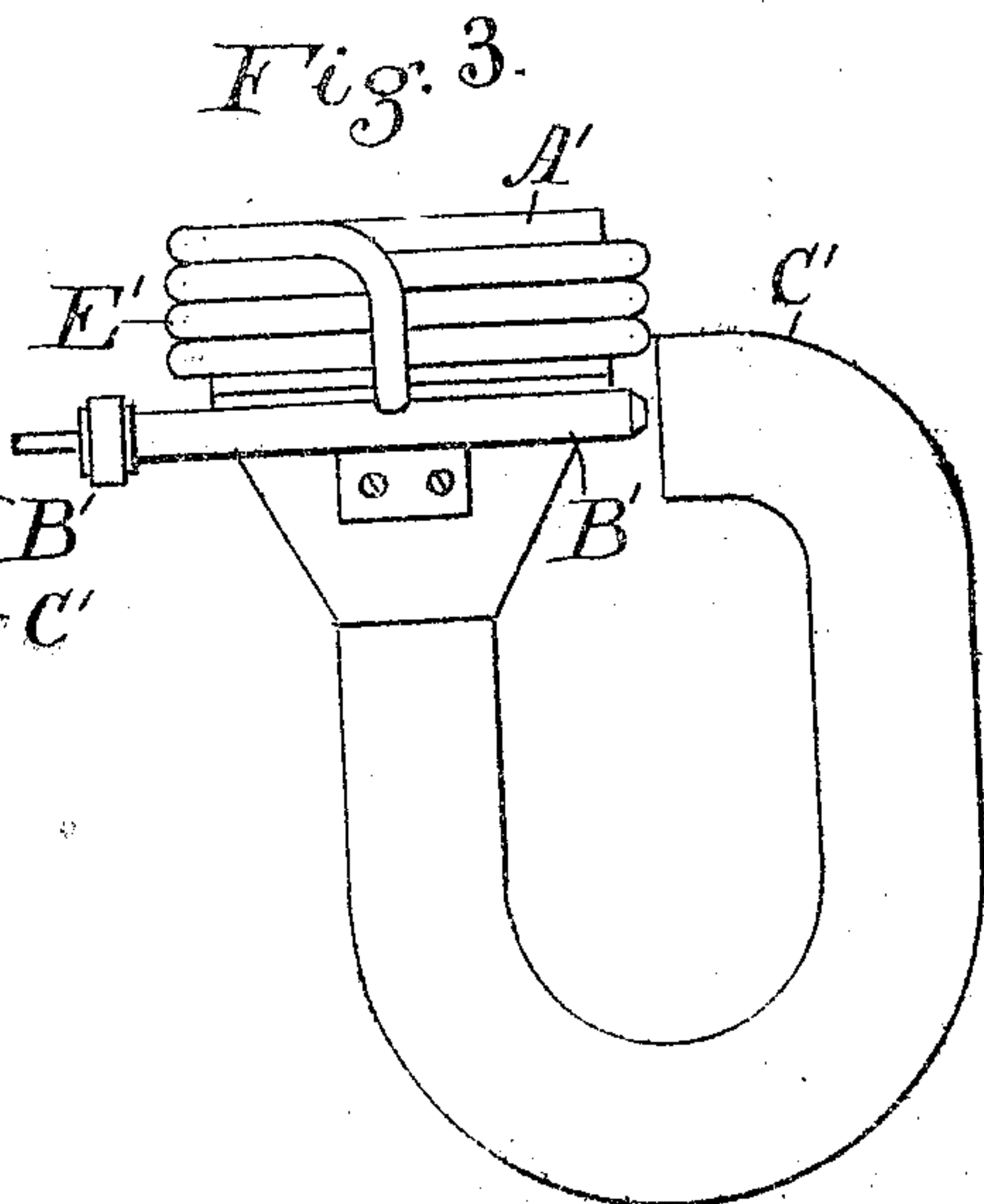
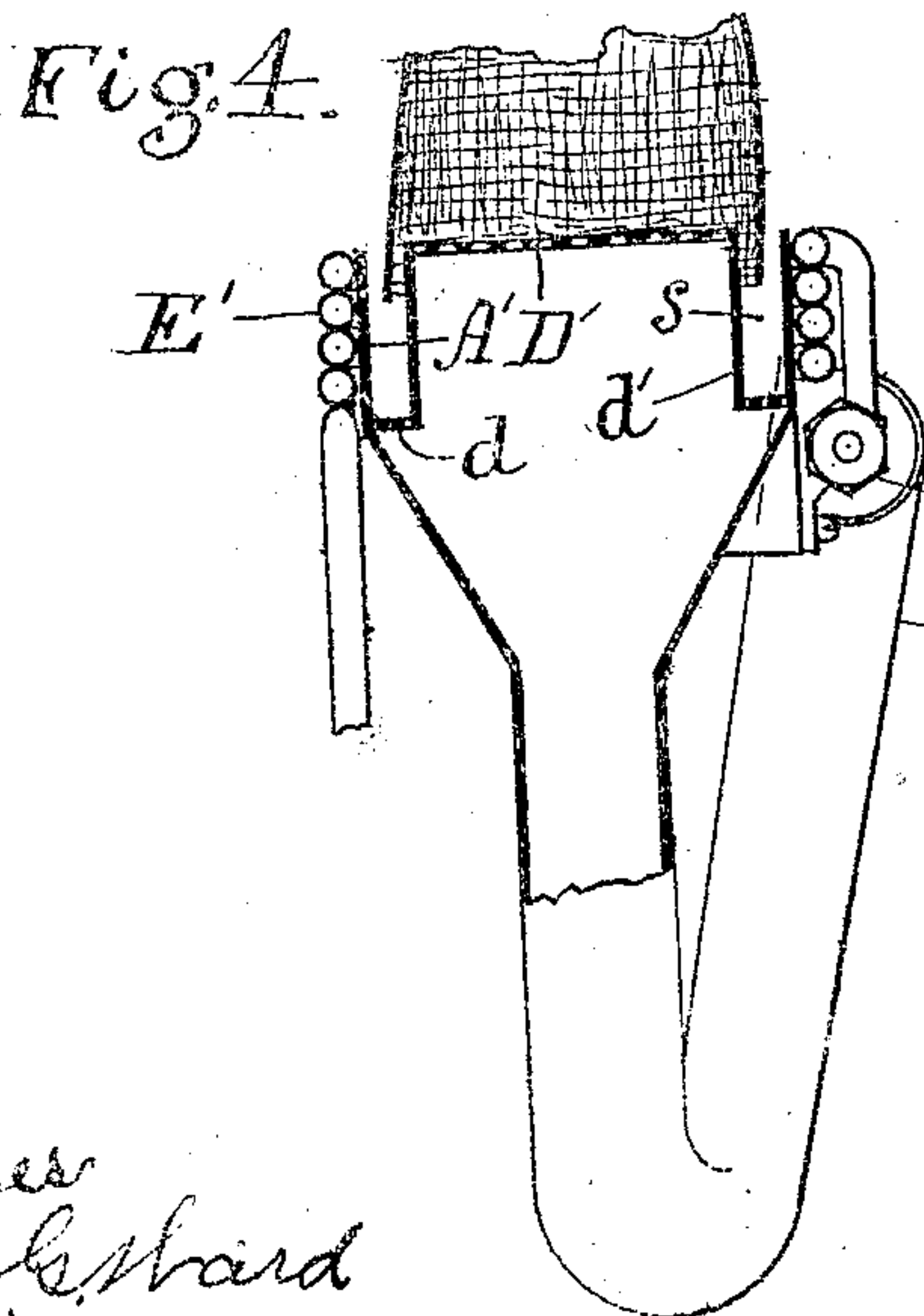
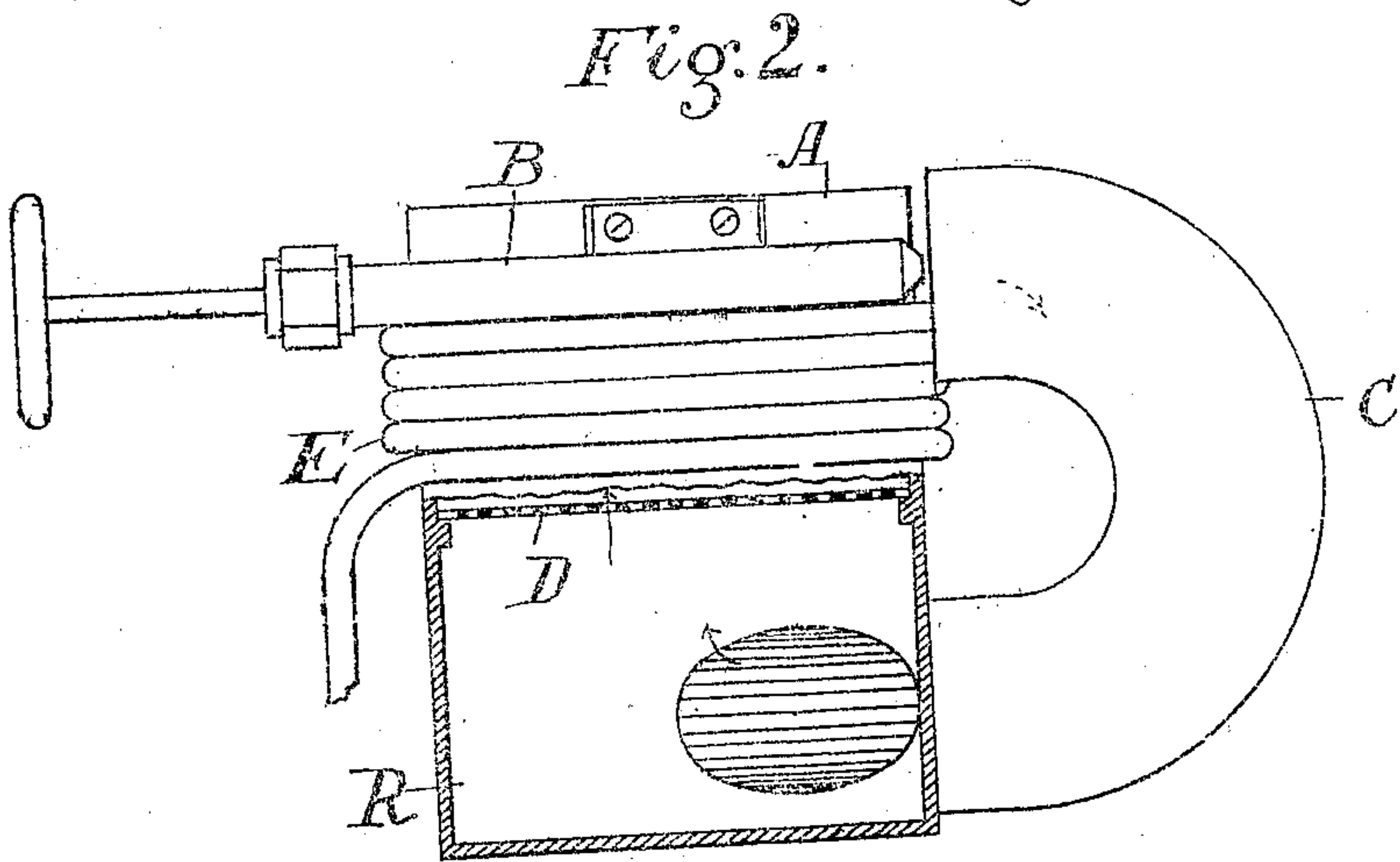
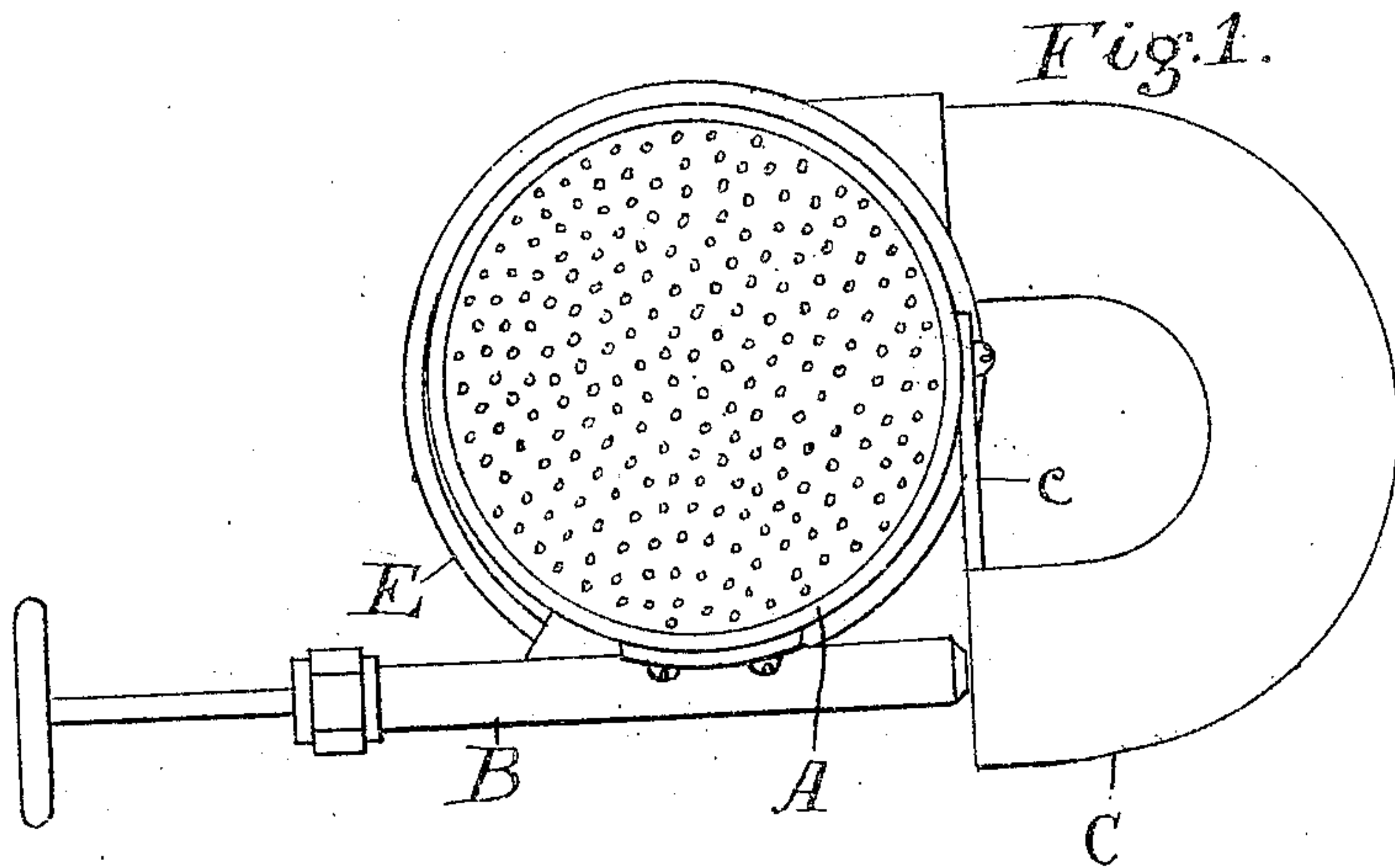


No. 877,897.

PATENTED FEB. 4, 1908.

S. W. BATES.
HYDROCARBON BURNER.
APPLICATION FILED JUNE 14, 1902.



Witnesses
Benj. L. Hard
Wm. W. Mitchell

Inventor:
Solomon W. Bates

UNITED STATES PATENT OFFICE.

SOLOMON W. BATES, OF PORTLAND, MAINE, ASSIGNOR TO GENERAL HYDROCARBON COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

HYDROCARBON-BURNER.

No. 877,897.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed June 14, 1902. Serial No. 111,614.

To all whom it may concern:

Be it known that I, SOLOMON W. BATES, a citizen of the United States of America, and a resident of Portland, Cumberland county, State of Maine, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

My invention relates to a hydrocarbon burner such as is used for burning heavy oils like kerosene constructed on the general principles of the Bunsen burner, that is to say, burners of this type project a fine stream of vapor under high pressure into the open end of a vapor supply tube, the stream of vapor drawing in air enough to mix with it to complete the combustion of the vapor and the air and vapor are burned after passing through a gauze or perforated diaphragm. In this type of burners the oil is usually vaporized in vaporizing chambers or retorts which are heated to a very high degree of heat either in contact with the main flame or a subsidiary flame. The overheating of the vapor causes it to decompose producing a deposit of carbon or as it is generally termed "carbonizing".

The object of the present invention is to vaporize the oil by means of a coil containing a relatively large amount of surface and protected from overheating by interposing between the coil and the flame an imperforate protecting casing which allows sufficient heat to pass through to vaporize the oil but not enough to carbonize it.

I illustrate my invention by means of the accompanying drawing in which

Figure 1 is a plan or top view of a burner constructed according to my invention, Fig. 2 is a side elevation of the same with a portion cut away, Fig. 3 is a side elevation of a modification and Fig. 4 is a vertical section of the modification shown in Fig. 3.

Considering first the forms shown in Figs. 1 and 2, D represents a perforated diaphragm, up through which the mixed air and vapor pass and above which it burns. Immediately below the diaphragm is the mixing chamber R where the air and vapor commingles before passing through the diaphragm. Mixed air and vapor are supplied to the mixing chamber through the vapor supply tube C, here shown as curved in form. The jet of vapor is projected into the mouth of the vapor supply tube from the

needle valve B supplied from the vaporizing coil E.

The coil is prevented from coming into immediate contact with the flame by means of an imperforate protecting casing which separates it completely from the flame although the protecting casing is in contact with the flame or within the zone of combustion and subject to the intense heat rising from the flame.

As here shown the protecting casing is in the form of an imperforate cylinder A which is an upward continuation of the mixing chamber and the coil is formed around and in contact with the cylinder. The needle valve is shown as being connected with the coil and secured to the side of the cylinder at or near the top, the vaporizing pipe being coiled below the valve. The end of the needle valve enters the upper end of the curved pipe C which bends around and enters the mixing chamber below the diaphragm D.

The operation of my burner is evident from its construction and will be readily understood. The coil E and the valve are first heated by some suitable means so as to vaporize the oil and the jet of vapor from the end of the needle valve is projected at great velocity into the end of the vapor supply tube C drawing in air enough for combustion. The air and vapor pass into the mixing chamber and up through the diaphragm D where the flame burns inside of the cylinder A. The walls of the imperforate cylinder A being interposed between the flame and the coil protect the coil from becoming overheated and at the same time let sufficient heat pass through to completely vaporize the oil. Another advantage of this form of vaporizer is that the coil presents a large surface heated with absolute uniformity from one end to the other and the vapor after being formed passes rapidly through the coil and is kept constantly moving until it reaches the outlet to the needle valve.

In Figs. 3 and 4 I have shown a modification capable of being used on a mantle burner. The exterior cylinder A' has the coil E' on the outside, the coil being connected with the needle valve B' which is secured in a horizontal position on the side of the burner. The vapor supply tube C' leads from the needle valve down and up entering the lower end of the cylinder A'. The main diaphragm or gauze D' is placed on the upper

end of a short inner tube d' placed inside of the cylinder A' leaving an annular space s between the exterior cylinder and the inner tube. The main flame is produced above the diaphragm D' and a subsidiary flame is produced in the annular space s for the purpose of keeping the coil hot. The subsidiary flame is formed by perforating the inner walls which separate the annular space s from the interior of the burner.

As here shown, the annular diaphragm d which connects the lower end of the inner tube with the inner surface of the cylinder A' is perforated but it is evident that the inner tube itself may be perforated if required.

It will be understood that in both these types of burner the vaporizing coil is connected with a source of oil supply under pressure and it will also be understood that many modifications may be made of the burners here shown for the purpose of illustration while yet keeping within the limits of my invention.

It will be understood that this burner may be made in various sizes and forms for a great variety of purposes such as mantle lights, torches, fire pots and for heating boilers and other like uses and it is adapted to burn not only kerosene but heavier hydrocarbons such as "fuel oil", so called.

I claim:—

1. In a hydrocarbon burner, the combination of a mixing chamber, an imperforate protecting casing above said mixing chamber, a perforated diaphragm between said mixing chamber and the protecting casing, a vaporizing coil contiguous to said protecting casing to be completely protected by said casing from the flame and a nozzle connected to said

coil having a vapor jet orifice arranged to discharge into said mixing chamber.

2. In a hydrocarbon burner, the combination of a cylinder comprising a mixing chamber and a flame chamber the portion of said cylinder forming said flame chamber being imperforate, a perforated diaphragm between the chambers, a vaporizing coil around the flame chamber, a needle valve connected with said vaporizing coil and a vapor supply tube for conveying air and vapor from said needle valve to the mixing chamber.

3. In a hydrocarbon burner, the combination of a cylinder, a perforated diaphragm within the same, a vaporizing coil on the outside of said cylinder above the diaphragm, a needle valve secured to the side of said cylinder and connected with said coil and having its axis disposed at right angles to the axis of the cylinder and a vapor supply tube for conveying vapor from said needle valve to the cylinder at a point below the diaphragm.

4. In a hydrocarbon burner the combination of a mixing chamber, an imperforate protecting casing arranged exteriorly of and adjacent to said mixing chamber, a perforated partition between said mixing chamber and the protecting casing, a vaporizing coil contiguous to said protecting partition to be completely protected by the same from direct contact with the flame and a vapor discharge nozzle for discharging vapor into said mixing chamber.

Signed at Portland Me this 12th day of June 1902.

SOLOMON W. BATES.

Witnesses:

BENJ. G. WARD,
WM. W. MITCHELL.