

(No Model.)

D. M. GRAHAM.

APPARATUS FOR VAPORIZING AND BURNING PETROLEUM OR OTHER
HYDROCARBON.

No. 260,476.

Patented July 4, 1882.

Fig. 1.

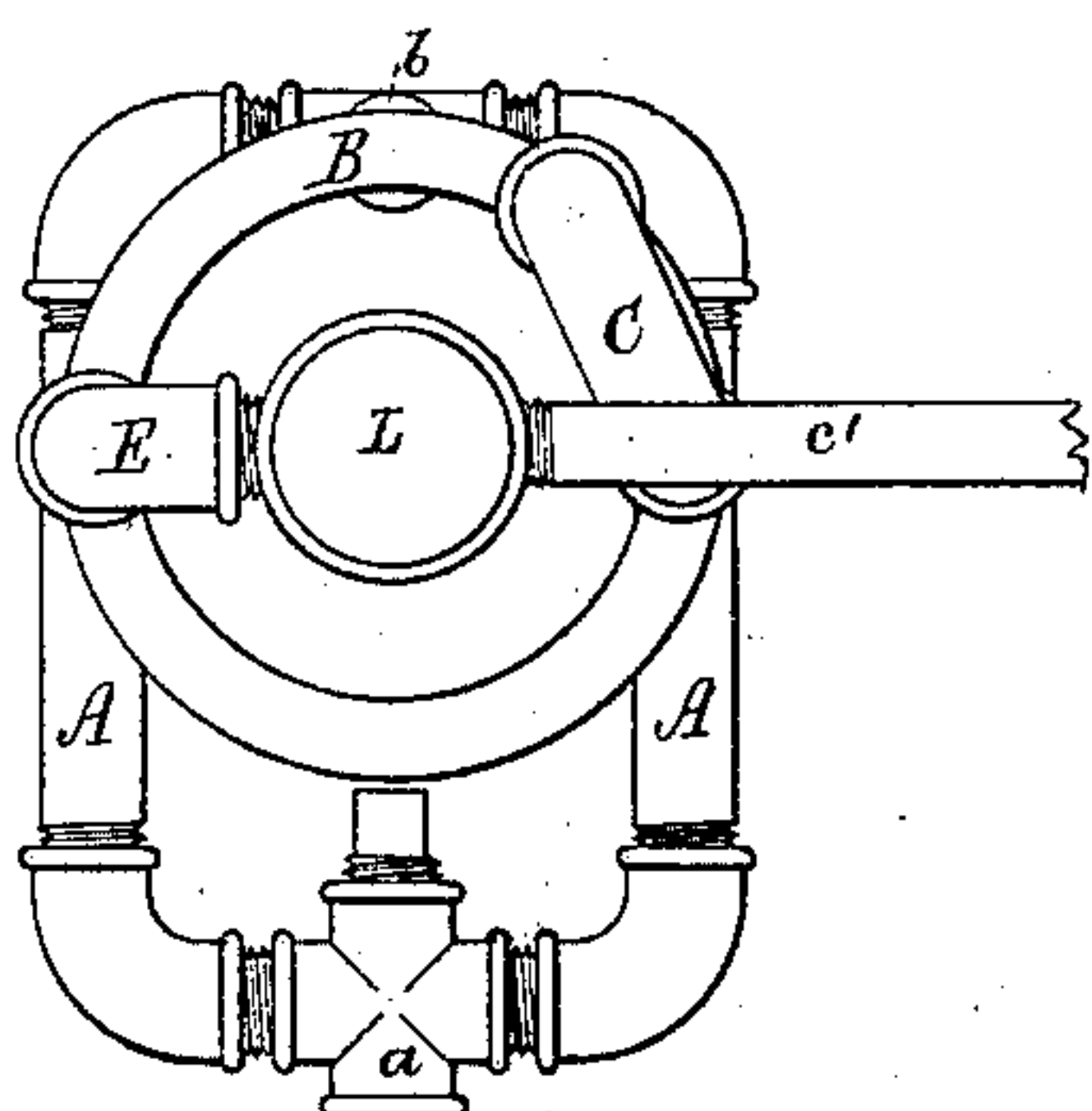


Fig. 2.

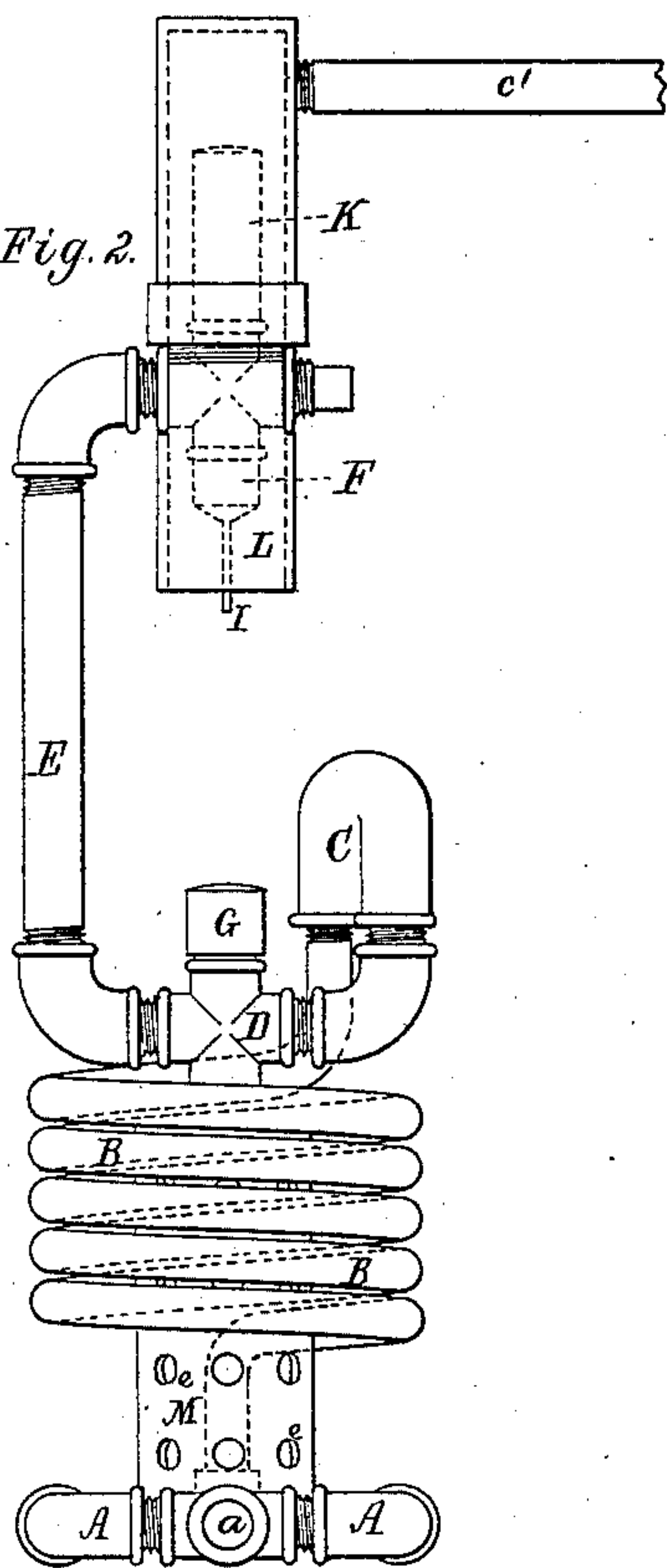
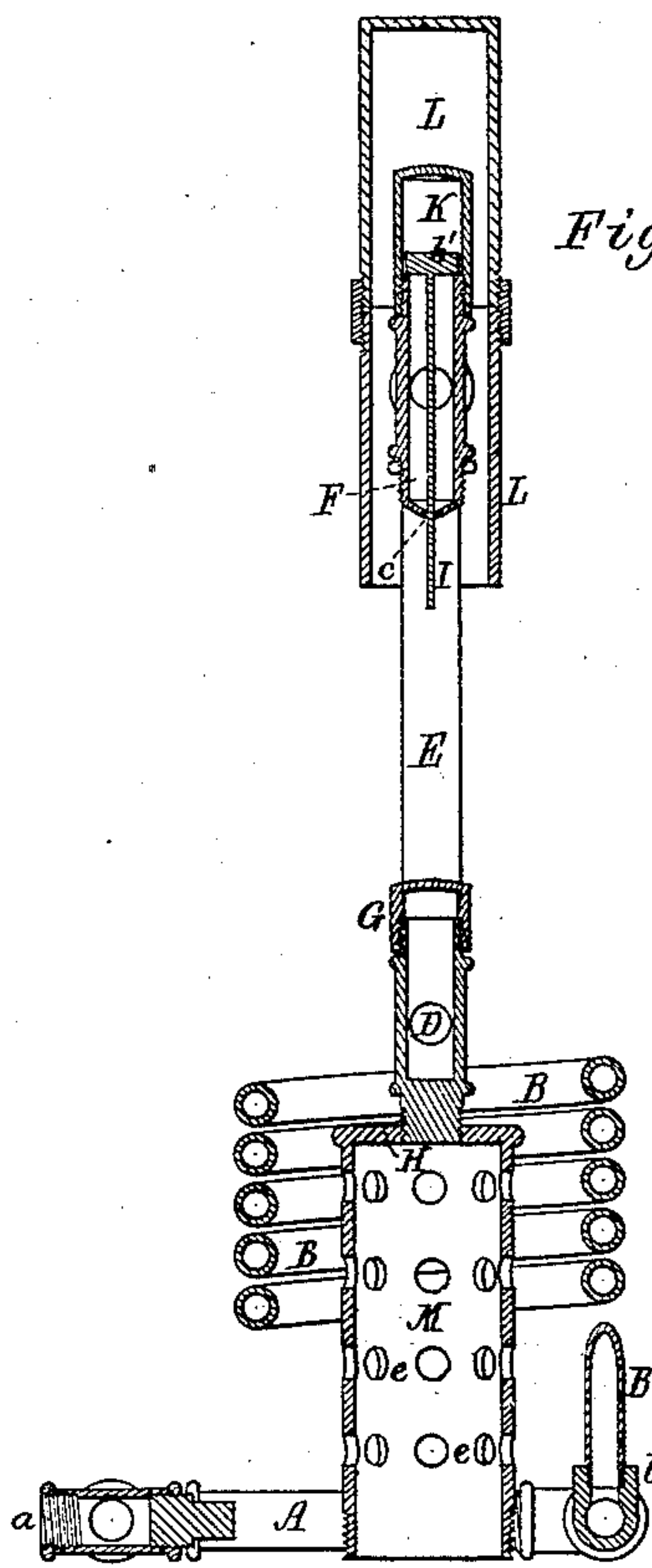


Fig. 3.



Witnesses.

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APPARATUS FOR VAPORIZING AND BURNING PETROLEUM OR OTHER HYDROCARBON.

SPECIFICATION forming part of Letters Patent No. 260,476, dated July 4, 1882.

Application filed March 25, 1882. (No model.)

To all whom it may concern:

Be it known that I, DANIEL M. GRAHAM, of Boston, in the county of Suffolk, of the State of Massachusetts, have invented a new and useful Improvement in Apparatus for Vaporizing and Burning Petroleum or other Hydrocarbon; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a front elevation, and Fig. 3 a vertical and transverse section, of an apparatus embodying my invention, the nature of which is defined in the claims hereinafter made.

In the drawings, A denotes the tubular base or "fluid-divider," which is substantially a tubular ring having a form approximating to a rectangle, although it may be circular or elliptical. At the middle of its front it has an induct, *a*, while at the middle of its rear it is provided with an educt, *b*, which opens into and is connected to the lower end of a coil or spiral tube, B, arranged over the divider A in manner as represented. The coil or tube B, at its upper end, is connected with and opens into a strong semicircularly-shaped branch pipe, C, which in turn supports and opens into a horizontal conduit, D, at one end thereof. From the other end of the conduit D a pipe, E, rises upward, and has connected with it a vertical jet, F, arranged in the axis of the coil B produced. Immediately below the said jet, and supported by the conduit D, is a deflector, G, which rises upward from the said conduit. Below the conduit, and supported by it, is another and longer deflector, H. Either or both of such deflectors can be used to advantage, the lower one being within and concentric with the coil. The upper deflector is above the coil. Their purposes will be hereinafter explained.

Within the jet F is a rod, I, which extends below the jet, and has on its upper end a head, *b'*, arranged within a closed chamber, K, extended upward from the jet. The rod or jet-clearer I is for clearing the discharge-orifice *c* of the jet or keeping it from being stopped by gummy deposits resulting from the vaporized petroleum. This rod may be spirally grooved, in order to cause it, under the action upon it of the stream of vapor or gas that may escape

with great force and velocity from the jet, to be revolved, in order for such clearer to automatically operate to prevent the discharge-orifice of the jet from becoming obstructed by gummy deposits; but when the clearer is without the spiral grooves, simply and occasionally moving the clearer upward by means of a poker will cause it to perform its office, its weight and that of its head causing it to descend, so as to bring the head upon the bottom of the chamber K.

Surrounding the jet is a tubular air receiver and discharger, L, into which, at its upper parts, air is to be led by a suitable conduit, *c'*.

The operation of the apparatus above described may be thus explained: A combustible liquid—as petroleum, for instance—is to be conducted into the tubular base or divider A by a pipe from a tank arranged at a proper altitude. In passing into and through the divider the liquid is separated into two streams, which are finally reunited at the educt of the divider. It being so divided, the liquid becomes heated to better advantage, and, besides, the apparatus is better supported than would be the case were a single petroleum conduit or pipe used immediately under and to communicate with the coil. The fluid from the divider passes through the coil, and by such is vaporized and reduced to a gaseous state, and in such condition is driven with great force out of the jet and on fire driven upon the upper deflector or upon both deflectors, the upper of which causes the flame to be deflected laterally and in radial directions over and down about the coil, while the lower deflector causes the flame impinging upon it to be deflected in radial directions and down within the coil and against its inner surface. The stream of gas escaping from the jet induces a strong body or current of air to flow into the air receiver and discharger L and out of such. Uniting with the said stream of gas previously set on fire, the air supplies the flame with oxygen necessary to cause it to operate with great heat on the deflectors and coil and on the divider, whereby the apparatus is caused to reduce the petroleum to vapor or gas and cause it to burn with great heat.

The annular tubular base or stream-divider A is arranged horizontally and wholly below the

coil B, or does not extend upward within it to interfere in any respect with the passage of flame or heat deflected into and down through it by either of the deflectors. The said stream-divider also answers as a base for the support of the parts above it.

The apparatus so constructed is to be placed within a chamber or furnace to be heated by it, the gas generated and burned with air serving to heat the walls of the chamber or furnace, or a boiler or other device, that may be properly exposed to the burning gas.

In practice this apparatus has been found to operate with great power and effect, and also with remarkably economical results.

From the lower deflector a tube, M, having holes or perforations *e* in its sides, extends downward, as shown, it being at its lower end open or provided with a conduit to lead atmospheric air into it. Such air flows or rushes out of the holes *e* and aids combustion of the gas.

What I claim as my invention is as follows, viz:

1. The combination of the air receiver and discharger L, encompassing the gas-jet F, with the said jet, the coil B, and one or more deflectors, G H, as described, all being arranged and connected substantially and to operate as set forth.

2. The combination of the headed clearer I and its supporting-chamber K with the gas-jet F, the coil B, and one or more deflectors, G H, as described, all being arranged and adapted substantially and to operate as explained.

3. The combination of the annular tubular base or stream-divider A, arranged horizontally, or thereabout, and wholly below the coil B, with the said coil B, the jet F, and one or more deflectors, G H, arranged with such jet and coil substantially as set forth.

4. The combination of the annular base or stream-divider A, arranged horizontally, or thereabout, and wholly below the coil B, with the said coil B and with the jet F, air receiver and discharger L, and one or more deflectors, G H, all being adapted and arranged in manner and to operate substantially as explained.

5. The combination of the perforated air receiving and discharging tube M with the deflector H, the coil B, gas-jet F, and the air receiver and discharger L, all being adapted and to operate substantially as set forth.

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Witnesses:

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