No. 644,160. Patented Feb. 27, 1900.

W. BOEHM.

ELECTRIC GLOW LAMP.

(Application filed Feb. 2, 1899.)

(No Model.) 2 Sheets—Sheet 1.

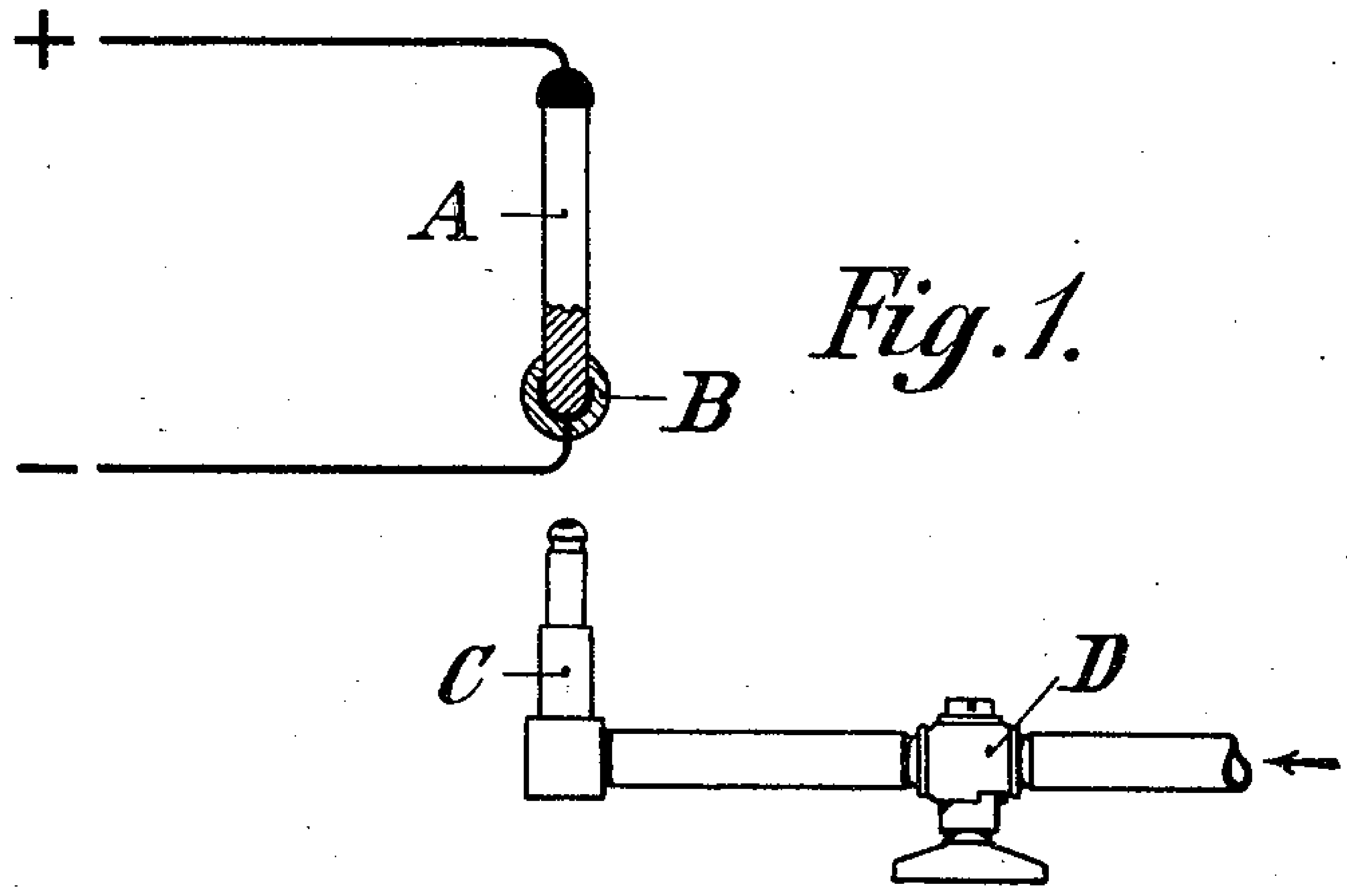


Fig. 1.

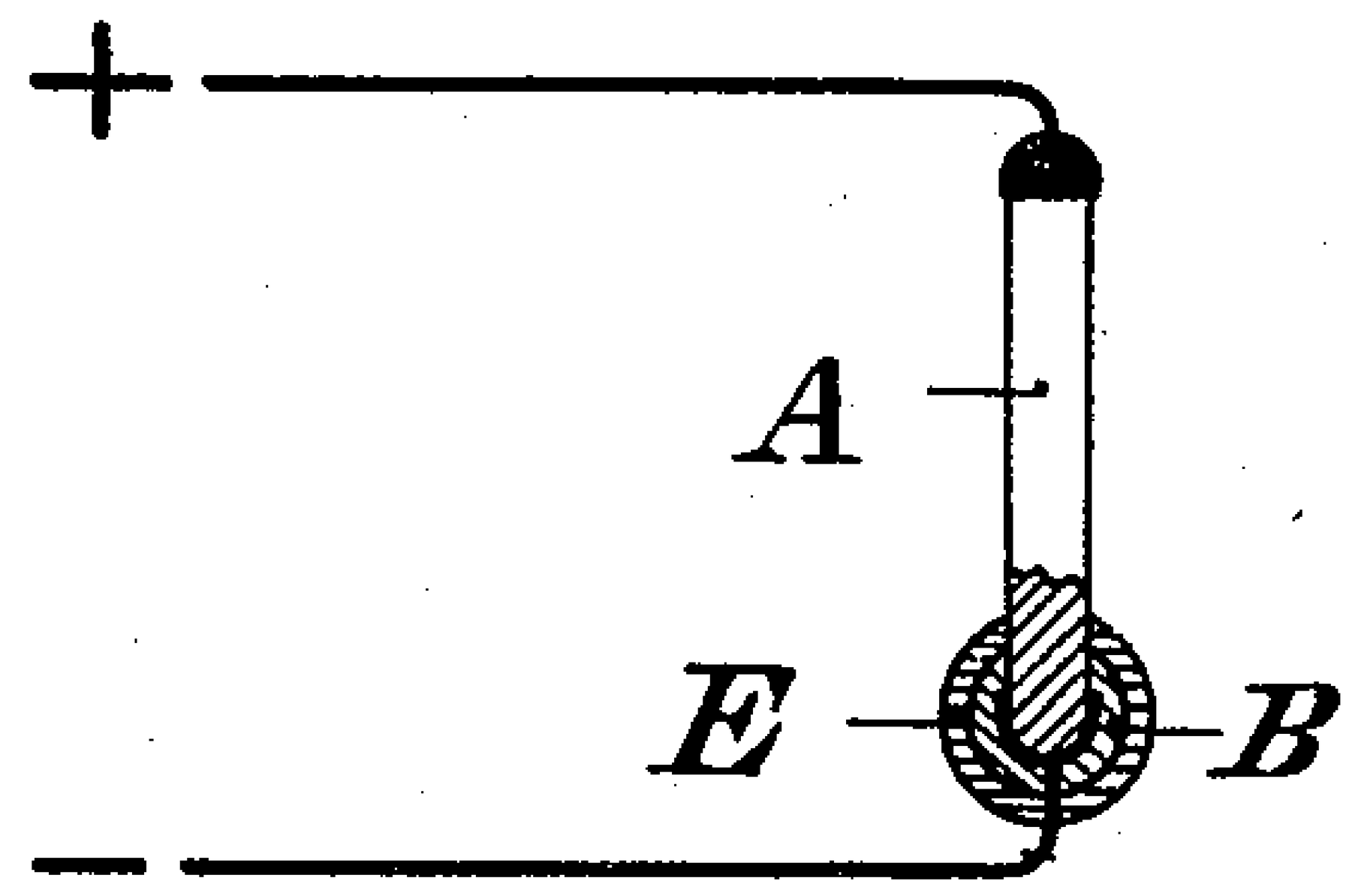


Fig. 2.

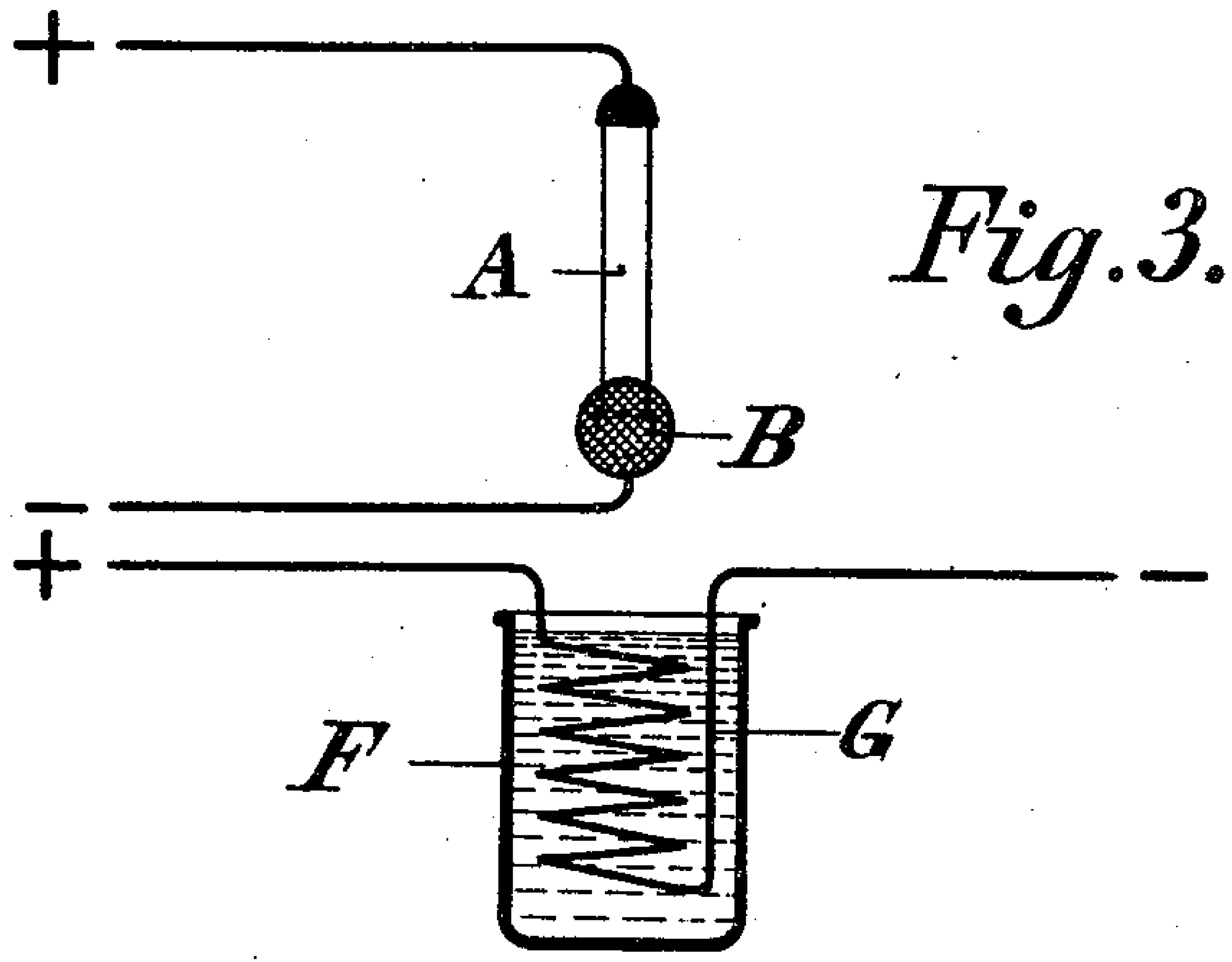


Fig. 3.

WITNESSES:

INVENTOR: Wilhelm Boehm

BY ATTORNEY:

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

No. 644,160.

Patented Feb. 27, 1900.

W. BOEHM.

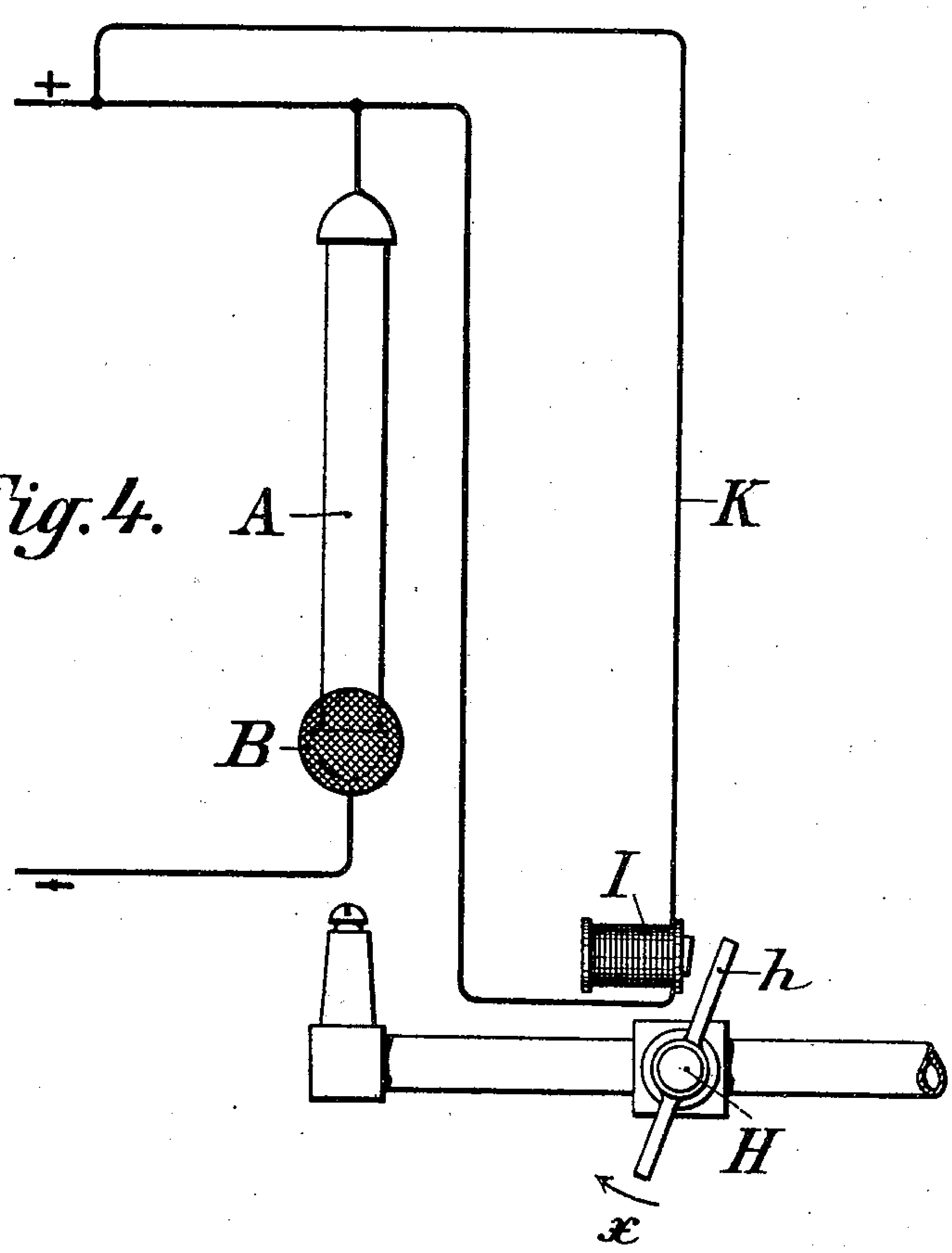
ELECTRIC GLOW LAMP.

(Application filed Feb. 2, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.



WITNESSES:
Anton Cloetzner
M. C. Massie.

INVENTOR:
Wilhelm Boehm

by ATTORNEY:
Max Georgii

UNITED STATES PATENT OFFICE.

WILHELM BOEHM, OF BERLIN, GERMANY.

ELECTRIC GLOW-LAMP.

SPECIFICATION forming part of Letters Patent No. 644,160, dated February 27, 1900.

Application filed February 2, 1899. Serial No. 704,275. (No model.)

To all whom it may concern:

Be it known that I, WILHELM BOEHM, a subject of the German Emperor, residing at 74 Rathenviverstrasse N. W., Berlin, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in 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 art to which it appertains to make and use the same.

My invention relates to that class of incandescent electric lamps in which the incandescent body is not a conductor at the ordinary temperature, but only becomes such when it is heated to a high temperature, as is the case with magnesia, zirconia, lime, and other oxids of metals.

The invention consists in the combination of certain means for heating, and thereby rendering conductive, the incandescent body with the same, this function having been hitherto executed by a separate heating apparatus.

Of the accompanying drawings, Figure 1 is a diagrammatical representation of my improved lamp, the incandescent body being partly in section. Fig. 2 is a modification of the incandescent body shown in Fig. 1, provided with a special arrangement for protecting the heating device. Fig. 3 is another modification. Fig. 4 is a diagrammatic view illustrating that form of my invention in which automatic means are employed for shutting off the gas.

The same letters of reference indicate the same parts in all the figures.

The incandescent body A is made of one of the suitable refractory oxids in the usual shape. In Fig. 1 the incandescent body is shown as having the shape of an elongated cylinder fastened between two conductors supposed to be connected with a source of electricity. (Not shown in the drawings.)

B is a platina mohr or any other finely-divided metal of the platina group having the property of occluding gases and thereby acting catalytically to produce incandescence—for instance, iridium mohr—said catalytically-acting material being brought in close proximity to the incandescent body—as, for example, by being fastened to one end of the cylinder A.

C is a gas-pipe through which ordinary gas or any other gas possessing the property of causing the platina mohr to glow can be brought into contact with the incandescent body by opening the tap D.

Fig. 2 shows a modification, the object of which is to obtain as great a durability as possible in the heating arrangement. For this means I cover the platina mohr B with a covering of asbestos or any other material sufficiently refractory and at the same time sufficiently porous to admit a free contact between the gas and the platina mohr.

E, Fig. 2, is the asbestos covering.

In order to close the gas-cock when the incandescent body has become sufficiently heated to allow the current to pass, I propose to employ automatic arrangements of different known kinds. It might, for instance, be closed by an electromagnet being placed in series with the incandescent body, so that it will be excited by the current that is started as soon as the incandescent body becomes sufficiently heated and conductive. In Fig. 4 I have shown one specific arrangement by which this can be done. In this figure the valve H is provided with a lever *h*, by means of which it may be opened or closed. This lever *h* has one end arranged to act as the armature of an electromagnetic device I, included in a shunt K, which takes the current from the main circuit when the latter is energized, the amount of current which passes over the shunt K being very small compared with that passing over the said main circuit. The operation of this device is as follows: The valve H is opened by turning the lever *h* in the direction of the arrow *x*, Fig. 4. The gas is thus permitted to escape and comes into contact with the catalytically-acting body B, which then becomes heated, and thereby raises the temperature of the glower A, which consequently increases in conductivity with the rise in temperature until it permits a sufficient current to pass through it to keep it incandescent. As soon as this occurs the current flows not only through the incandescent body or glower, but also through the shunt K, thus energizing the electromagnetic device I, which attracts the lever *h* and draws it in the direction of the arrow *y*, whereby the valve is turned and

the supply of gas shut off. The glower A is then kept incandescent solely by the electric current passing through it.

In case it should not be convenient to generate the gas used for causing the platina mohr to glow at a point distant from the lamp itself, I propose to employ the arrangement shown in Fig. 3. Below the incandescent body A a vessel F is provided, which is filled with some liquid and volatile hydrocarbon—such as, for instance, benzene, gasolene, or the like. Inside this vessel is an electric resistance G, which can be heated by an electric current, and thereby causes the hydrocarbon to evaporate and to come into contact with the platina mohr.

In order to insure a more perfect convection of the heat generated by the glowing of the platina mohr, I propose to impregnate a mantle of any suitable fabric made to fit the incandescent body with a solution of a mixture of salts that have the property of becoming electrolytes at high temperatures with salts that have the property of being reduced at high temperatures. I use, for instance, a solution of ninety-nine parts of nitrate of thorium, mixed with one part of chlorid of platina. Having impregnated the said mantle with such solutions, I draw it over the incandescent body proper and burn it in the way usual in the manufacture of Welsbach mantles. The metallic platina thus distributed over the surface of the body effects a comparatively-quick convection of heat from the platina mohr B to the other parts of the body A. Instead of using a mantle of fabric, as indicated, I also impregnate the body A itself.

The operation of my invention is as follows: By opening the gas-tap or by sending a heating-current through the resistance G in the arrangement shown in Fig. 3 the platina mohr B is caused to glow and imparts its heat to the incandescent body A. The latter being placed between the terminals of an electric distributing system gradually becomes a better and better conductor as its temperature increases, and at last a sufficiently-strong current flows through it to maintain it incandescent. Then the gas-jet is either shut off by hand or else automatically, as described.

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

1. In an electric glow-lamp, the combination, with a glower which is a non-conductor at ordinary temperatures and becomes a conductor at higher temperatures, of a catalytically-acting body in proximity to said glower and arranged to heat said glower, means for supplying a gas to the catalytically-acting body whereby the latter is caused to heat the glower, and means for supplying current to the glower.

2. In an electric glow-lamp, the combination with a glower which is a non-conductor at ordinary temperatures and becomes a conductor at higher temperatures, said glower being coated with a mixture of an electrolyte, and a metal, of a catalytically-acting body in proximity to the glower and arranged to heat said glower, means for supplying a gas to the catalytically-acting body whereby the latter is caused to heat the glower, and means for supplying current to the glower.

3. In an electric glow-lamp, the combination, with a glower which is a non-conductor at ordinary temperatures and becomes a conductor at higher temperatures, of a mantle impregnated with a mixture of an electrolyte and a metal, said mantle being located on the glower, a catalytically-acting body in proximity to the glower, means for supplying the gas to said catalytically-acting body, and means for supplying current to the glower.

4. In an electric glow-lamp, the combination, with a glower which is a non-conductor at ordinary temperatures and becomes a conductor at higher temperatures, of a catalytically-acting body in proximity to the glower, and a covering of porous and refractory material upon the catalytically-acting body, means for supplying a gas to the latter, and means for supplying current to the glower.

5. In an electric glow-lamp, the combination with a glower which is a non-conductor at ordinary temperatures and becomes a conductor at higher temperatures, of a catalytically-acting body in proximity to the glower, means for supplying current to the glower, means for supplying gas to the catalytically-acting body, and mechanism for automatically shutting off the gas when the glower reaches a predetermined temperature.

6. In an electric glow-lamp, the combination with a glower which is a non-conductor at ordinary temperatures and becomes a conductor at higher temperatures, of a catalytically-acting body in proximity to the glower, means for supplying a gas to the catalytically-acting body, a valve for controlling said gas-supply, an electromagnet arranged to close said valve, and means for supplying current to the glower and to the electromagnet, whereby the valve is closed when the current flows.

7. In an electric glow-lamp, the combination with a glower which is a non-conductor at ordinary temperatures and becomes a conductor at higher temperatures, of a catalytically-acting body in proximity to the glower and arranged to heat the said glower, means for generating gas in proximity to the said catalytically-acting body whereby the latter is caused to heat the glower, and means for supplying current to the glower.

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

WILHELM BOEHM.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.