

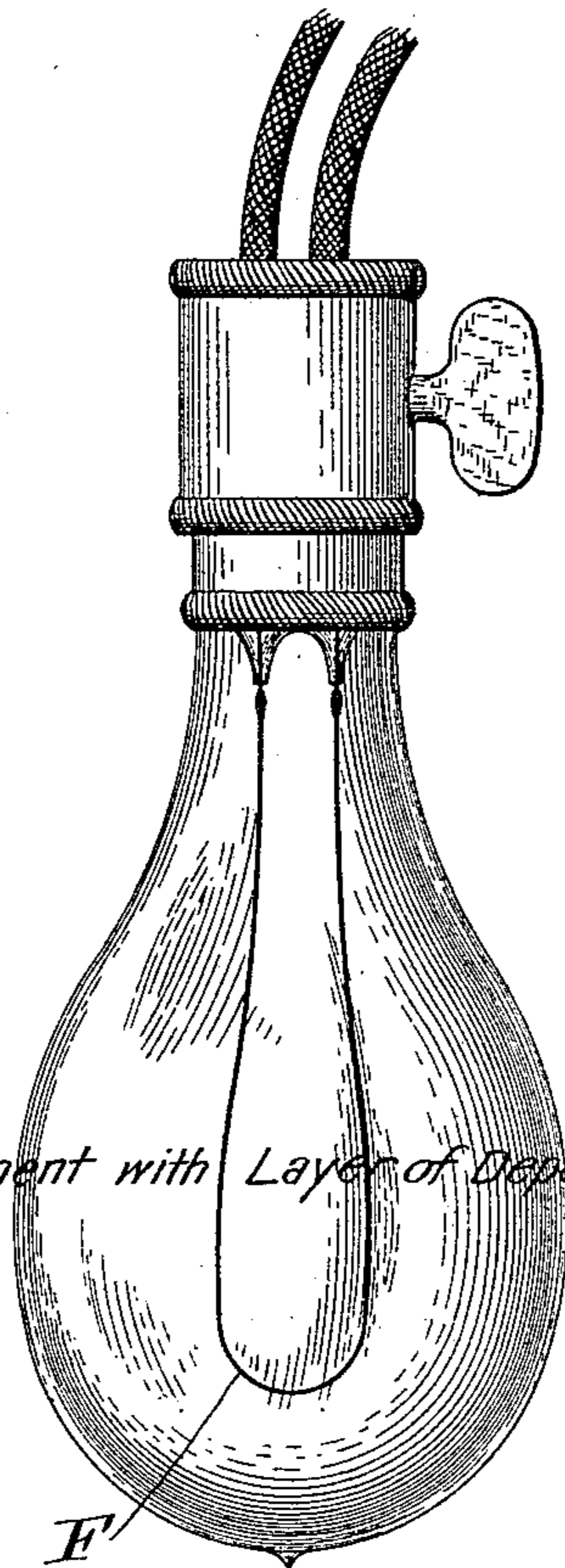
(No Model.)

F. G. A. HELLER.

FILAMENT FOR INCANDESCENT ELECTRIC LAMPS.

No. 448,920.

Patented Mar. 24, 1891.



Carbon Filament with Layer of Deposited Chromium.

F'

Witnesses:

Percy C. Bowen.
J. C. Kilson.

Inventor:

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By Ernest Hilkinson
Attorney.

UNITED STATES PATENT OFFICE.

FRIEDRICH GUSTAV ADOLF HELLER, OF BERLIN, GERMANY, ASSIGNOR TO
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FILAMENT FOR INCANDESCENT ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 448,920, dated March 24, 1891.

Application filed July 22, 1890. Serial No. 359,544. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH GUSTAV ADOLF HELLER, engineer, a subject of the King of Saxony, residing at Berlin, in the Kingdom of Prussia and German Empire, have
5 invented certain new and useful Improvements in Filaments for Electric Glow-Lamps; 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
10 art to which it appertains to make and use the same.

The most frequent method of manufacturing filaments for electric lamps consists in
15 causing the common carbon filaments taken from the furnace to glow within an atmosphere of some hydrocarbon, causing thereby carbon to be deposited upon the filaments. These filaments suffer from certain defects the diminution of which is desirable. One
20 defect, for instance, is that the carbon layer deposited is eventually removed through the influence of the current, so that the filament gets useless after a certain time. Another great defect in this method of manufacture
25 arises from the fact that the carbon layer deposited, being of extremely good conducting capacity, considerably diminishes in consequence the resistance of the carbon filament, necessitating the use of very thin carbon
30 filaments and very thin layers of deposited carbon in order to obtain a glowing substance of conveniently high resistance. My method of manufacturing glowing substance reduces considerably the said defects. The
35 hereinafter-described filament has the property that the particles forming the light-emitting layer cohere very strongly, while a far more feeble tendency exists to disperse the layer, and the whole inner cohesion of the glowing substance as compared with the
40 destroying influences is considerably stronger. This new body is for practical purposes best manufactured in filament shape, as shown in the figure of the drawing.

45 First a filament must be got of a convenient carbonizable matter, and then be put in proper shape. After this the filament is carbonized in a furnace for that purpose in the

common way. The proportions and resistances of these filaments are chosen and determined according to requirements.

It has been found that if carbon filaments prepared in the afore-described manner be covered with a layer of such metals which
55 melt only with difficulty and whose melting-point is high enough to allow them to resist easily to such temperatures as occur in incandescent lamps, the cohesion of these particles with the inner filaments, and at the
60 same time between themselves, will be a strong one. This cohesion makes itself felt against the influences attacking the durability of a filament made to glow by a passing
65 current, as well as against those influences which eventually bring about the dispersion of the particles and their settling on the glass bulbs. As metals proper for the purpose may be mentioned chromium and others of similar
70 properties. Chromium I have found to give the most satisfactory results under the various conditions to which the filaments are subjected. The filament so formed is not
75 liable to be easily fractured, as is the case with many of those now in use, and gives an excellent light.

The metallic cover may be obtained in different manners, either by the purely electrolytical way, in which the carbon filament forming the inner part of the glowing body
80 acts as one electrode, or by the direct chemical way through reduction of a metallic salt put upon the carbon filament by any proper means of reduction.

It depends entirely upon the proper use of
85 the method to give to the metallic cover more or less conducting capacity, and it has been found that the filaments which resist well the influences tending to dispersion have a metallic layer of a comparatively high specific
90 resistance. In the described manner of combining a carbon filament with a layer of a metal fusible with difficulty may be obtained filaments of comparatively high resistance, which, without being of too attenuated proportions, offer considerably more durability
95 than the hitherto known filaments, and possess, further, at high temperature far less ca-

capacity to disperse their particles, and by their purely metallic surface favor very greatly the production of light.

What I claim, and desire to secure by Letters Patent, is—

1. A filament for electric lamps, consisting, essentially, of a small carbon rod or core with a covering of metallic chromium deposited upon the outside thereof, substantially as described.

2. A filament composed, essentially, of carbon and chromium, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRIEDRICH GUSTAV ADOLF HELLER.

Witnesses:

GEORG ELWEIN,
MAX WAGNER.