

(No Model.)

A. BORNHOLDT.  
INCANDESCENT ELECTRIC LAMP.

No. 441,128.

Patented Nov. 25, 1890.

Fig. 1.

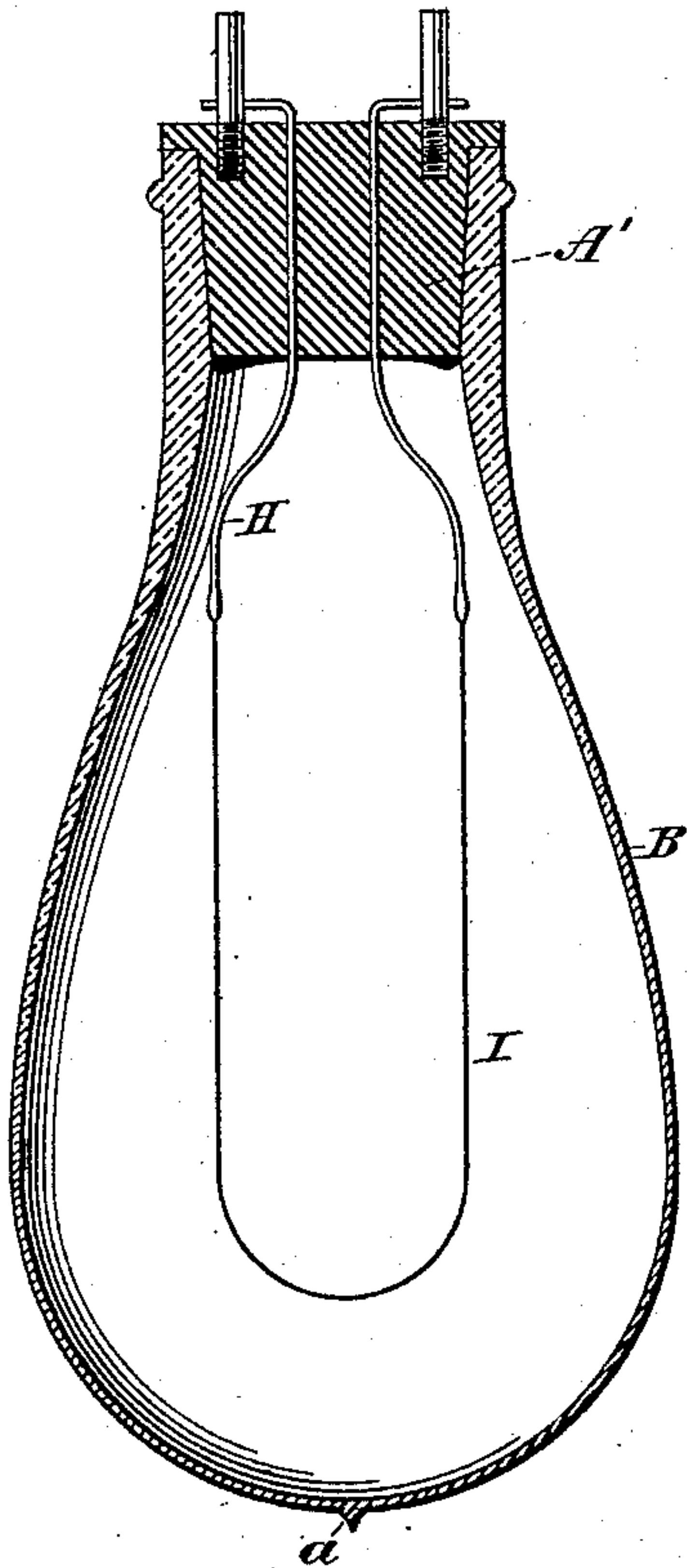


Fig. 3.

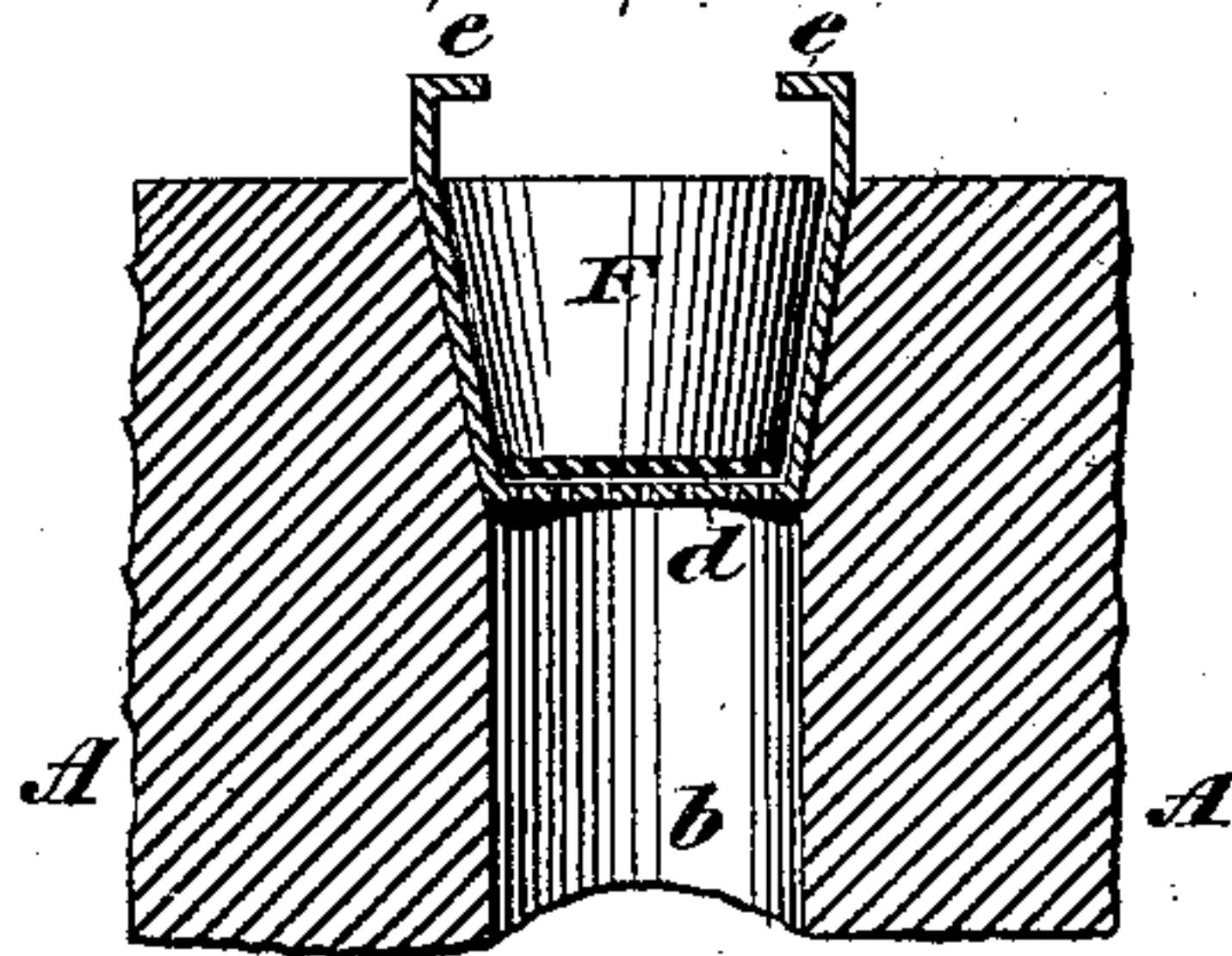


Fig. 5.

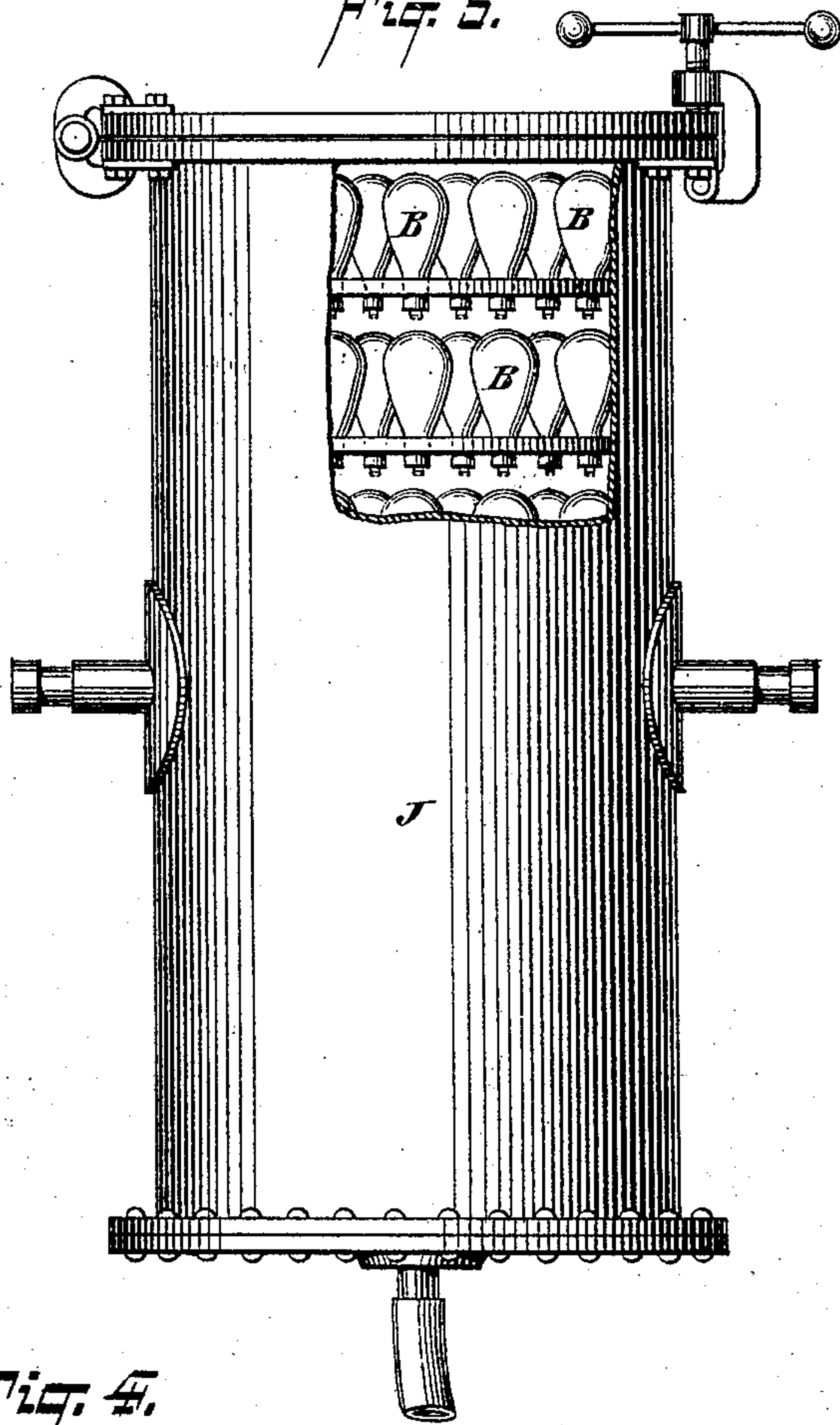


Fig. 2.

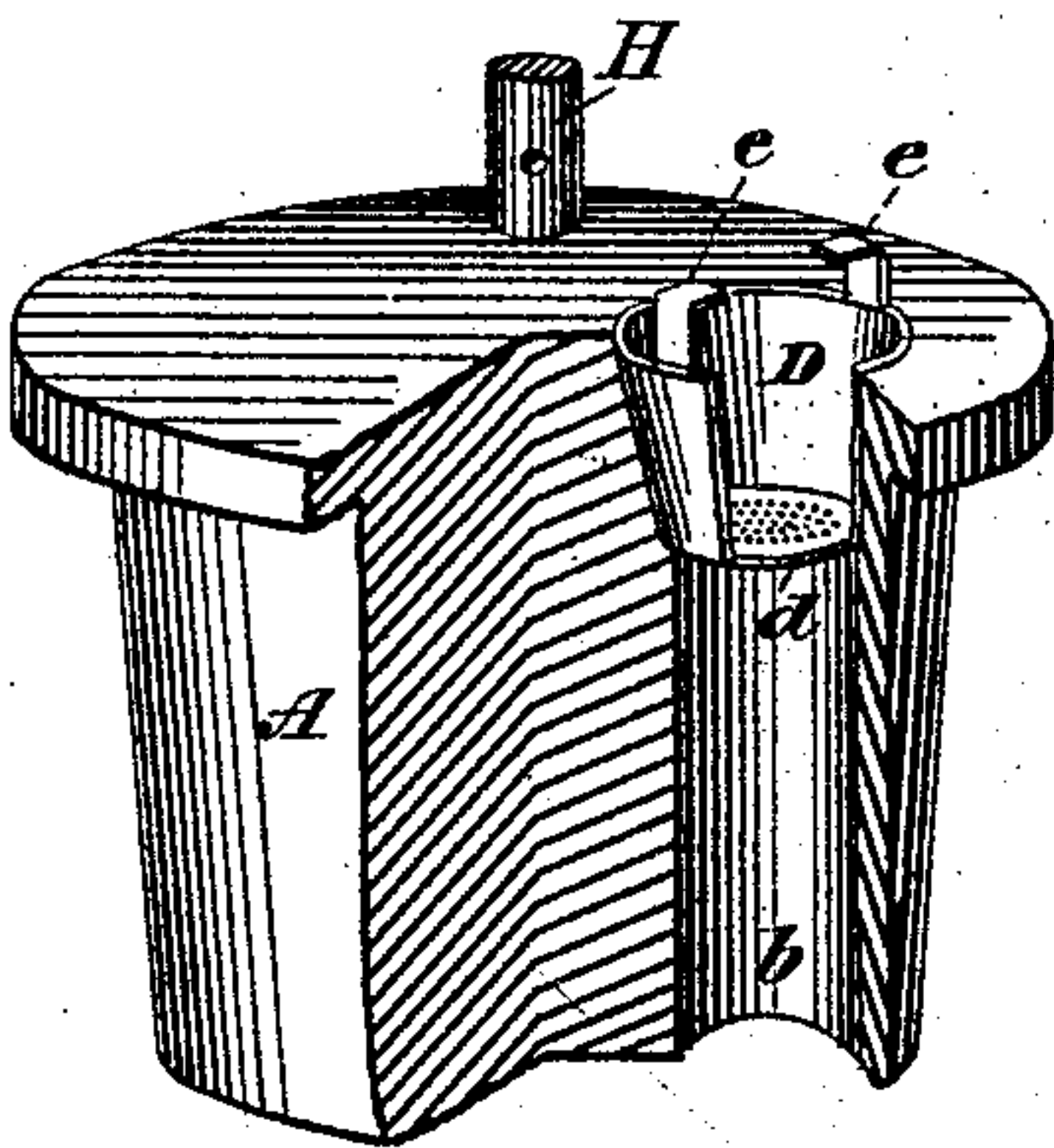
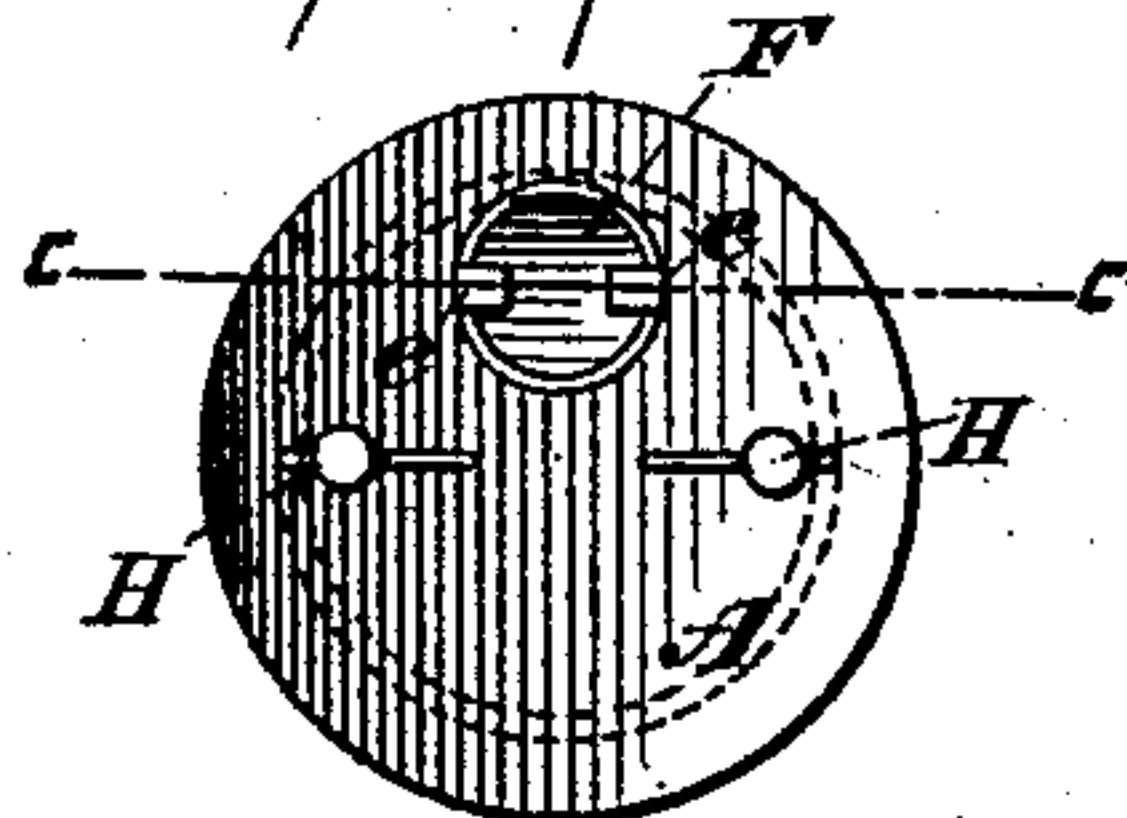


Fig. 4.



WITNESSES:

Gustave Dietrich.  
William Goebel.

INVENTOR

Adolph Bornholdt  
BY Briesen Knauth

ATTORNEYS



# UNITED STATES PATENT OFFICE.

ADOLPH BORNHOLDT, OF BROOKLYN, NEW YORK.

## INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 441,128, dated November 25, 1890.

Application filed March 19, 1890. Serial No. 344,500. (No model.)

*To all whom it may concern:*

Be it known that I, ADOLPH BORNHOLDT, a resident of the city of Brooklyn, Kings county, and State of New York, have invented an Improved Stopper for Electric-Light Bulbs and other Vessels, of which the following is a specification.

In the accompanying drawings, Figure 1 represents a central section of an electric-light bulb having my stopper. Fig. 2 is a perspective view, partly in section, of my improved stopper. Fig. 3 is a sectional view of part of my improved stopper. Fig. 4 is a top view of the same; and Fig. 5 is a side view, partly in section, of a vacuum-tank containing series of bulbs having my stoppers.

The object of this invention is to produce for electric-light bulbs and other vessels that are to be more or less perfectly exhausted a stopper adapted to permit the creation of the vacuum within the vessel and to securely close the same once the vacuum has been created.

The process herein referred to of exhausting air is fully described in an application for patent, Serial No. 344,499, filed by me March 19, 1890.

The invention consists, mainly, in supplying the stopper with a tubular passage leading from the outer to the inner end of said stopper, said passage having a support for a secondary stopper, and means, as hereinafter described, for limiting the movement in both directions of said secondary stopper, as hereinafter specified.

In the drawings, referring to Fig. 1, the letter B is there represented as showing an electric-light bulb, A' being a stopper for the mouth of the same. This stopper is made to hermetically close the mouth of the vessel B, so as to prevent air entering or escaping, as hereinafter shown, and is the carrier for the conductors H, that unite with the carbon film I. In order to create a vacuum in a vessel of this kind it was necessary heretofore to apply the suction apparatus at an opening *a* in the vessel B opposite the mouth, which opening afterward had to be closed by sealing the glass, an operation causing great expense and producing considerable breakage.

Now, in order to permit the creation of the

vacuum within the vessel B through the stopper-body itself and thus permit the use of a stopper, I construct my improved stopper A (see Figs. 2, 3, and 4) with a tubular passage *b*, that extends from top to bottom thereof, and within this passage I place a finely-perforated support *d* for a secondary or gravity stopper F, so that this stopper F may rest with its cushioned lower end on the support *d*, as in Fig. 3. Above the secondary or gravity stopper F, I provide the main stopper A with lugs *e* at such a distance that the secondary stopper may move outward a little from the inner support *d*. The secondary stopper F is conical or tapering, and so is the seat, which it fits when in its lower position, and it follows that when the secondary stopper is in contact with the outer supports *e* and away from the inner support *d* an air-passage around the secondary stopper and through the aperture *b* is formed, leading into the vessel B.

In order to utilize this compound stopper for the purpose named, I insert it—that is, the main stopper A constructed as described—in the vessel B, whatever that vessel may be, and I then place series of these vessels B, as in Fig. 5, in inverted position into a vacuum-cylinder J. While in this inverted position the secondary stoppers F drop away from their inner supports *d* against the outer lugs *e*, thus forming a passage between the interior of each vessel B and the surrounding atmosphere. Consequently when an air-pump is applied to the vessel J a more or less perfect vacuum is created within each vessel B, and when the desired result has been obtained it is only necessary afterward to reverse the position of each vessel B by turning the vacuum-cylinder J upside down, when the secondary stoppers F will drop onto their seats. As soon as atmospheric air is now admitted to contact with any vessel B, the atmospheric pressure will hold each secondary stopper to its seat, no other fastening being necessary, although for greater security the lugs *e* may be turned down upon the secondary stoppers. Of course, instead of the lugs *e* other contrivances for arresting the outward motion of each secondary stopper prior to the creation of the vacuum may be employed.

A particular advantage of this compound stopper as used in connection with vacuum-bulbs is that when the carbon film I is burned out or broken a new one can readily be applied to the removable stopper A and the same bulb B used again indefinitely, whereas heretofore when such bulbs were made without any removable stopper the destruction of the film carried with it necessarily the destruction of the bulb.

Having now described my invention, what I claim is—

1. The vacuum-bulb B, combined with the removable stopper A, carrying the electric conductors H and carbon film I, said stopper

A having the passage *b*, within which the gravity-stopper F is contained, substantially as described.

2. The stopper A, having tubular passage *b*, inner support *d*, outer support *e*, tapering stopper-seat between the supports *d* *e*, and gravity-stopper F, all combined and arranged to enable the compound stopper to be used for creating and maintaining a vacuum within the vessel to which it is applied, as set forth.

ADOLPH BORNHOLDT.

Witnesses:

HARRY M. TURK,  
LIVINGSTON EMERY.