

H. KUZEL.
METAL FILAMENT FOR ELECTRIC INCANDESCENT LAMPS.
APPLICATION FILED JULY 16, 1907.

898,752.

Patented Sept. 15, 1908.

Fig. 1.

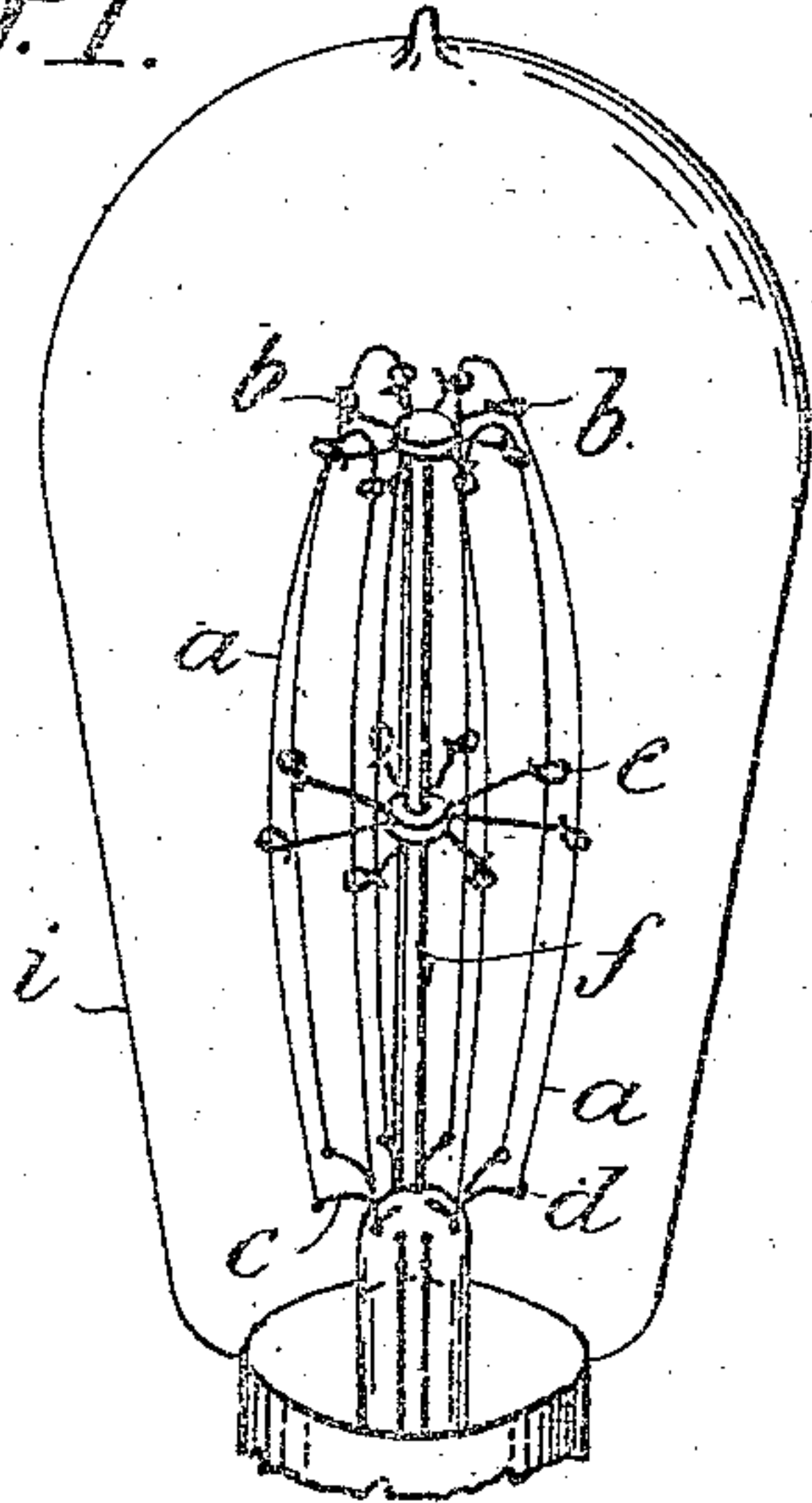


Fig. 4.

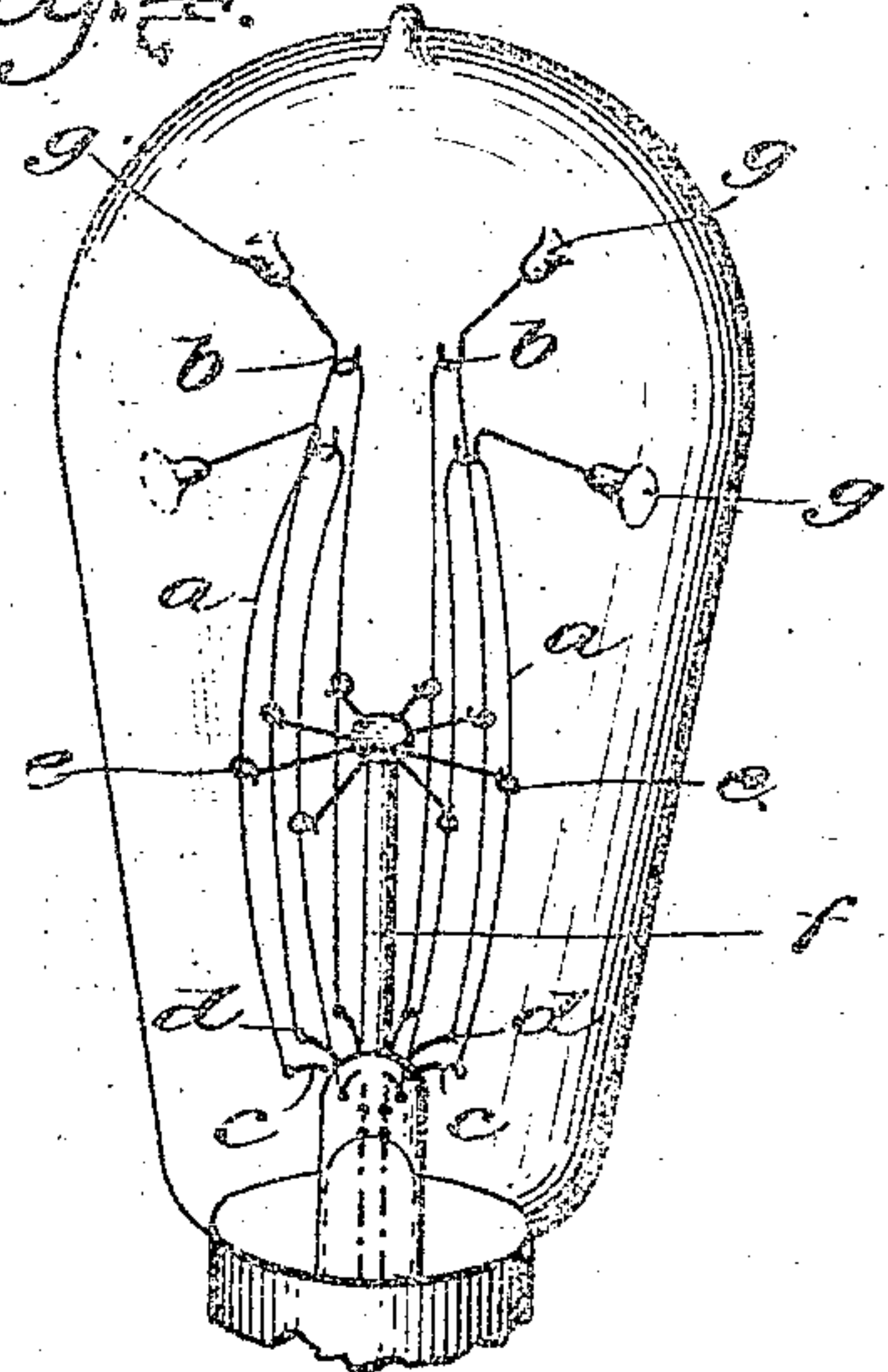


Fig. 2.

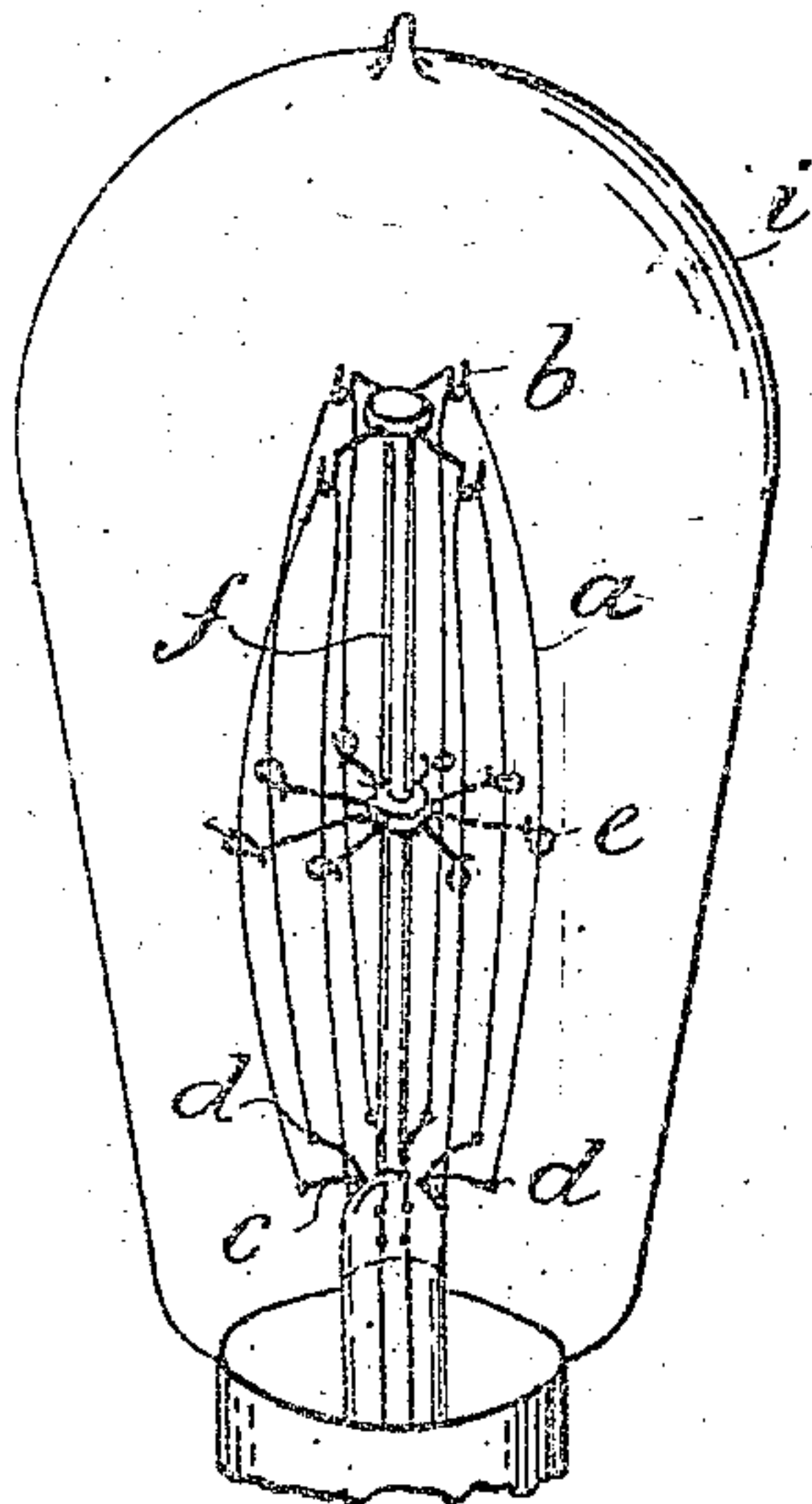
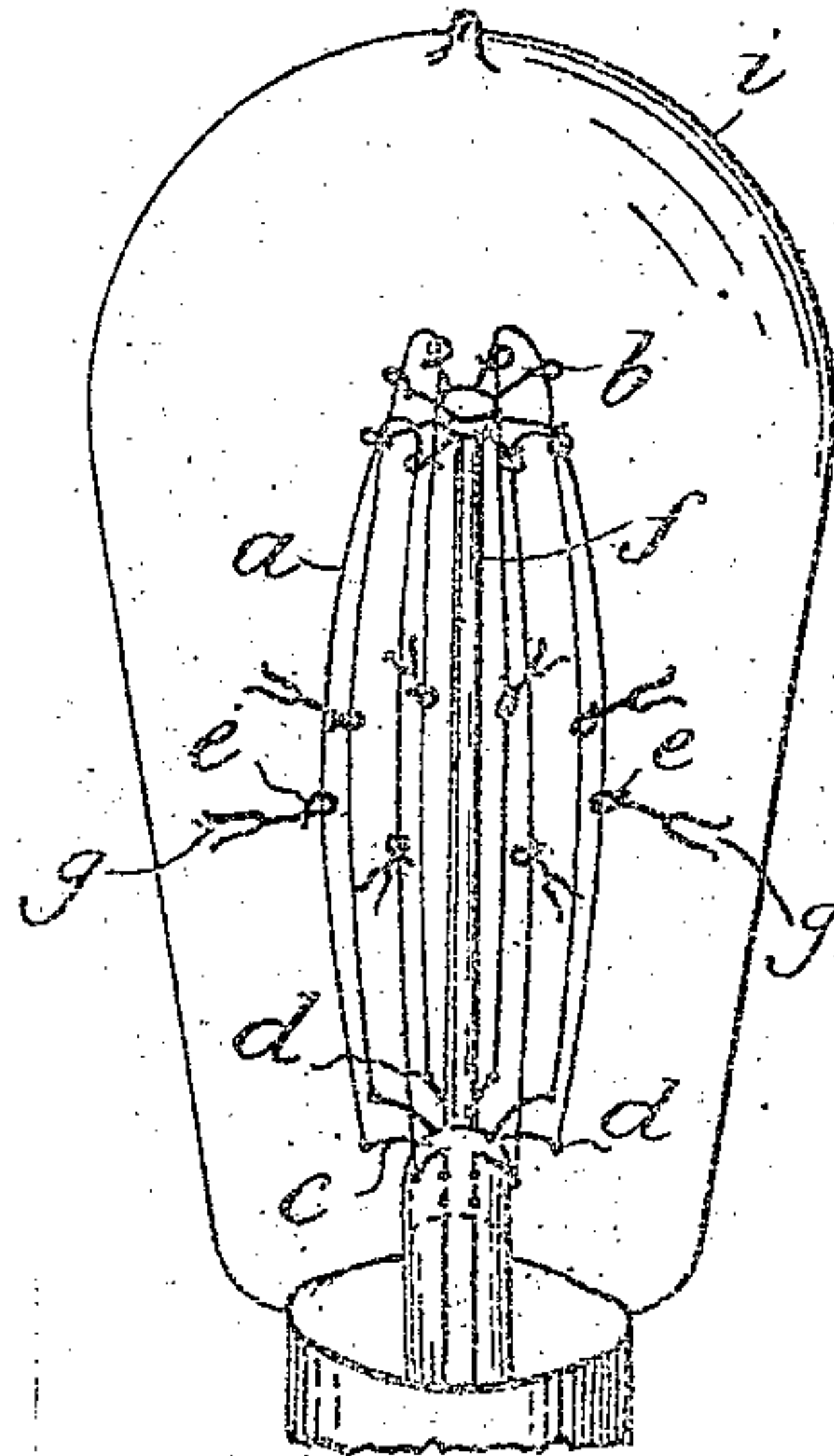


Fig. 3.



WITNESSES

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METAL FILAMENT FOR ELECTRIC INCANDESCENT LAMPS.

No. 898,752

Specification of Letters Patent.

Patented Sept. 15, 1908.

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To all whom it may concern:

Be it known that I, HANS KUZEL, a subject of the Emperor of Germany, and a resident of Baden, near Vienna, Empire of Austria-Hungary, have invented certain new and useful Improvements in Metal-Filament Electric Incandescence Lamps, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to electric incandescence lamps having horse shoe shaped filaments made of refractory metals, such as tungsten. Such lamps could be burned heretofore only in a downwardly hanging position and the filaments had to be supported by special holding devices such as hooks, eyelets or the like provided within the bulb for preventing distortions of the filaments. Such distortions are due to the softening of the extremely fine and delicate filaments when heated to incandescence by the passage of the current and to electrodynamic action, and in some cases also to electrostatic actions, and frequently result in an early destruction of the lamp owing to short circuiting in consequence of neighboring filament legs coming into contact with each other. It has been proposed to avoid this deficiency by so arranging the holding devices supporting the individual legs of the filaments at points intermediate between the points of connection of the same to the supply wires and the bights of such horseshoe or U shaped filaments, that the distance of the said points of connection from the longitudinal axis of the lamp is different from the distance of the centers of the said holding devices from the same axis. Such lamps can also only be burned in a downwardly hanging position, their longitudinal axis being vertical with the said points of connection uppermost and the bights of the filaments lowermost.

According to my present invention I provide in such lamps besides the holding devices arranged as just described relatively to the points of connection of the filaments to the supply wires, also bight holders supporting the bight of each filament at the bight and preferably make the distance of such bight holder from the longitudinal axis of the lamp different from the distance between the adjacent holding devices, and the same axis. Lamps having their bights so

supported may be burned in an upright position with their bights uppermost or even in a horizontal or any inclined position, because by so supporting the filaments the inevitable distortion of the filament legs are so controlled that any risk of neighboring filament legs coming into contact with each other is avoided.

In the accompanying drawing Figures 1 to 4 are perspective views, showing various modifications of my improved metal filament incandescence lamps.

In the drawing *a* are the horse shoe or U-shaped metal filaments, *c* are the supply wires, *d* are the soldering or cementing beads connecting the filaments to the supply wires, *e* are the holding devices to loosely guide the filaments. The distance of these latter from the longitudinal axis of the lamp is different from and as shown in the drawing greater than the distance of the soldering or cementing beads *d* from the same axis. *b* are the bight holders supporting each of the filaments at its bight. The distance of the bight holders from the longitudinal axis of the lamp, is different from and as shown less than the distance of the holding devices from the same axis.

In Figs. 1 and 2 the holding devices *e* and the bight holders *b* are attached to a central support *f* within the bulb *i* of the lamp while in Fig. 3 the holding devices *e* are attached to small glass rods *g* sealed into the bulb, the bight holders *d* being attached to the central support.

In Figs. 1 and 3 two bight holders for each filament are shown while in Fig. 2 there is provided only one such bight holder for each filament.

Instead of attaching the bight holders to the central support they might be attached to glass rods sealed into the bulb as shown in Fig. 4.

By supporting the filaments in the manner described, the lamps may be burned in any position whatever, because the distortions of necessity occurring in the parts of the filament legs between neighboring supporting points are so controlled by the arrangement of these supporting points that any danger of neighboring filament legs coming into contact with each other is practically completely avoided. Further when the filaments are softened when heated to incandescence by the passage of the current, the parts of their legs contained between neigh-

boring supporting points become curved or bent under the action of gravity, such bending or curving of the filaments permitting them to contract again without breaking when they are thrown out of circuit.

Claim—

In an electric incandescent lamp, the combination of supply wires, a plurality of horse-shoe shaped metal filaments having their free ends connected to such supply wires, holding devices, means for supporting such holding devices in the bulb, the said holding devices being adapted to loosely guide longitudinally both legs of each filament at points intermediate between the points of connection of such legs to the supply wires and the bight of such filament, the distance of the points of connection between the free ends of the filament and the supply

wires from the longitudinal axis of the lamp being different from the distance of the holding devices from the said axis, bight holders adapted to support such filaments at the bights and means for supporting the said bight holders, the distance of such bight holders from the longitudinal axis of the lamp being different from the distance of the neighboring holding devices from the said axis, substantially as and for the purpose described.

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

HANS KUZEL.

Witnesses:

JOHN GEORGE HARDY,
ROBT. W. HEINGARTNER.