

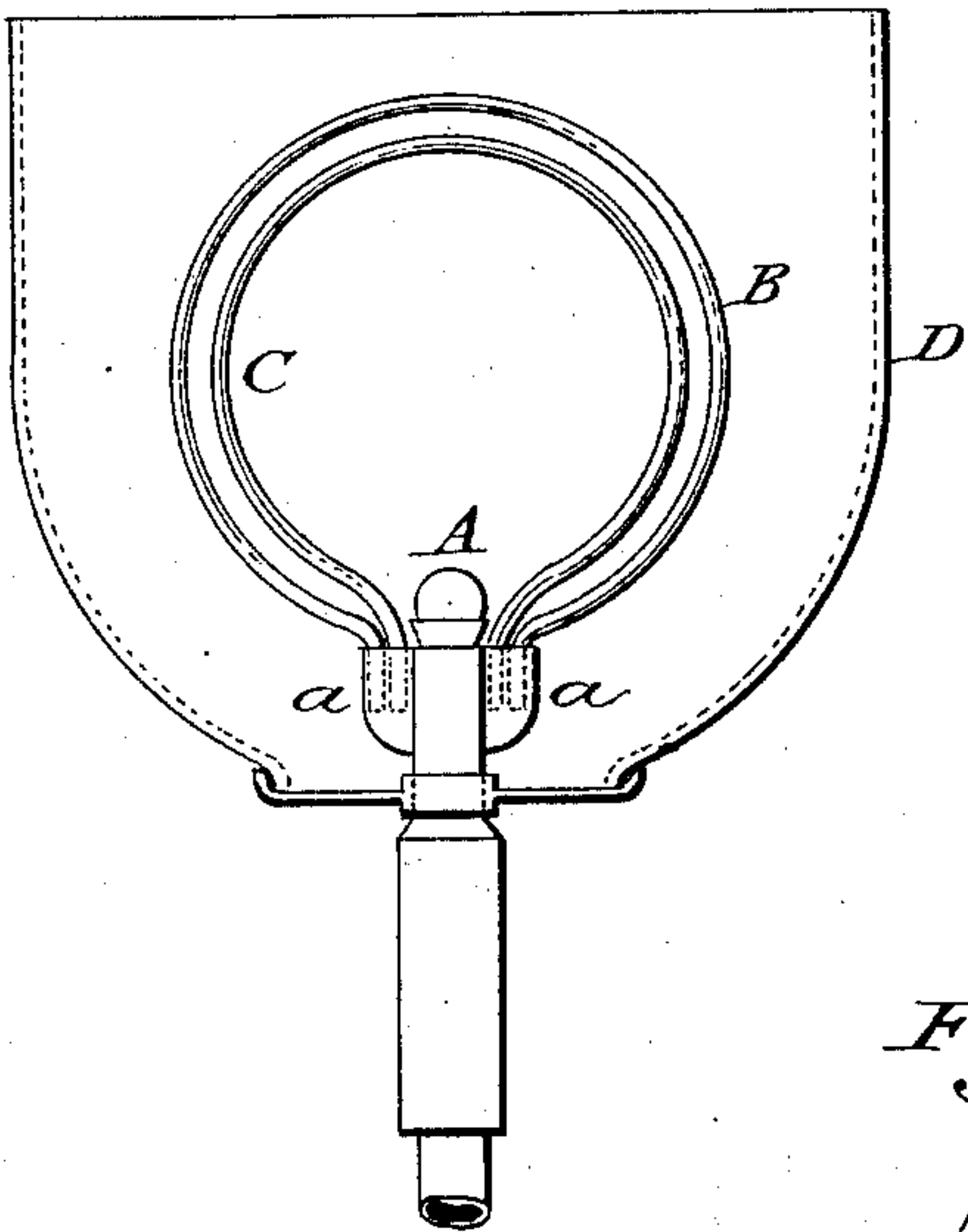
(No Model.)

C. M. LUNGREN.  
INCANDESCENT GAS LIGHT.

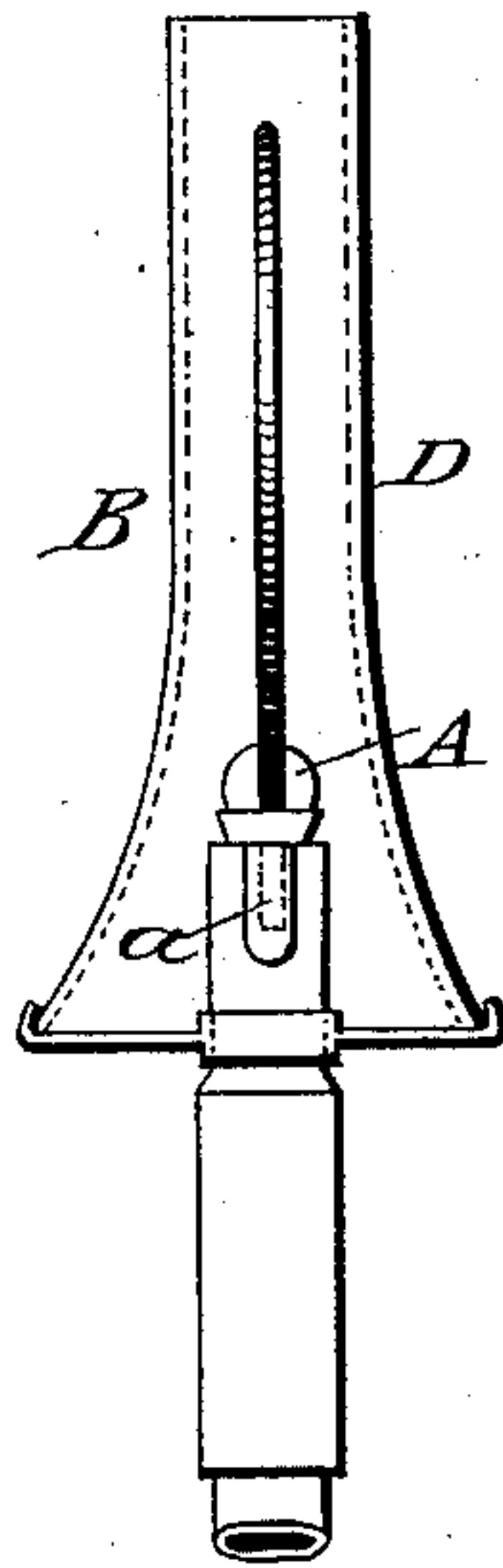
No. 367,534.

Patented Aug. 2, 1887.

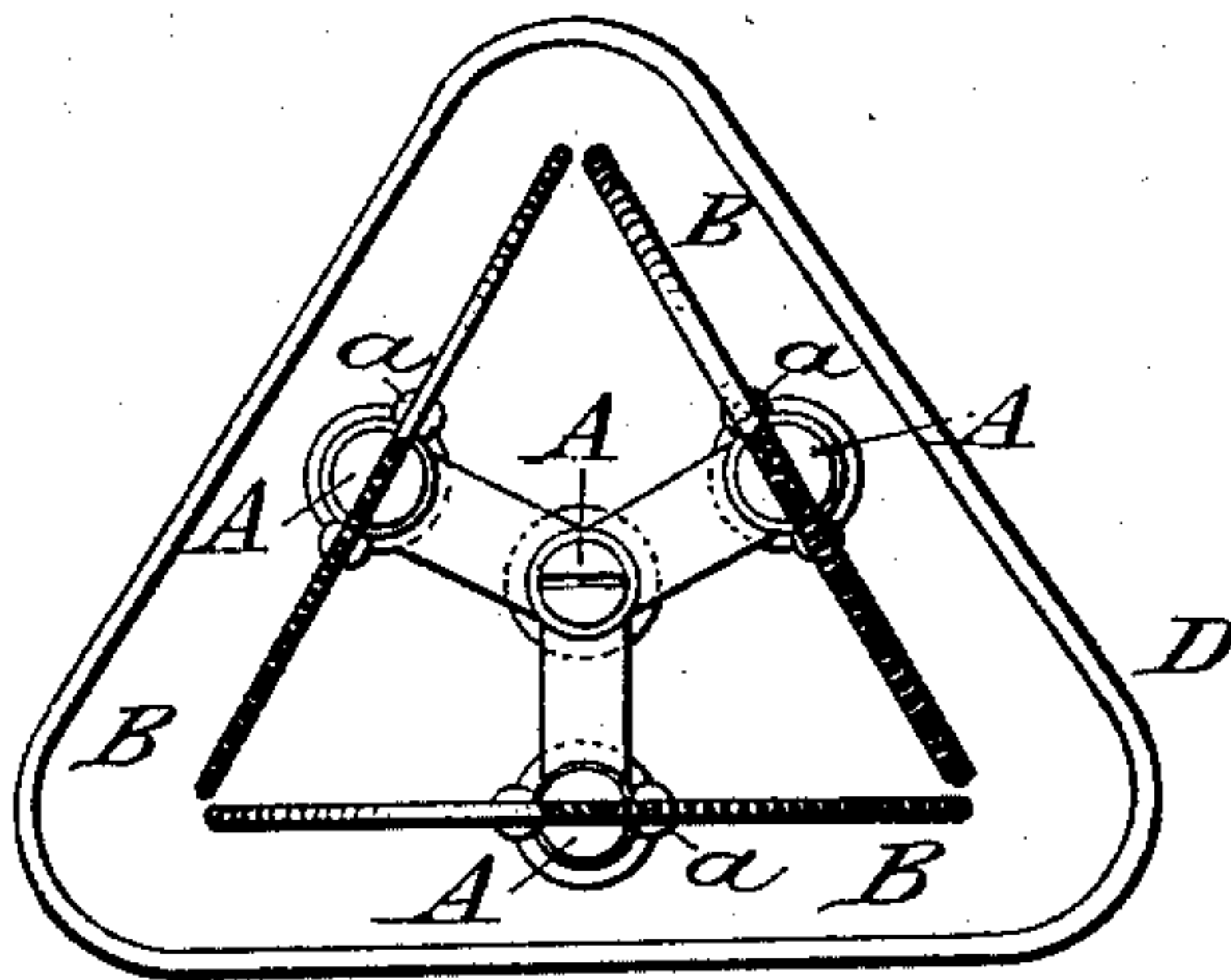
*Fig. 1.*



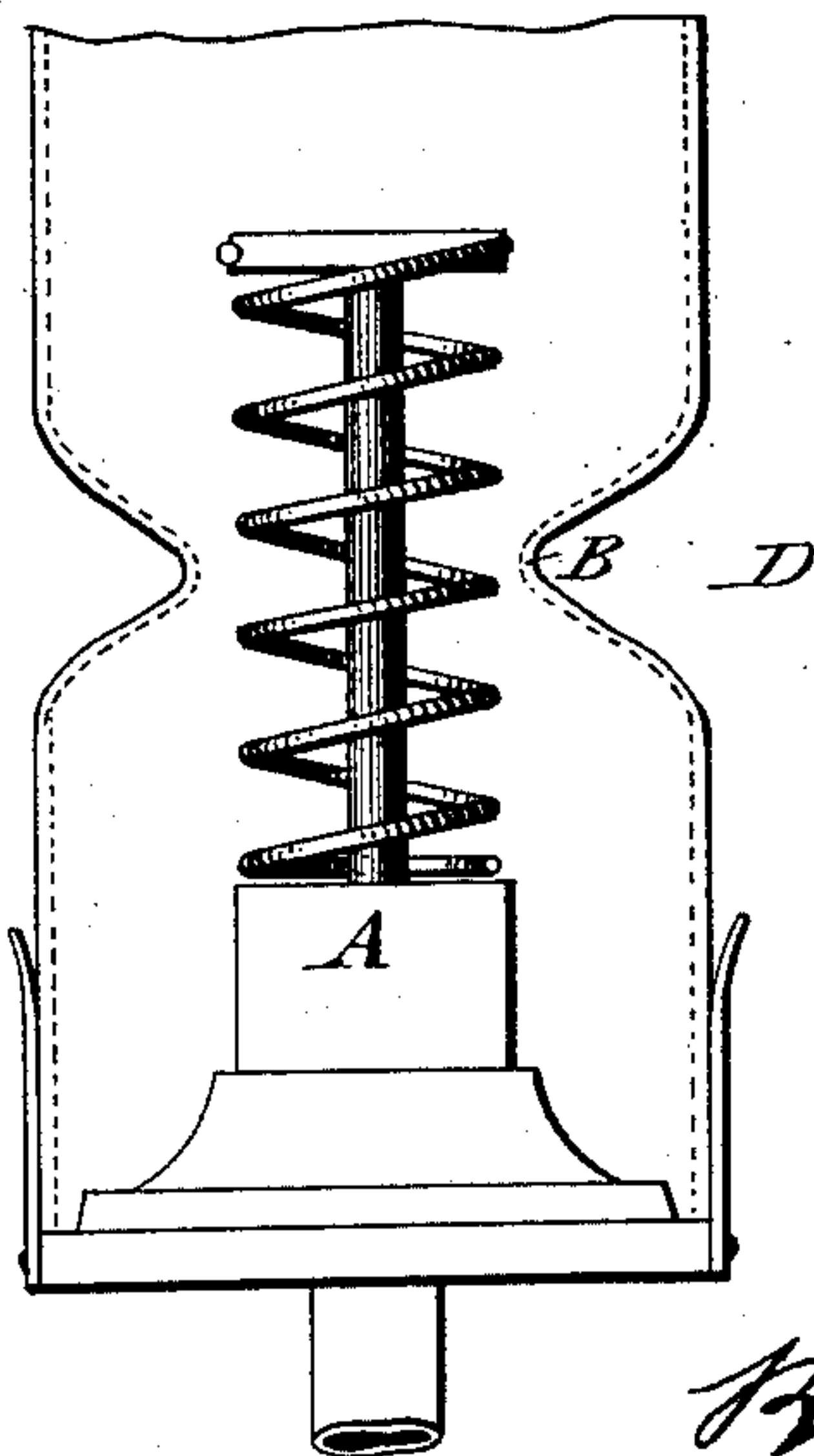
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



*Witnesses:*  
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*Att'y.*

# UNITED STATES PATENT OFFICE.

CHARLES M. LUNGREN, OF NEW YORK, N. Y.

## INCANDESCENT GAS-LIGHT.

SPECIFICATION forming part of Letters Patent No. 367,534, dated August 2, 1887.

Application filed December 26, 1885. Serial No. 186,699. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES M. LUNGREN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Incandescent Gas-Lights, of which the following is a specification.

Before my invention a wire of metal had been applied above a gas-jet to spread the gas and promote the luminosity of an ordinary gas-flame, and a wire of platina had been rendered incandescent by a non-luminous flame, and in some cases the non-luminous flame had been directed upon a cylinder of lime or similar material.

My invention relates to the employment of the refractory oxides or earths—such as lime, magnesia, zirconia, and the like—in a filamentary form as the light-giving organ in an incandescent gas-burner. Such filamentary body is placed in such a position in a gas-jet as to become intensely hot and luminous under the action of a non-luminous gas-flame, so that the light results from the incandescence of the refractory material, and not from the flame itself. By this improvement the non-luminous gas produced from anthracite coal and similar material is available for illuminating purposes.

Ordinary illuminating-gas, or any combustible vapor mixed with a proper amount of air to render it non-luminous, may, however, be also used for raising the filamentary body to incandescence.

A method of preparing the filamentary body which I have found satisfactory consists in forming a plastic mass of any of the aforesaid substances or mixtures of them by kneading them with a mucilaginous binding material and then obtaining filaments from this mass by expressing the material through a die. These are then, while still plastic, bent into the desired shape and dried. After the filaments have been shaped and dried they should be burned to render them compact and enable them to withstand the heat of the flame in which they are brought to incandescence; otherwise they are liable to warp and crack when placed in the flame. This may be done by subjecting them to a high heat in a mold

in a blast-furnace or by heating them directly in a gas-flame, the heating being continued until they are strong and have no longer any tendency to warp or crack. It is better to raise them in this heating operation to a higher temperature than that at which they are to be used, and, if desired, the heat may be carried to the full temperature of the oxyhydrogen-flame. In the burning the mucilaginous binding material is burned out, and the filamentary body becomes strong and durable. Such filaments may be used in a variety of ways in combination with gas-burners. They may be straight or curved, and any desired number may be grouped together in a flame. They may also be coiled into the form of a spiral or in any other desired shape. In the drawings I have shown two forms in which such filaments may be used; but it is to be understood that I do not limit myself to these forms.

In the present drawings, Figure 1 is an elevation of a flat-flame burner, and Fig. 2 the same in a plane at right angles to that of Fig. 1. In these figures A is a burner, and *aa* a small metal holder for the end of the bow-shaped filament. C and B are incandescing filaments placed in the flame. D is a glass or porcelain chimney or shade placed around the flame, so that drafts of air will not divert it from the filaments.

Fig. 3 is a plan of a triangular burner, in which three flat flames form the sides of the prism. Each flame has one or more filaments, B. Within the triangle a jet-tube for a small subsidiary flame is provided, the gas-cock being constructed with two ways, so that when the flat flames are turned off this small jet is lighted, and when the former are turned on this jet is extinguished after lighting the flat flames.

Fig. 4 shows an Argand gas-burner in which the incandescing organ is in the form of a coil, which may be supported in any convenient manner, as by arms from a center post, as shown.

I do not claim in this application the broad invention of a filamentary body of refractory earth, as that invention forms the subject of another application filed by me, Serial No. 174,233.

What I claim as my invention is—

1. In an incandescent gas-light apparatus, the combination of a gas-burner and a fila-



mentary body of refractory earth placed so as to be rendered incandescent by the flame, substantially as specified.

2. In an incandescent gas-light apparatus,  
5 the combination of a gas-burner and a series or group of filaments of refractory earth placed so as to be rendered incandescent by the gas-flame, substantially as specified.

Signed at Philadelphia, in the county of Philadelphia and State of Pennsylvania, this 10 22d day of December, A. D. 1885.

CHARLES M. LUNGREN.

Witnesses:

WM. H. CAPEL,  
ALBERT W. COX.