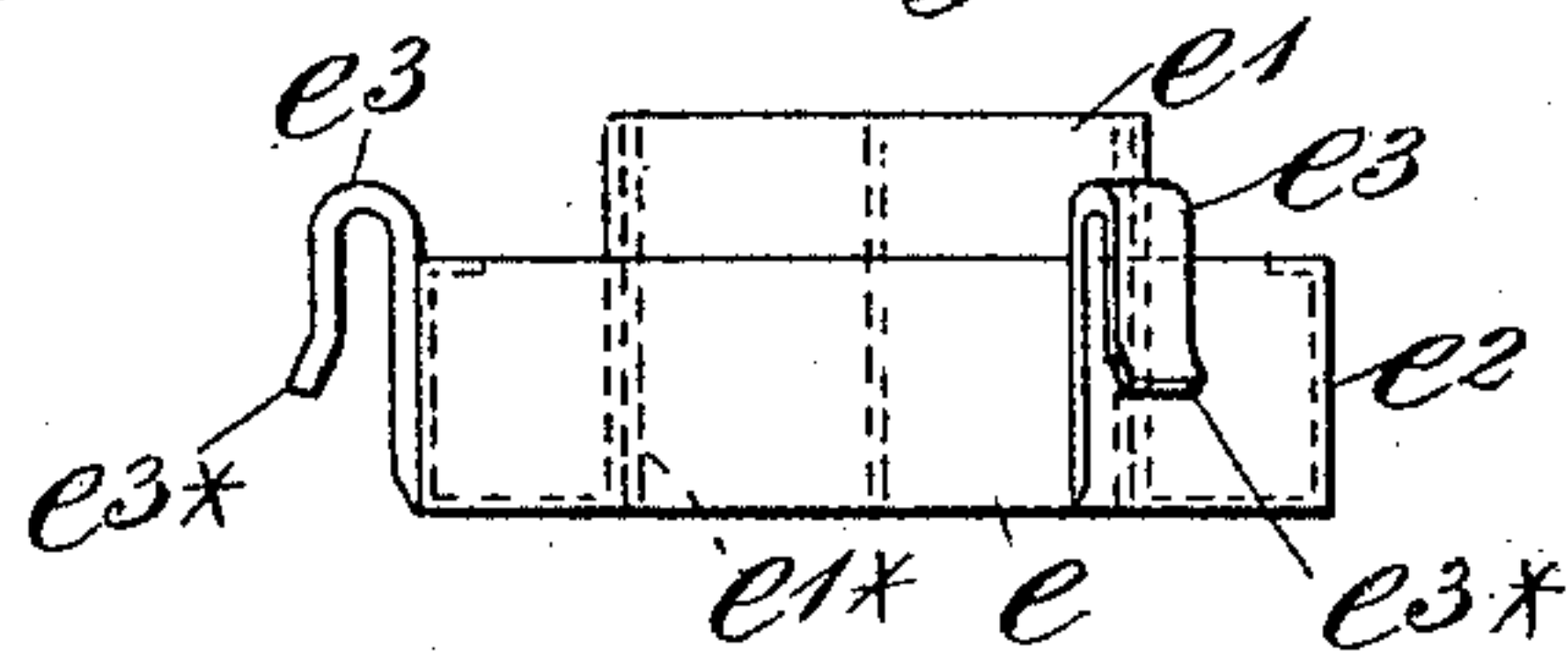
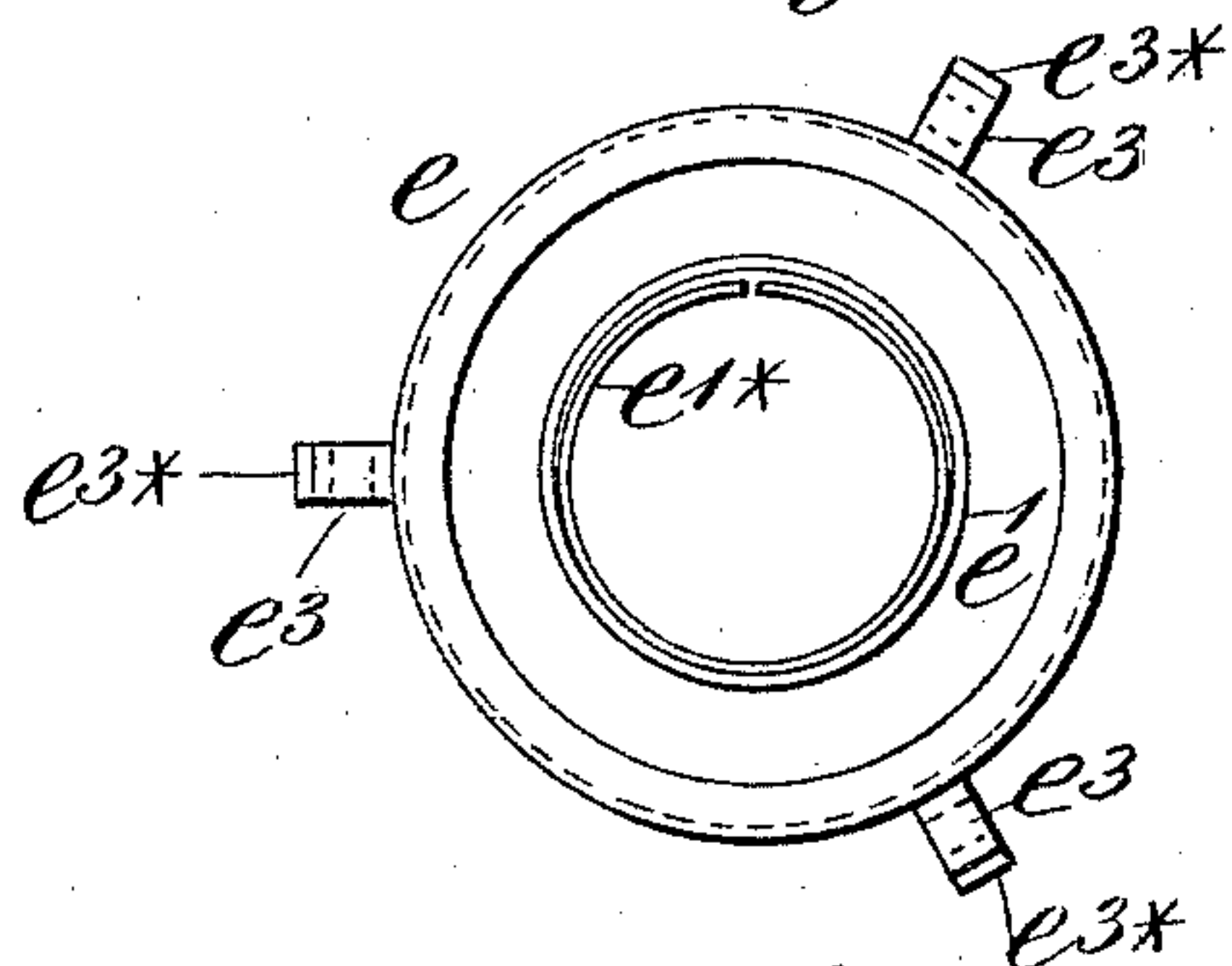


Fig. 6.



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# UNITED STATES PATENT OFFICE.

HERBERT AUGUSTUS BENHAM AND WILLIAM HOPKINS TOMSON, OF LONDON,  
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## CANDLE-LAMP FOR USE IN PHOTOGRAPHIC DARK-ROOMS.

SPECIFICATION forming part of Letters Patent No. 473,814, dated April 26, 1892.

Application filed July 10, 1891. Serial No. 399,028. (No model.)

*To all whom it may concern:*

Be it known that we, HERBERT AUGUSTUS BENHAM and WILLIAM HOPKINS TOMSON, art metal workers and manufacturers, subjects of the Queen of Great Britain, both managing directors of Benham and Froud, Limited, of Chandos Metal Works, Chandos Street, Strand, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Candle-Lamps for use in Photographic Dark-Rooms, of which the following is a specification.

The invention relates to improvements in that class of lamp consisting of a "reflecting reading-lamp" closed at the front with a disk of suitably-colored glass in order to adapt it to the requirements of the photographic dark-room and to other uses, wherein a non-actinic or screened light is desirable; and the objects of the present invention are to simplify some of the constructive details of, and therefore to cheapen the lamp; to provide an efficient means for freely admitting a supply of air in excess of that actually required to support combustion in order to keep cool the parts adjacent to the candle while obstructing the passage of any rays of light issuing from the lamp, and to render the lamp capable of compression into a comparatively small compass for transport. For this purpose we cover the front of the reflecting-hood with a disk of ruby or other non-actinic glass, as heretofore proposed; but we fit this disk of glass into the front of the hood against a bead or shoulder and hold it in its place by means of an annular ring or cap of U-shaped or equivalent section, which fits tightly upon the rim of the hood, and when the lamp is not in use we, in order to protect the glass, cover the front thereof with a metal cap which at other times constitutes the foot or base of the lamp, as hereinafter described. The foot or base of the lamp is formed hollow to fit upon the ring or cap of the hood and with a central apertured rise constituting a socket to receive and hold the lower end of the candle-tube, which constitutes the stem of the lamp and is formed with a rim or shoulder adapted to rest upon the wall of the socket. We provide the upper part of the candle-tube with a candle cone or

burner consisting of a flat ring supported upon short studs or projections from the candle tube or stem, as we find that such arrangement materially assists the steady burning of the flame of the candle. The hood is formed with a downwardly-extending short tube of a diameter considerably larger than the candle-tube, and which at its upper part extends into the hood in the manner well understood, while at its lower part its diameter is increased so as to form an annular chamber. Into this annular chamber we insert a ring or fitting formed like an annular trough, the inner wall of which is prolonged and adapted to fit and slide upon the candle-tube, while the outer wall is formed shorter than the depth of the annular chamber and of slightly-smaller diameter than the wall thereof, so as to leave an air-passage between the parts, and the outer wall of the ring or fitting is provided with several distance-pieces disposed vertically around the exterior thereof and shaped to tightly fit the annular chamber, but so that the ring or fitting will be easily separable therefrom. By this arrangement of parts an air-passage of large area is provided between the ring or fitting and the annular chamber, and a current of air of considerable volume is thus caused to pass upward between the candle-tube and the short descending tube of the hood, and those parts are thus efficiently maintained in the cool condition necessary to prevent the candle becoming unduly softened, while any rays of light from the flame of the candle will strike down into the annular trough of the ring or fitting, which presents a very extended surface blackened in the manner well understood, and in order to escape the rays would then require to rise over the outer wall of the trough and descend between that wall and the wall of the annular chamber. Any suitable form of chimney may be employed which will allow a free exit to the products of combustion and obstruct any rays of light from the flame. When a white light is required, the ring or cap and glass may be removed from the front of the hood, or the hood may be removed bodily from the candle-tube. When it is desired to compact the lamp for transport, the candle-tube is telescoped within



the hood, when the height of the lamp will be much reduced, while the foot or base of the lamp may be detached and placed over the front of the hood as a cap or cover to protect the glass.

Our invention consists in the features of novel construction hereinafter described and claimed.

In order that the said invention may be more clearly understood and readily carried into effect, we will proceed, aided by the accompanying drawings, more fully to describe the same.

In the drawings, Figure 1 is a vertical section of a candle-lamp constructed according to our invention and extended for use. Fig. 2 is a side elevation thereof, showing the lamp compacted for transport. Fig. 3 is a horizontal section taken on the line 1 1 of Fig. 1, the foot or base of the lamp being omitted. Fig. 4 is a vertical section of the ring or fitting separately. Fig. 5 is an elevation thereof, and Fig. 6 is a plan thereof.

In the several figures, in which like parts are indicated by similar letters of reference, *a* represents the foot or base of the lamp, *b* represents the candle tube or stem, and *c* represents the reflecting-hood, the front of which is covered with a disk *d*<sup>\*</sup>, of ruby or other non-actinic glass, as heretofore proposed. This disk *d*<sup>\*</sup> of glass is fitted into the front of the hood *c* against a bead or shoulder *c*<sup>'</sup> and it is held in its place by means of an annular ring or cap *d* of U shape, having outer rim *d*<sup>2</sup> and inner flat ring *d*<sup>3</sup>, or it might be an equivalent section which fits tightly upon the rim of the hood *c* and overlaps the edge of the glass disk *d*<sup>\*</sup>, thereby effectually obstructing the passage of any rays of light around the same, while the ring or cap *d* is secured against accidental displacement by means of studs *d*<sup>'</sup> thereon engaging corresponding bayonet-slots *c*<sup>2</sup> in the rim of the hood *c*.

The foot or base *a* of the lamp is formed hollow, with a rim *a*<sup>2</sup> to fit upon the rim *d*<sup>2</sup> of the ring or cap *d* of the hood *c*, so that when the lamp is not in use it may constitute a metal cap, as represented at Fig. 2, to protect the glass disk *d*<sup>\*</sup> against accidental injury, and the base or foot *a* is also formed with a central apertured rise or socket *a*<sup>'</sup> to receive and hold the lower end of the candle-tube *b*, which constitutes the stem of the lamp and is formed with a bead or shoulder *b*<sup>'</sup>, adapted to rest upon the wall of the socket *a*<sup>'</sup>.

The candle *b*<sup>\*</sup> is inserted into the candle-tube *b* from the lower end thereof, and is forced upward by means of a spring *b*<sup>2</sup>, held in place by a screw-plug *b*<sup>3</sup>, as is well understood, and the upper part of the candle-tube *b* is provided with a candle cone or burner consisting of a flat or cupped ring *b*<sup>4</sup>, supported upon short studs or projections *b*<sup>5</sup> from the candle tube or stem *b*, as it is found in practice that such arrangement materially assists the steady burning of the flame of the candle.

The hood *c* is formed with a downwardly-extending short tube *c*<sup>3</sup> of a diameter considerably larger than the candle-tube *b* and which at its upper part extends into the hood *c* in the manner well understood, while at its lower part its diameter is increased or expanded so as to form an annular chamber *c*<sup>4</sup>. Into this annular chamber *c*<sup>4</sup> is inserted a ring or fitting *e*, formed like an annular trough, the inner wall *e*<sup>'</sup> of which is prolonged and furnished with a split ring *e*<sup>'\*</sup>, and is thus adapted to fit and slide upon the candle-tube *b*, while the outer wall *e*<sup>2</sup> is formed with a horizontal flange *e*<sup>4</sup> and shorter than the depth of the annular chamber *c*<sup>4</sup> and of slightly-smaller diameter than the wall *c*<sup>4\*</sup> thereof, so as to leave an air-passage around and over the trough between the parts, and the outer wall *e*<sup>2</sup> of the ring or fitting *e* is provided with several distance-pieces *e*<sup>3</sup>, formed of strips of metal, which are at one end fixed to the outer wall *e*<sup>2</sup> of the ring or fitting *e*, and the other ends of which are turned over to form springs and shaped to tightly fit the annular chamber *c*<sup>4</sup>, while they are slightly bent outward at their ends *e*<sup>3\*</sup> to engage an annular groove or depression *c*<sup>4\*\*</sup>, formed in the wall *c*<sup>4\*</sup> of the annular chamber *c*<sup>4</sup>, so that the ring or fitting *e* will be securely held in place, but with capability of easy removal. By this arrangement of parts an air-passage of large area is provided between the ring or fitting *e* and the wall *c*<sup>4\*</sup> of the annular chamber *c*<sup>4</sup>, and a current of air of considerable volume is thus caused to pass upward between the candle-tube *b* and the short descending tube *c*<sup>3</sup> of the hood *c*, and those parts are thus efficiently maintained in the cool condition necessary to prevent the candle becoming unduly softened, while any rays of light from the frame of the candle will strike down into the annular trough of the fitting or ring *e*, which presents a very extended surface blackened in the manner well understood, and will thus be efficiently trapped, as in order to escape the rays would require to rise over the outer wall *e*<sup>2</sup> of the trough and then descend between that wall and the wall *c*<sup>4\*</sup> of the annular chamber *c*<sup>4</sup>.

Any suitable form of chimney may be employed which will allow a free exit to the products of combustion and obstruct any rays of light from the flame of the candle; but in the course of our experiments we have found the following simple arrangement of parts to answer well.

*c*<sup>5</sup> represents a short tube of large diameter rising from the upper part of the hood *c* and formed with an enlargement or shoulder *c*<sup>6</sup> and a rim *c*<sup>6\*</sup> at its upper part, upon which is loosely placed a deflector or screen *c*<sup>7</sup>, shaped like an inverted cone and formed with a downwardly-projecting notched or scalloped ring *c*<sup>7\*</sup>, which rests upon the shoulder *c*<sup>6</sup>, and while supporting the cone-shaped deflector or screen *c*<sup>7</sup> also affords a free passage to the current of air and products of combustion passing through the tube or chimney *c*<sup>5</sup>. The top of



the chimney  $c^5$  is fitted with a dwarf-cap  $c^8$ , provided with a rim  $c^9$ , fitting around the rim  $c^6$ , and with a central aperture  $c^{8*}$  therein, which occupies a position over the hollow or depression of the cone-shaped deflector  $c^7$ , and thus affords an efficient egress for the air and products of combustion, while at the same time it assists to obstruct the passage of any rays of light from the flame of the candle.

When a white light is required, the ring or cap  $d$  and glass  $d^*$  may be removed from the front of the hood  $c$ , or the hood may be removed bodily from the candle-tube  $b$ .

When it is desired to compact the lamp for transport, the candle-tube  $b$  is telescoped within the hood  $c$ , as represented at Fig. 2, when the height of the lamp will be much reduced, while the foot or base  $a$  may be detached from the candle-tube  $b$  and placed over the front of the hood  $c$  as a cap or cover to protect the glass  $d^*$ , as hereinbefore described.

Instead of the ring or fitting  $e$  being made removable from the annular chamber  $c^4$ , it may, if desired, be fixed therein by means of solder or otherwise.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. A lamp comprising a tube or stem, a hood, and a removable and replaceable foot or base adapted to fit either upon the tube or stem or upon the hood, substantially as described and shown.

2. A lamp comprising a tube or stem, a hood having a ring or cap, and a removable and replaceable foot or base adapted to fit either upon the tube or stem or upon the ring or cap of the hood, substantially as described and shown.

3. The combination of the tube or stem having a bead or shoulder, the hood having a ring or cap formed with an outer rim, and a removable and replaceable foot or base having a socket receiving the tube or stem and supporting it by means of the bead or shoulder thereon and provided with a rim adapted to fit upon the rim of the ring or cap of the hood, substantially as described and shown.

4. The combination, with a tube or stem having a foot or base and a hood having a short tube of large diameter, provided with an enlargement at its lower end, of a trough having an inner wall adapted to slide on the tube or stem and an outer upwardly-extending wall, and means by which the short tube is supported on the trough, so as to provide an air-space between the outer wall of the latter and the enlargement around and over the trough, substantially as described.

5. The combination of a foot or base, a tube or stem, a hood having a short descending tube of large diameter formed with an enlargement, having a wall provided with an annular groove, and a trough having an inner wall sliding on the lamp tube or stem and an outer wall provided with distance-pieces fitting against the wall of the enlargement and engaging the annular groove thereof, substantially as described and shown.

6. The combination of the foot or base, the tube or stem, the annular trough formed with an inner split wall and an outer wall having a horizontal flange and provided with distance-pieces, and the hood having a short tube of large diameter formed with an enlargement at its lower end, provided with an annular groove to receive the lower ends of the distance-pieces, the trough and enlargement providing an air space or chamber around and over the trough, substantially as described and shown.

7. The combination of a foot or base, a tube or stem, and a hood provided with a chimney consisting of a short tube of large diameter, having an enlargement at its upper end formed with a shoulder and rim, a scalloped ring having an inverted-cone deflector, and a dwarf-cap formed with a rim and central opening, substantially as described and shown.

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