No. 654,976. Patented July 31, 1900.

W. HAWKS.

HYDROCARBON ILLUMINATING LAMP.

Application filed Dec. 22, 1898. Renewed June 25, 1900.

(No Model.) 3 Sheets—Sheet 1.

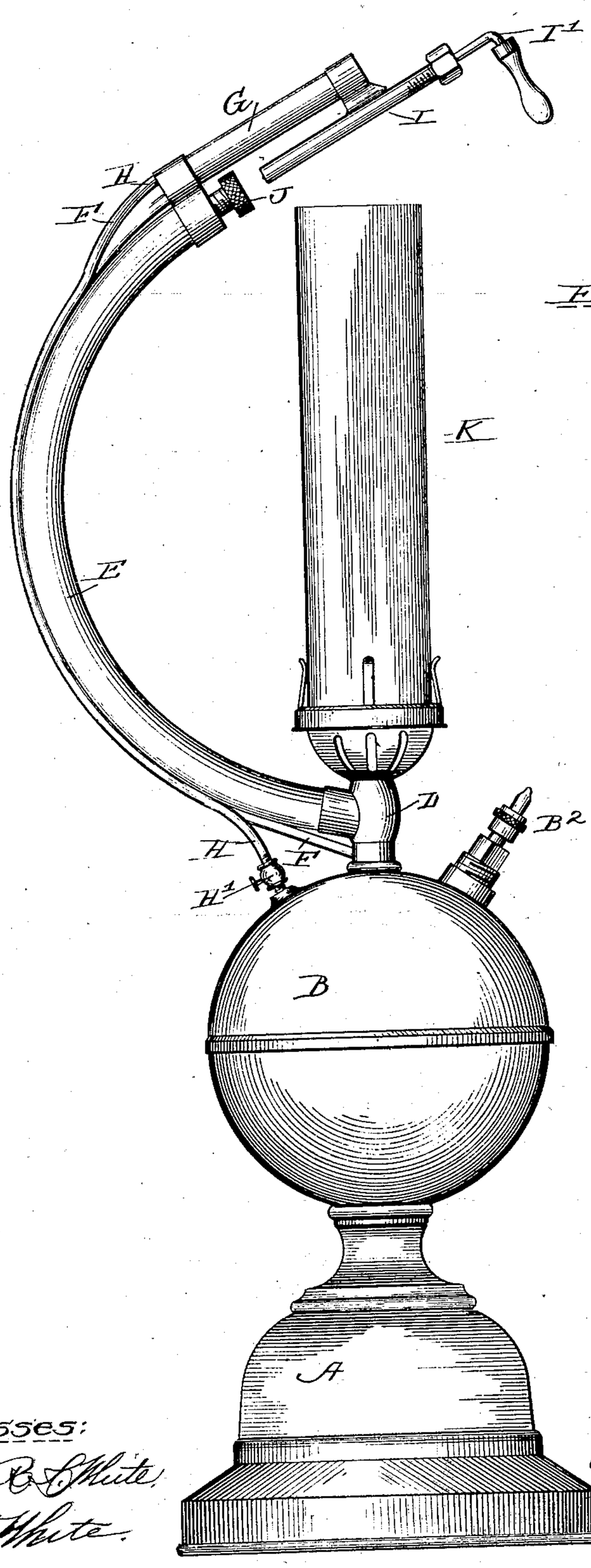

Fig. 1.

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K. White.

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Fig. 2.

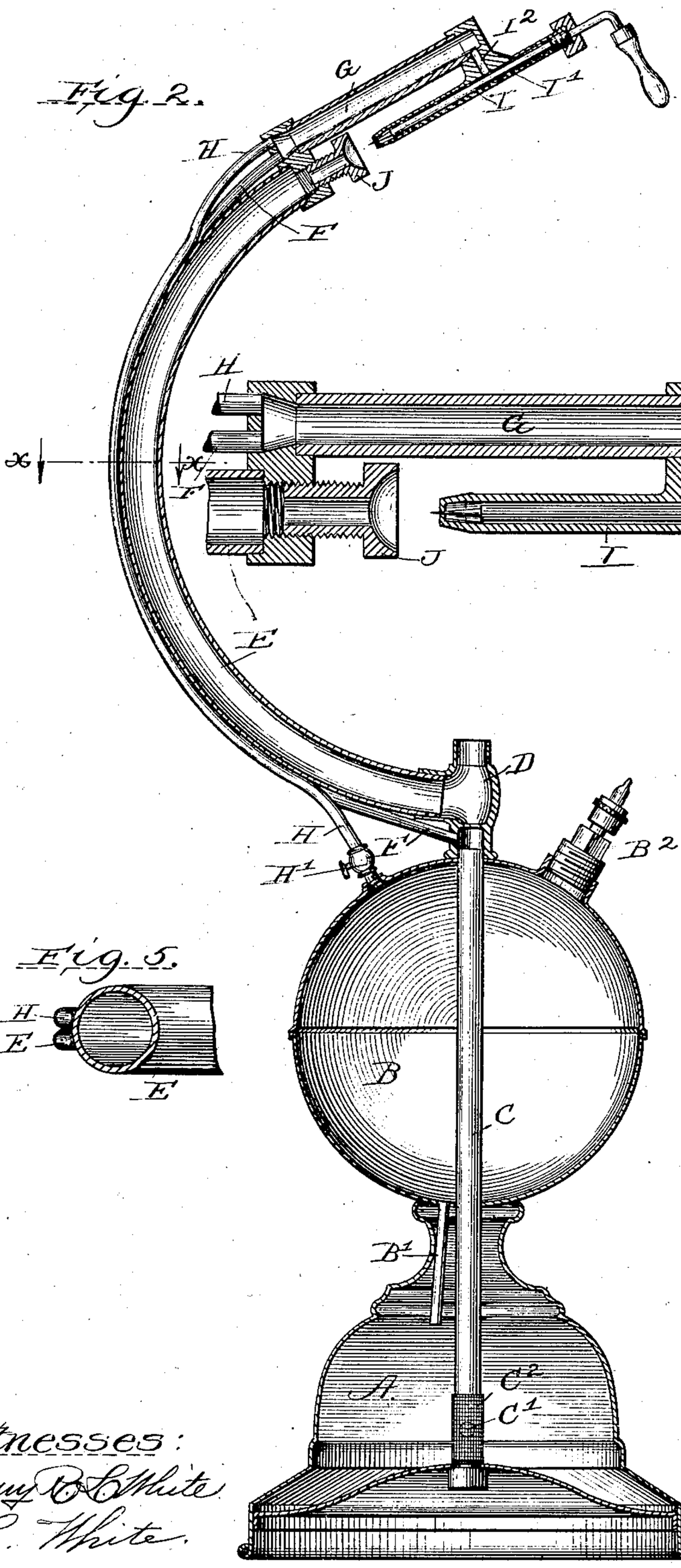

Fig. 3.

Fig. 4.

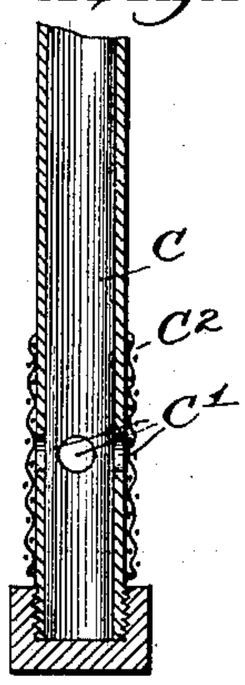

Fig. 5.

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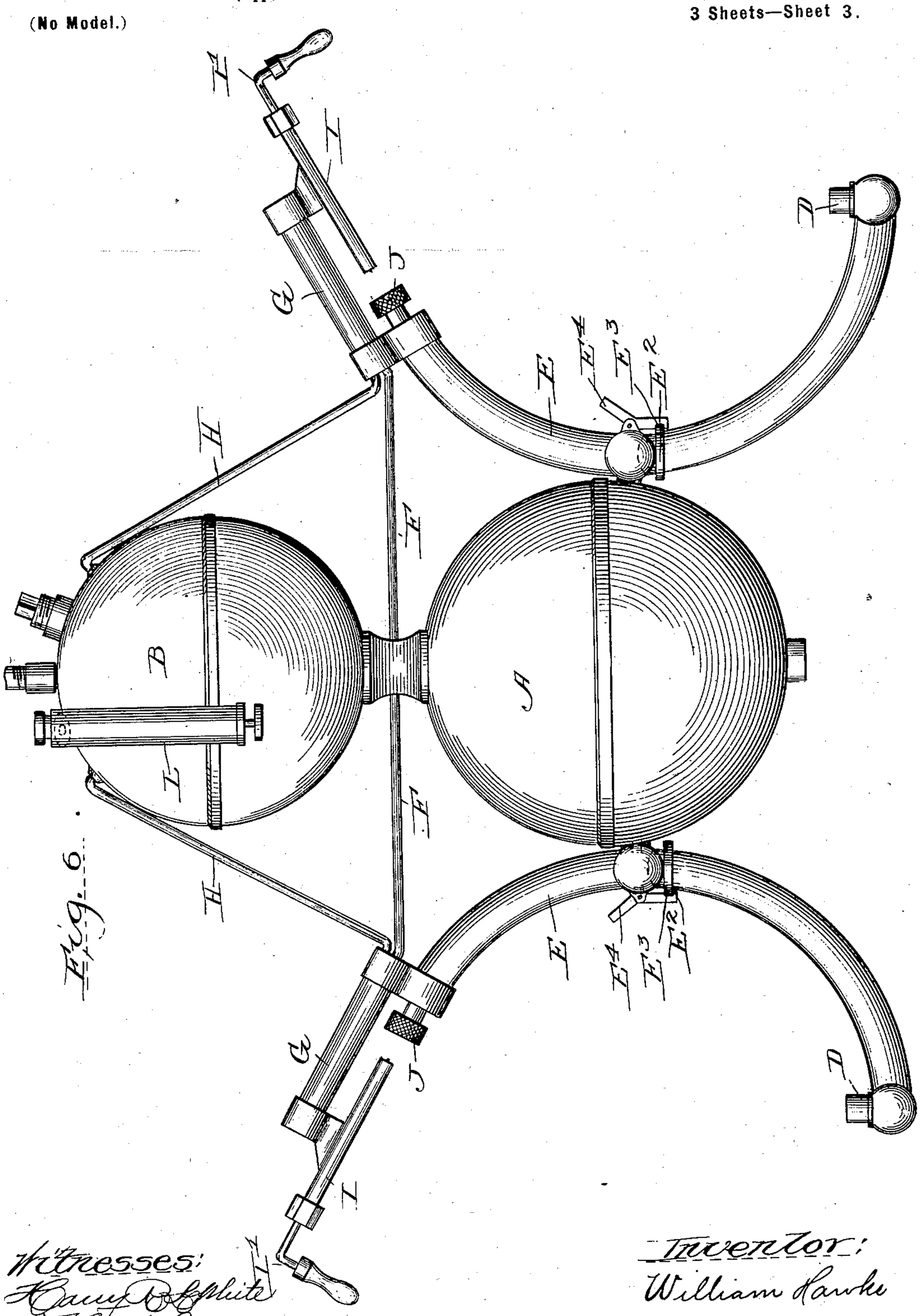

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM HAWKS, OF MIDLAND, MICHIGAN, ASSIGNOR TO THOMAS B. JEFFERY AND CHARLES F. STOKES, OF CHICAGO, ILLINOIS.

HYDROCARBON ILLUMINATING-LAMP.

SPECIFICATION forming part of Letters Patent No. 654,976, dated July 31, 1900.

Application filed December 22, 1898. Renewed June 25, 1900. Serial No. 21,573. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HAWKS, a citizen of the United States, residing at Midland, in the county of Midland and State of Michigan, have invented certain new and useful Improvements in Hydrocarbon-Lamps, of which the following is a specification.

The object of this invention is the production of an illuminating-lamp of the character mentioned for giving a clear white light of great intensity with a comparatively-small consumption of the liquid fuel.

In the accompanying drawings, Figure 1 is a side elevation of this lamp. Fig. 2 is a vertical central section of the same. Fig. 3 is an enlarged central section of the generating-chamber and needle-valve. Fig. 4 is an enlarged view of the lower end of the vertical hydrocarbon-conducting pipe extending through the air-chamber and the hydrocarbon-receptacle. Fig. 5 is an enlarged section on dotted line *x x* of Fig. 2, showing the relative positions of the several pipes rising above the air-chamber. Fig. 6 is a side elevation of my lamp adapted for chandelier use.

Like letters of reference indicate corresponding parts throughout the several views.

A is the hydrocarbon-receptacle.

B is the air-chamber, located above the receptacle A.

B′ is a pipe forming a communication between the air-chamber and the hydrocarbon-receptacle.

B^2 is an air-valve of any suitable construction, through which air may be introduced into the air-chamber B. For convenience I have used an air-valve similar to that employed on bicycle-tires.

C is a hydrocarbon-conducting pipe extending centrally through the hydrocarbon-receptacle A and the air-chamber B, opening into the former by means of the openings C′, but having no direct communication with the interior of the air-chamber B. The casing C^2, of wire-gauze, protects the openings C′.

D is a cap for closing the upper end of the hydrocarbon-conducting pipe C, forming also a support for the burner and upper parts of the lamp.

E is a curved mixing-pipe, within which the generated gas is mixed in proper proportions with the atmosphere.

F is a tube having communication with the interior of the vertical conducting-pipe C and extending between said pipe and the generating-chamber G.

H is an air-tube having communication with the interior of the air-chamber B and extending between the latter and the generating-chamber G.

H′ is a valve in the pipe H near to the air-chamber B.

I is a needle-valve casing, and I′ the valve therein. The interior of the casing I communicates with the generating-chamber G by means of the opening I^2. The needle-valve casing is of slightly-greater diameter than the needle-valve to permit of the passage of the generated gas beside the valve. The needle-valve I′ is provided with a screw-thread connection with the needle-valve casing to give it the necessary longitudinal movement in said casing.

J is an air-funnel having a screw-thread connection with the upper end of the mixing-pipe E, whereby it may be moved with relation to the end of the needle-valve I′ and the quantity of air uniting with the hydrocarbon gas thus regulated.

K is an incandescent burner of any suitable form, in which the gas generated in the generating-chamber G passing by the needle-valve I′ and through the mixing-pipe E is consumed.

In the chandelier form of lamp shown in Fig. 6 I have arranged a swivel-joint E′ in the curved mixing-pipe E, whereby the burner K may be turned to one side for convenience in heating the generator. An alcohol or other torch is usually used to heat the generator on lighting the lamp, and it is convenient to thus move aside the burner until the generator is heated. E^2 is a ring fixed on the lower member of the curved mixing-pipe E, having the notch E^3 in said ring. E^4 is a pivoted gravity-latch for engaging the notch E^3 and holding the two members of the pipe E in proper relative positions. In this form of lamp I have also provided an attached air-pump L for supplying the air-chamber B with air under pressure.

In practice the hydrocarbon-receptacle A is filled with gasolene, the air-valve B^2 being entirely removed for that purpose. Pressure

is created in the air-chamber B by forcing atmospheric air through the air-valve B^2 by any suitable means. The air-pressure upon the surface of the gasolene in the receptacle A is sufficient to force that liquid upward in the conducting-pipe C and the tube F into the generating-chamber G, and upon the application of sufficient heat to the generating-chamber gas is caused to issue from the needle-valve casing I′ into the mixing-pipe E, whence it is conducted to the burner K, where it is consumed. The heat of combustion rising from the burner K keeps the generating-chamber G heated to a temperature sufficient to continue the generation of the hydrocarbon gas. The air-valve H′ in the tube H permits the generating-chamber G to be drained of gasolene by admitting air-pressure from the air-chamber B to the generating-chamber, thus allowing the hydrocarbon in that chamber to be drawn downward through the tube F and the conductor-pipe C by the force of gravitation. Upon closing the valve H′ the pressure within the air-chamber B will cause the hydrocarbon again to rise to the generating-chamber G. This is desirable in starting the generation of gas to remove the body of liquid from the generating-chamber, permitting the quick heating of that chamber.

The air-funnel J is moved to or from the end of the needle-valve by turning the funnel in its screw-thread connection with the pipe E, thereby regulating the quantity of air which mixes with the generated gas discharged from the needle-valve casing.

While I have shown this lamp as a stand-lamp, it is clear that it may be used in connection with hanging or chandelier brackets, as in Fig. 6, and that the hydrocarbon fuel may be conducted to the generating-chamber from an elevated tank instead of being raised by air-pressure; but I much prefer the latter means of feeding the hydrocarbon to the generating-chamber.

I have found that a considerable advantage arises from the inclined position which I have given the generating-chamber. With a horizontally-extending generating-chamber the hydrocarbon feeds into it with a pulsating movement, making the flow of gas from the needle-valve, and consequently the flame, unsteady, and this is particularly true when the hydrocarbon is supplied from an elevated tank, flowing to the generating-chamber by the force of gravitation.

The arrangement here shown of the needle-valve is such that the generated gas is reverted from the generator-chamber and caused again to pass across the heated zone above the burner, whereby the gas is not only thoroughly heated, but is discharged in a direction contrary to that of the liquid hydrocarbon upon its entrance to the generating-chamber, which latter is of great convenience in the construction of these lamps, and more especially in building those of the chandelier variety.

I claim as my invention—

1. In a hydrocarbon illuminating-lamp, in combination, a hydrocarbon-receptacle; a burner; a mixing-pipe for supplying gas to said burner; an air-funnel having an adjustable connection with the mixing-pipe; a generating-chamber having communication with said hydrocarbon-receptacle, located above said burner; and a needle-valve casing over the burner lying substantially parallel with and having communication with said generating-chamber, and being so arranged relative to said generating-chamber that the generated gas is reverted over the burner, and discharged into the mixing-pipe slightly to one side of the heated zone directly over said burner.

2. In a hydrocarbon illuminating-lamp, in combination, a hydrocarbon-receptacle, an air-chamber communicating with the receptacle, an air-valve for the chamber, a gas-generator, a communication between the generator and the hydrocarbon-receptacle, a burner, a gas-discharge valve for the generator, a mixing-pipe communicating between the discharge-valve and the burner, an air-tube communicating between the air-chamber and the generating-chamber, and a valve in the air-tube, substantially as and for the purpose specified.

WILLIAM HAWKS.

Witnesses:
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GEO. L. CHINDAHL.