

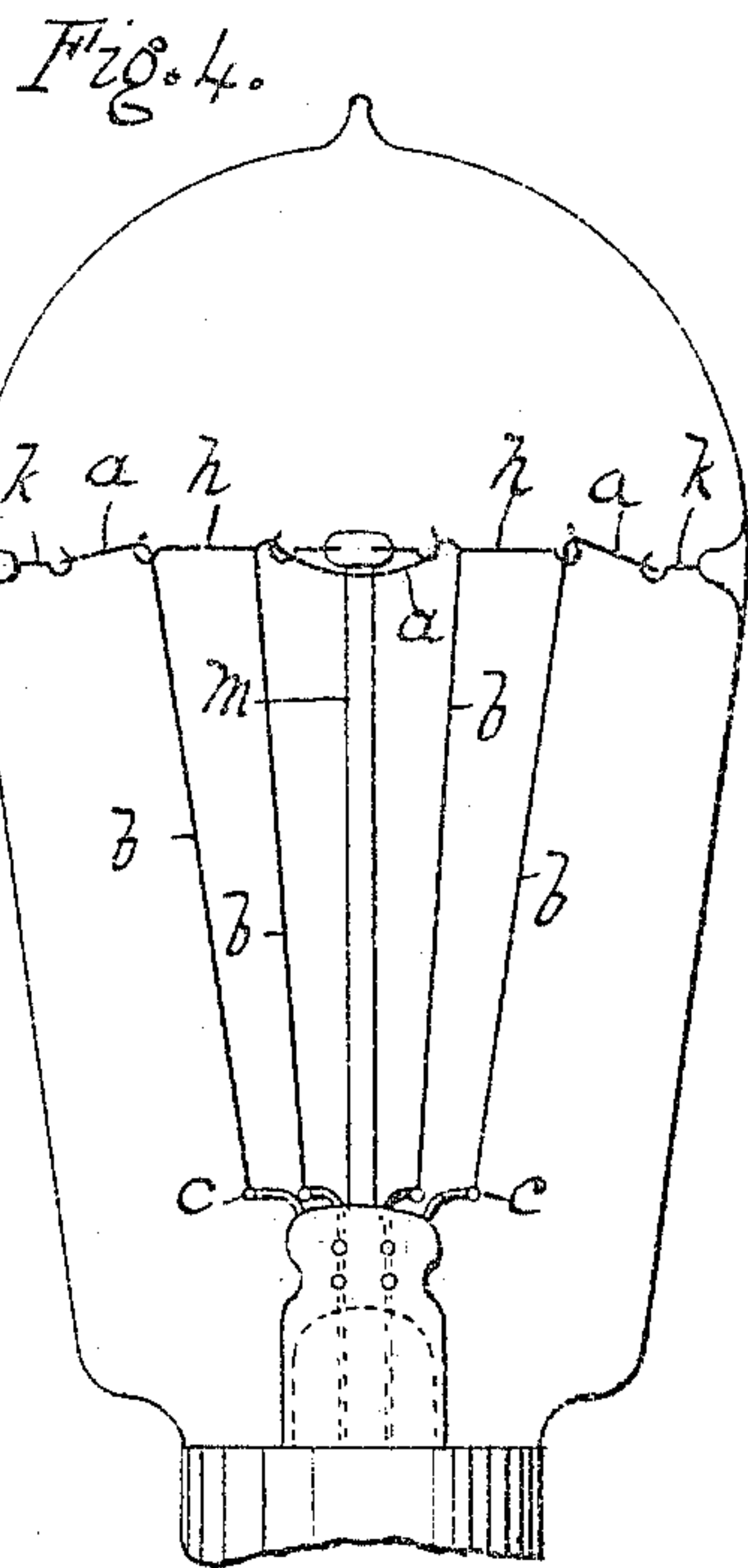
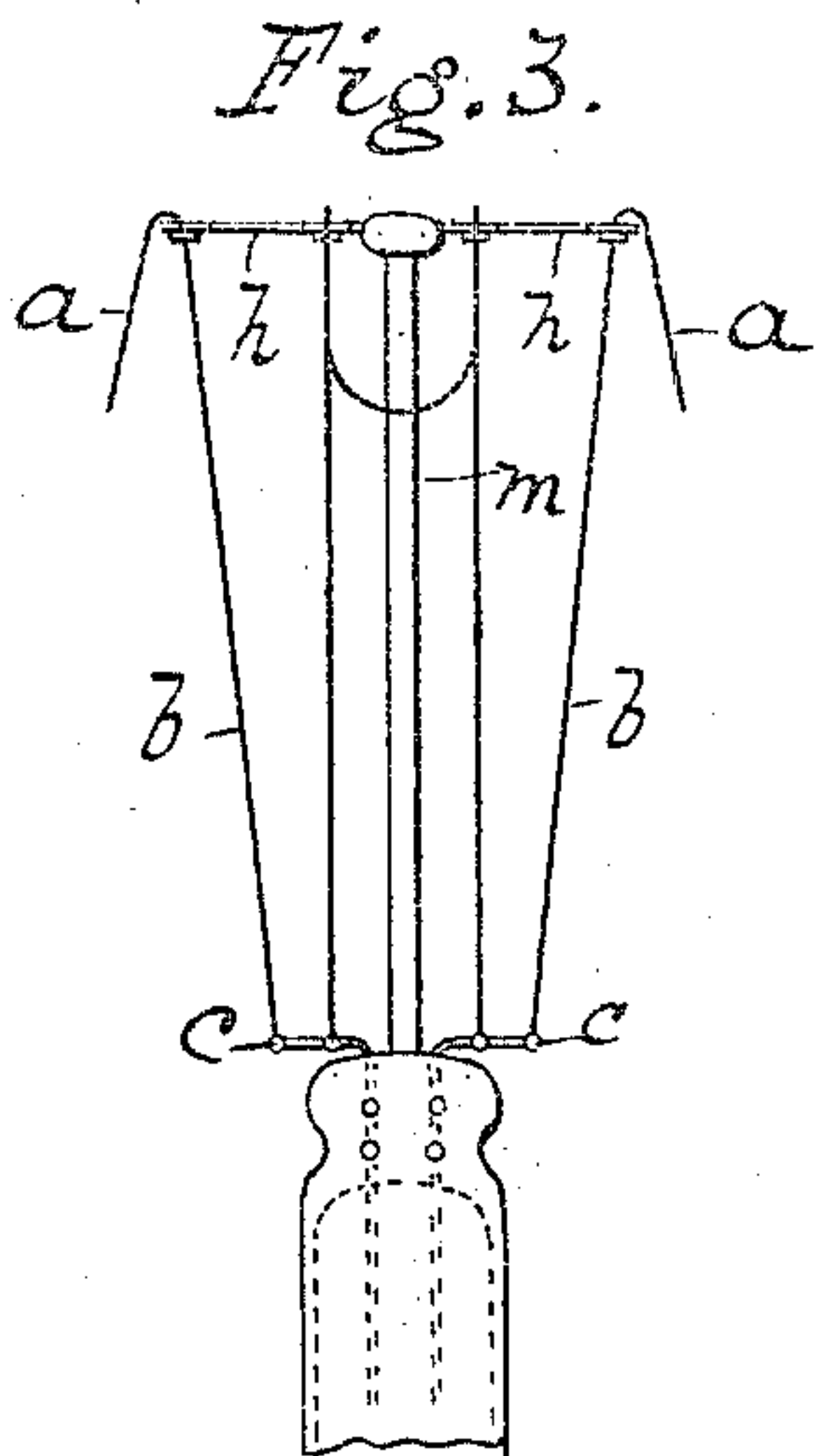
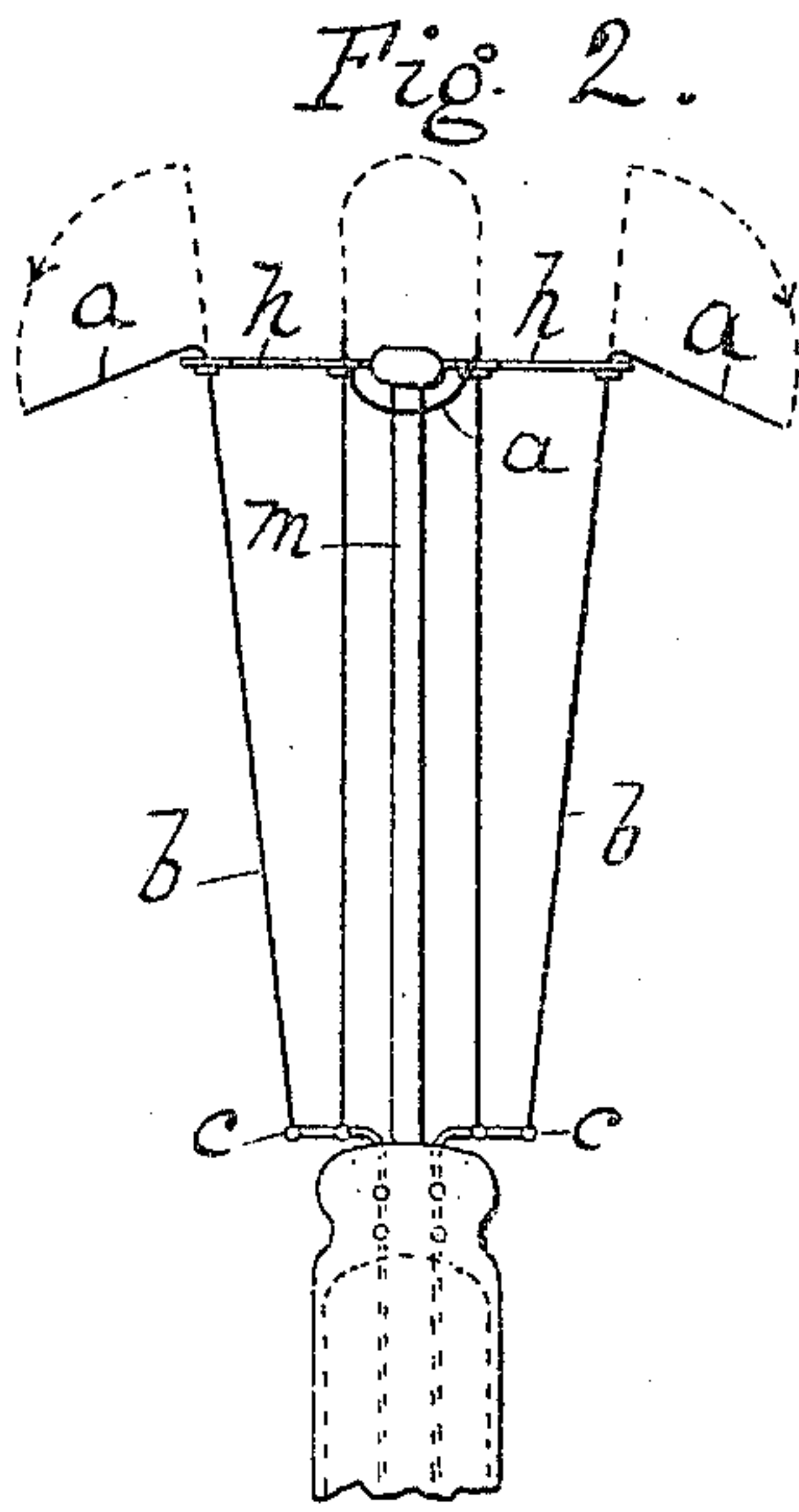
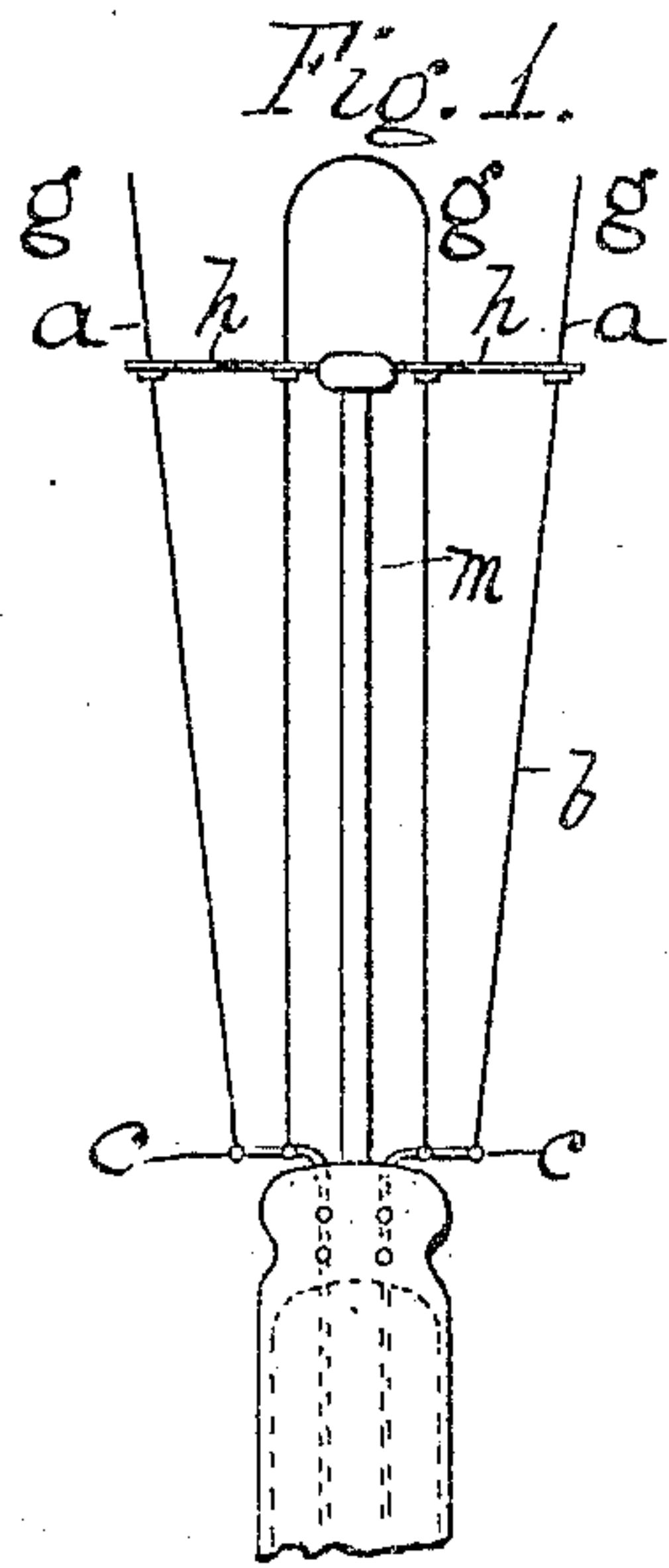
H. KUŽEL.

METALLIC FILAMENT ELECTRIC GLOW LAMP.

APPLICATION FILED MAR. 31, 1908.

960,962.

Patented June 7, 1910.



WITNESSES:

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METALLIC-FILAMENT ELECTRIC GLOW-LAMP.

960,962.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed March 31, 1908. Serial No. 424,330.

To all whom it may concern:

Be it known that I, HANS KUŽEL, 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 Metallic-Filament Electric Glow-Lamps, of which the following is a specification.

In the accompanying drawings, Figures 1, 2, 3 and 4 are diagrammatic elevations, illustrative of my improved metal filament electric glow lamps adapted to be burned in an upright position.

The prior patent No. 897,110 to myself and another discloses metal filament electric glow lamps in which the horseshoe or U-shaped filaments are so supported that at first, that is to say before burning, they are at an angle to the longitudinal axis of the lamp. Such lamps have to be burned hanging downward. A supporting frame of a glow lamp in which a cluster of filaments is mounted in this way is shown diagrammatically in elevation in Fig. 1 of the annexed drawing. In this figure, *m* is the central support carrying the supports or guides *h* in the form of eyelets, supporting or guiding the filaments at each of their legs, at a point intermediate between the fastened end of the legs and the apex of the filament. In the case illustrated by way of example, in Fig. 1 the shorter portion *a* of each filament projects above the eyelets while the longer portion *b* of the same is below the eyelets. Fig. 1 shows the cluster of filaments as it looks before burning the lamp. If now current is passed through such a cluster of filaments while in an upright position, in which it is shown in Fig. 1, it will be observed that the part *a* when it becomes sufficiently incandescent and thus sufficiently soft, will gradually sink downward as indicated by dotted lines and the arrows in Fig. 2. Finally the part *a* will bend over the support or guide *h* and hang downward approximately vertically from the same, so that the cluster of filaments will then appear in the form shown in Fig. 3. If the filaments are inclined to the axis of the lamp as in the example shown and if the portions *a* are sufficiently long they will bend themselves owing to gravity as soon as the filaments are softened by incandescing; otherwise this bending may be brought about by any suitable mechanical means. A lamp

with filaments thus bent as shown in Fig. 3 may be burned upright in a vertical position without any risk of the several parts of its filaments coming into contact with each other. My described improvement therefore constitutes a very simple solution of this problem which is very important with metal filament glow lamps. The lower parts of the filaments will show a regular curvature such as set forth in said prior patent, being the result of the particular mode of supporting the filaments and thereby the filaments are also protected from short circuiting.

If it is desired to have the portion *a* not hang downward approximately vertically but to occupy an upwardly inclined or a horizontal or a moderately downwardly inclined position, for instance as shown in Fig. 2, then to obtain this result for the bights or ends of each of the portions *a*, one or more supports, for instance hooks *k*, Fig. 4, may be provided, that are held in position in any suitable or preferred manner, as for instance, by being sealed or secured into the walls of the bulb to hold the bights *a* in the desired positions. In this case the filaments need not be inclined at an angle to the axis of the lamp before burning as was supposed in the example shown, but may be parallel to the axis of the lamp, or may be inclined upward and inward relatively to the said axis.

If the bights or bent portions *a* of the filaments have to be supported the supports *h* will be usually attached to the bulb body or to the central spindle according to whether the portions of the filament legs between the soldering beads *c* and the supports *h* are inclined upward and inward or outward respectively. The supports attached to the central spindle or to the bulb body and designed for the bights will in most cases have to be mounted in position before the bending of the bights and will have to be so arranged that the bights on being bent outward or inward will apply themselves to such supports and will be held by them hanging downward or inclined upward at any desired angle.

The bight supports might be sealed into the lamp bulb in the well known manner from the outside after the filaments have already been provided with the angular bend, or if filaments provided with such angular bend beforehand have been mounted in the lamp.

In the construction hereinbefore described the upper or bight portion *a* of each horse-shoe shaped filament extends some distance beyond the supports or guides *h*, whereby
5 the lamp is enabled to burn in an upright position as above set forth. If the filament legs were not supported at all by guides or supports *h* it would obviously be impossible to burn the lamp in an upright position, as
10 the filaments, on being softened when heated to incandescence, would infallibly sink down and become entangled so that the lamp would be ruined. If to avoid this, the supports *h* were arranged to hold the filament at its apex or bight proper, then the fila-
15 ment legs of the lamp burning in an upright position would sag owing to dilatation and softening to such an extent that contact between adjacent legs and consequent destruction of the lamp could hardly be avoided. But by arranging the guides or supports as
20 herein set forth, so that the bight portion *a* extends to some distance beyond the said guides the said bight portion softening on burning the lamp will bend at the said
25 guides as shown. Each leg may then be considered as consisting of two parts, namely, the part *b* between the point of attachment *c* and the support *h* and the bight
30 portion *a* extending beyond the support while the filament as a whole is so to speak hook-shaped and hooked at its bend on the guides or supports *h*. The portion *b* is then
35 sufficiently firmly held by the weight of the portion *a* and friction at the support *h* to prevent it from sagging to an undesired extent while permitting it to dilate and contract freely without risk of breakage, where
40 as the portion *a*, even if not specially supported, is too short to undergo any undesirable deformation on softening. If, moreover, portion *a* is specially supported at the

bight proper as by hooks *k* in the body of the glass bulb as indicated in Fig. 4, any undesirable deformation of this portion *a* and
45 its coming into contact with the portion *b* is positively prevented. Thus the construction above described enables the lamp to be burned in an upright position without any risk of any parts of the filaments coming
50 into contact with each other.

I claim as my invention—

1. In an electric glow lamp, the combination of a horse-shoe shaped filament, and the supply wires to which the ends of the fila-
55 ment legs are fastened, with supporting means for the filament legs, such supporting means being located at a point intermediate between the fastened ends of the legs and the apex of the filament, the bight portion of
60 the filament projecting beyond the supports being bent on the said supporting means, substantially as and for the purpose described.

2. In an electric glow lamp, the combina-
65 tion of a horse-shoe shaped filament and supply wires to which the ends of the filament legs are fastened, with supporting means for the filament legs, such supporting
70 means being located at a point intermediate between the fastened ends of the legs and the apex of the filament, and the bight portion of the filament beyond the said supporting means being bent on the latter, and
75 means for supporting the said bight portion so bent, 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 KUŽEL.

Witnesses:

ROBERT W. HEINGARTNER,
AUGUST FUGGER.