(No Model.) 3 Sheets—Sheet 1.

C. W. HEINÉ.

HYDROCARBON BURNER.

No. 353,027. Patented Nov. 23, 1886.

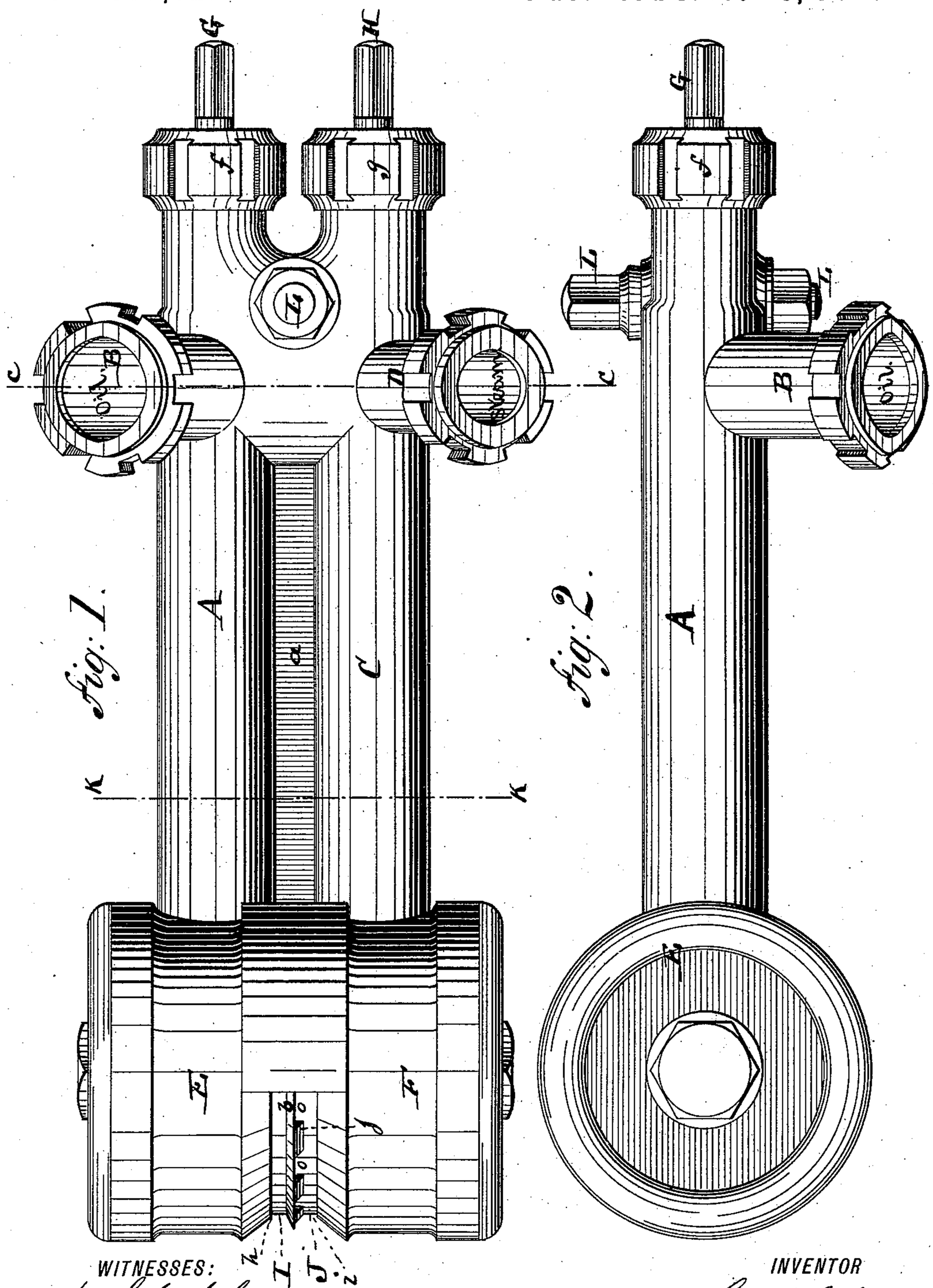

Fig. 1.

Fig. 2.

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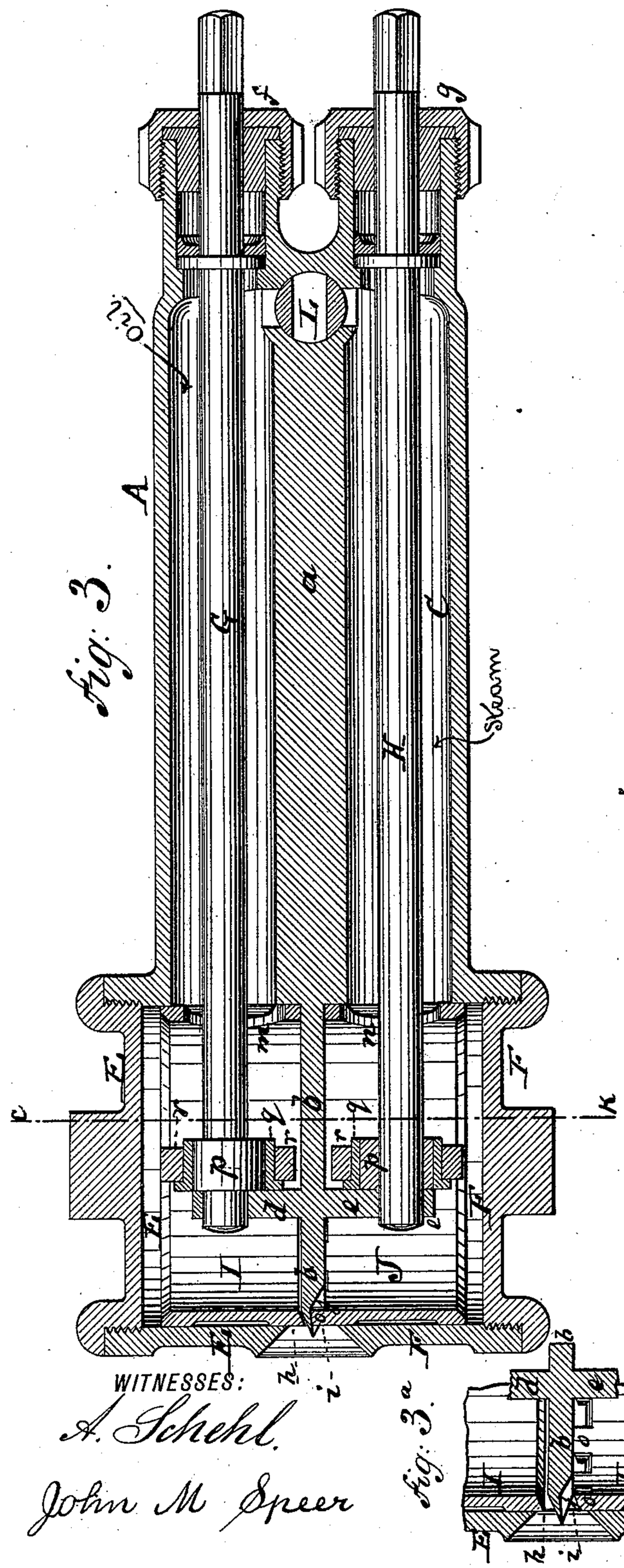

Fig. 3.

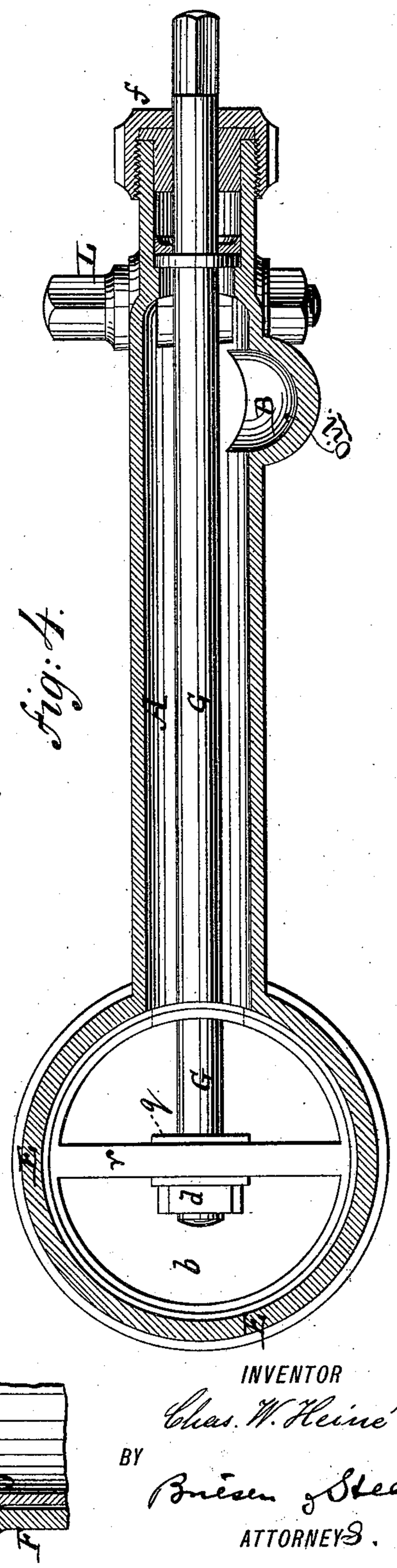

Fig. 4.

Fig. 3a.

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Fig: 5.

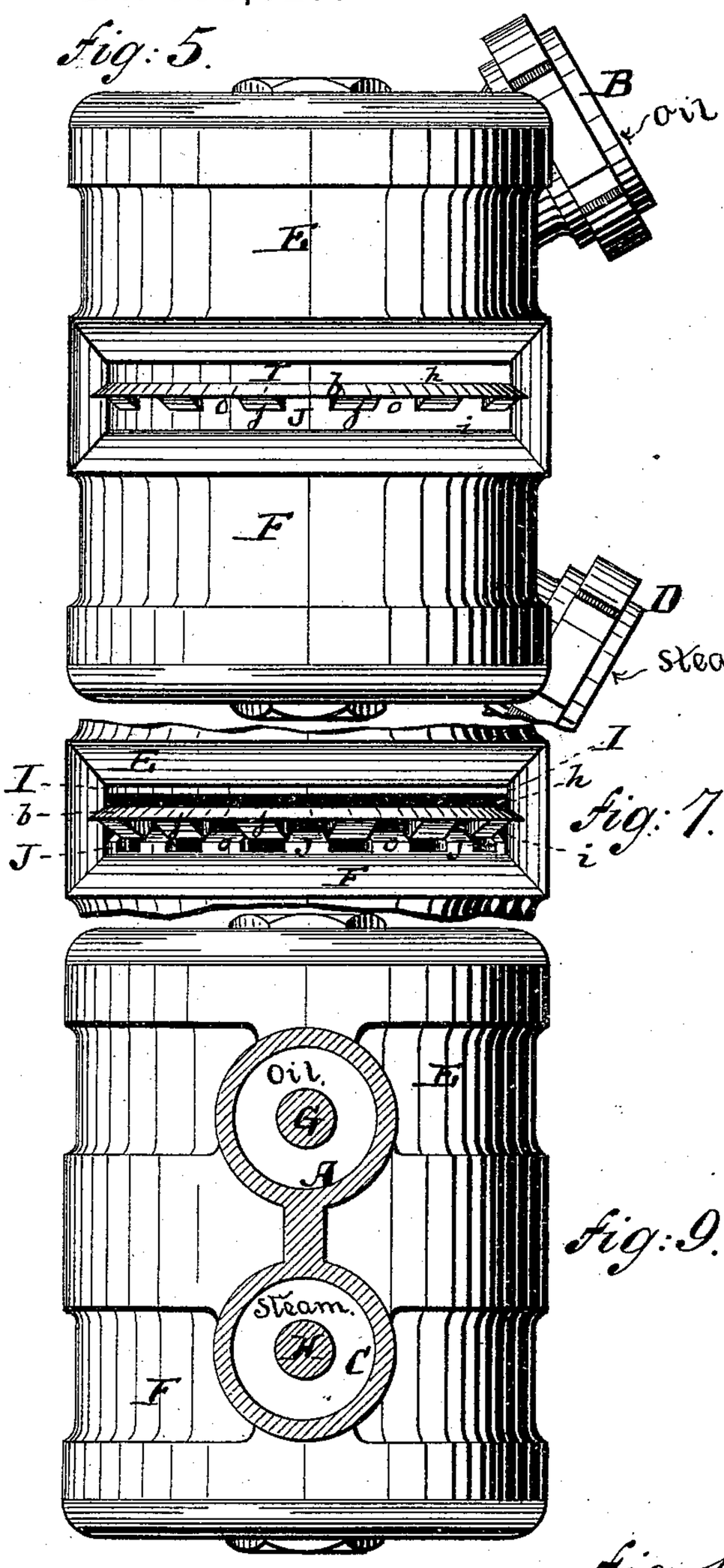

Fig: 6.

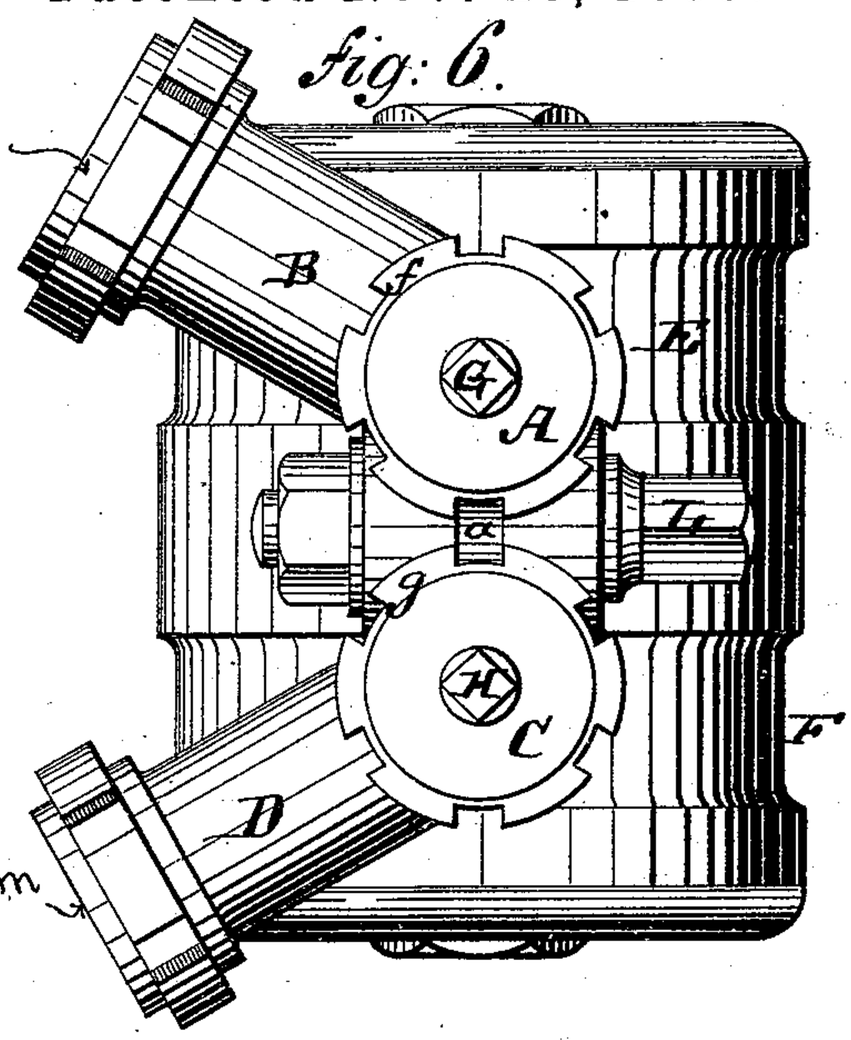

Fig: 7.

Fig: 8.

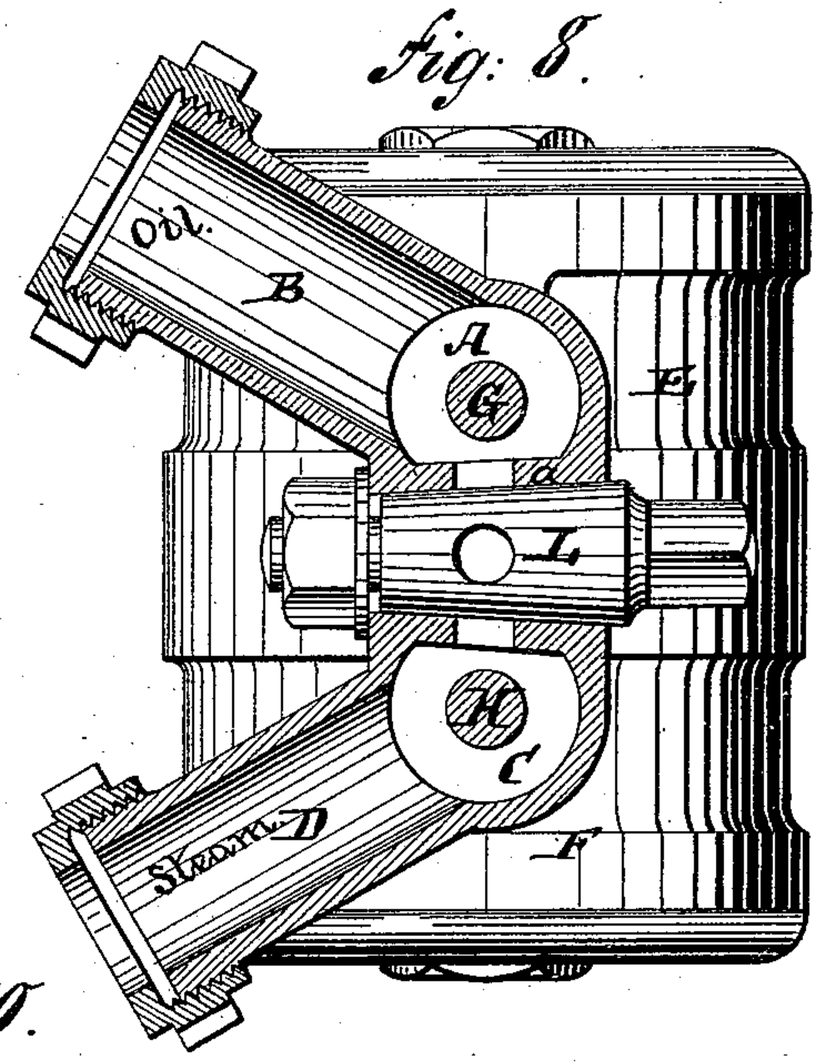

Fig: 9.

Fig: 10.

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UNITED STATES PATENT OFFICE.

CHARLES W. HEINÉ, OF NEW YORK, N. Y.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 353,027, dated November 23, 1886.

Application filed July 2, 1885. Serial No. 170,473. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. HEINÉ, a resident of New York city, in the county and State of New York, have invented an Improved Hydrocarbon-Burner, of which the following is a full, clear, and exact description, reference being made to the accompanying drawings, in which—

Figure 1 is a side view of my improved hydrocarbon-burner. Fig. 2 is a top view of the same. Fig. 3 is a vertical longitudinal section of the same. Fig. 3ª is a detailed vertical section of a part of the same. Fig. 4 is a longitudinal horizontal section of the same. Figs. 5 and 6 are end views of the same. Fig. 7 is a partial end view of the discharge end of the same, showing the same opened. Fig. 8 is a vertical cross-section of the same, the line *c c*, Fig. 1, indicating the plane of said section. Fig. 9 is a vertical cross-section of the same, taken on the plane of the line *k k*, Fig. 1. Fig. 10 is a vertical cross-section taken on the plane of the line *c k*, Fig. 3.

This invention relates to a new construction of burner for injecting hydrocarbon fluid in the presence of steam into the flame as fuel.

The invention consists, principally, in the employment of movable gates for controlling the discharge of the steam and of the hydrocarbon; also, in the peculiar construction of the steam-gate and other parts of the apparatus for dividing the jet of steam into jets that are projected in different directions, and in other details of improvement that are hereinafter further specified.

In the accompanying drawings, the letter A represents a tube or cylinder, constructed of metal or other suitable material, which, near one end, joins the supply-pipe B. C is another such tube or cylinder, which, near one end, joins the supply-pipe D.

The two cylinders A and C are, by preference, placed parallel, and united by a metallic or other web, *a*, (see Fig. 9,) into one rigid structure. The cylinder A at that end which is farthest from the pipe B joins a chamber, E, which, by partition *b*, is separated from a similar chamber, F, with which the cylinder C communicates. The partition *b* has on opposite faces projecting lugs *d* and *e*, that extend, respectively, into the chambers E and F. The partition *b*, it will be seen, Fig. 3, is a continuation of the web *a*.

The cylinder A contains a shaft, G, which has its bearings in the lug *d* and in a stuffing-box, *f*, at the farther end of said cylinder. A similar shaft, H, is contained within the cylinder C, and has its bearings in the lug *e* and in the stuffing-box *g* at the farther end of said cylinder. The ends of the shafts G and H that project from said cylinders are squared or otherwise constructed to permit of their being turned in their bearings.

The chamber E is cylindrical in form—that is to say, it forms a vertical cylinder aligned with the horizontal cylinder A, and in like manner the chamber F constitutes a vertical cylinder aligned with the horizontal cylinder C, the two cylinders E and F being, as a matter of fact, but one cylinder, which is divided by the partition *b* into said two chambers E and F. The chamber E at the discharge end of the burner—that is to say, that end which is farthest from the stuffing-boxes *f g*—has a narrow slot, *h*, directly above the partition *b*, the said partition at this place being made to slope downwardly, as appears clearly from Fig. 3. The chamber F, at the discharge end of the burner, has also a narrow slot, *i*, directly below the partition *b*, the lower side of this partition being at this place provided with downwardly-projecting teeth *j* and intervening spaces or notches, as appears more fully from Fig. 7. The cylindrical chamber E embraces a vertical cylindrical valve, I—that is to say, the said valve is really a ring, of which the outer circumference is substantially the same as the inner circumference of the chamber E; but the said valve I is shorter than said chamber E, so that it is capable of being moved vertically therein. That part of the valve I which is next to the cylinder A contains a large aperture, *m*, so that it will not interfere with the free communication between the cylinder A and chamber E. When the valve I is in its lowermost position—that is to say, when it rests on the partition *b*, as in Fig. 3—it closes the slot *h*, as in that figure; but when the valve I is raised (see Fig. 3ª and Fig. 7) it opens the slot *h* and allows the contents of the chamber E to escape through said slot. In like manner the chamber F contains

a cylindrical close-fitting valve, J, which has an aperture, *n*, next the cylinder C, and which is capable of being moved up and down within the chamber F. That part of the valve J which is directly beneath the toothed portion *j* of the partition *b* is also toothed, as at *o*, Fig. 7, every tooth *o* on the valve being in line with a notch in the partition, so that when the valve J is raised its teeth *o* interlock with the teeth *j* of the partition, thereby holding the slot *i* closed, as in Fig. 3; but when the valve J is lowered the said slot *i* is opened to allow the escape of steam from the chamber F. The upper edges of the teeth *o* slope downwardly outward, and the lower edges of the teeth *j* slope upwardly outward, so that by this system of teeth and intervening notches the steam which is ejected through the slot *i* will be formed into numerous jets that are alternately projected upward and downward. If it were not for these teeth and notches, the steam would be projected in a continuous sheet, which would be less effective.

The valves I and J can be raised and lowered by means of the shafts G and H. Each of these shafts carries within the circumference of its valve an eccentric, *p*, which turns within a box, *q*, that is capable of sliding horizontally, but not vertically, in a partition, *r*, of the valve. (See Fig. 10.) Thus whenever one of these shafts is turned the eccentric which it carries will be turned with it, and will thereby raise or lower the valve in the manner desired.

The apparatus thus far described operates as follows: Hydrocarbon liquid of suitable kind is admitted into the cylinder A by the pipe B, at the same time steam is admitted into the cylinder C by the pipe D. The shaft G is turned to raise the valve I to the proper extent, so as to let the hydrocarbon flow from the chamber E, which communicates with the cylinder A to the flame through the slot *h*. The valve J is, by turning the shaft H, lowered to let the steam escape from the chamber F. It will be seen that the jets of steam that escape in this manner from the burner are in close proximity to the discharge of the hydrocarbon. Hence the steam will throw the hydrocarbon in form of jets or spray into the flame, thus producing admirable results. The valves I and J can be moved to any desired extent to regulate the quantities of hydrocarbon and steam ejected and the proportionate ejectment of each. The partition or web *a* contains a cock, L, which, when turned at right angles to the position in which it is represented in Fig. 3, will cause the cylinders A and C to communicate, for the purpose of allowing the cylinder A to be blown out by steam admitted to the cylinder C.

I claim—

1. The combination of the cylinder A and its chamber E, the latter having outlet slot *h*, with the cylindrical valve I and means, substantially as described, for moving said valve, as specified.

2. The combination of the cylinder A, chamber E, and valve I with the cylinder C, chamber F, valve J, and partition *b*, said chambers E and F having the slots *h* and *i*, substantially as herein shown and described.

3. The partition *b*, constructed with the teeth *j*, in combination with the movable valve J, having teeth *o*, substantially as specified.

4. The combination of the cylindrical valve I, having partition *r*, with the box *q*, eccentric *p*, shaft G, and supports for said shaft, all arranged, as described, for moving said valve in manner specified.

5. In a hydrocarbon-burner having steam-cylinder C and hydrocarbon-cylinder A, separated by a web, *a*, the combination of said cylinders and said web with the cock L, placed in the web for the purpose of establishing and preventing communication between said cylinders, as set forth.

6. In a hydrocarbon-burner having partition *b*, placed between the upper hydrocarbon-discharge orifice and the lower steam-discharge orifice, the combination of said partition with the vertically-movable hydrocarbon-valve I and vertically-moving steam-valve J, as and for the purpose specified.

7. In a hydrocarbon-burner, the partition *b*, constructed with upper sloping discharge-edge and lower toothed discharge-edge, in combination with the vertically-movable valves I and J, as specified.

CHARLES W. HEINÉ.

Witnesses:
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HARRY M. TURK.