

(Model.)

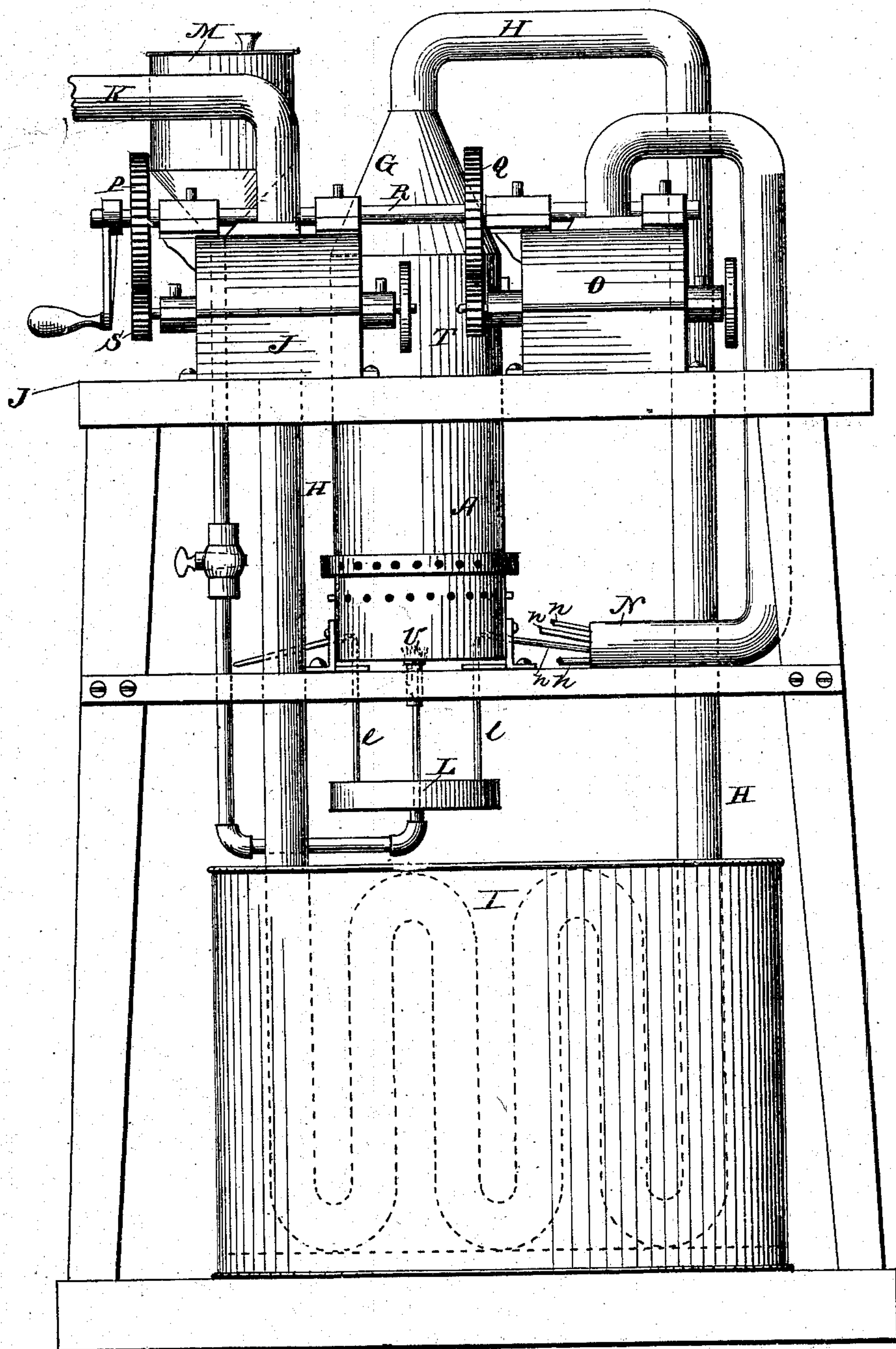
2 Sheets—Sheet 1

C. L. GARFIELD.
FIRE EXTINGUISHER.

No. 249,236.

Patented Nov. 8, 1881.

Fig. 1.



Attest,
W. H. Knight
Fred F. Church.

Inventor,
Charles Lyman Garfield
By Hill & Church
His atty.

(Model.)

2 Sheets—Sheet 2.

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Fig. 4.

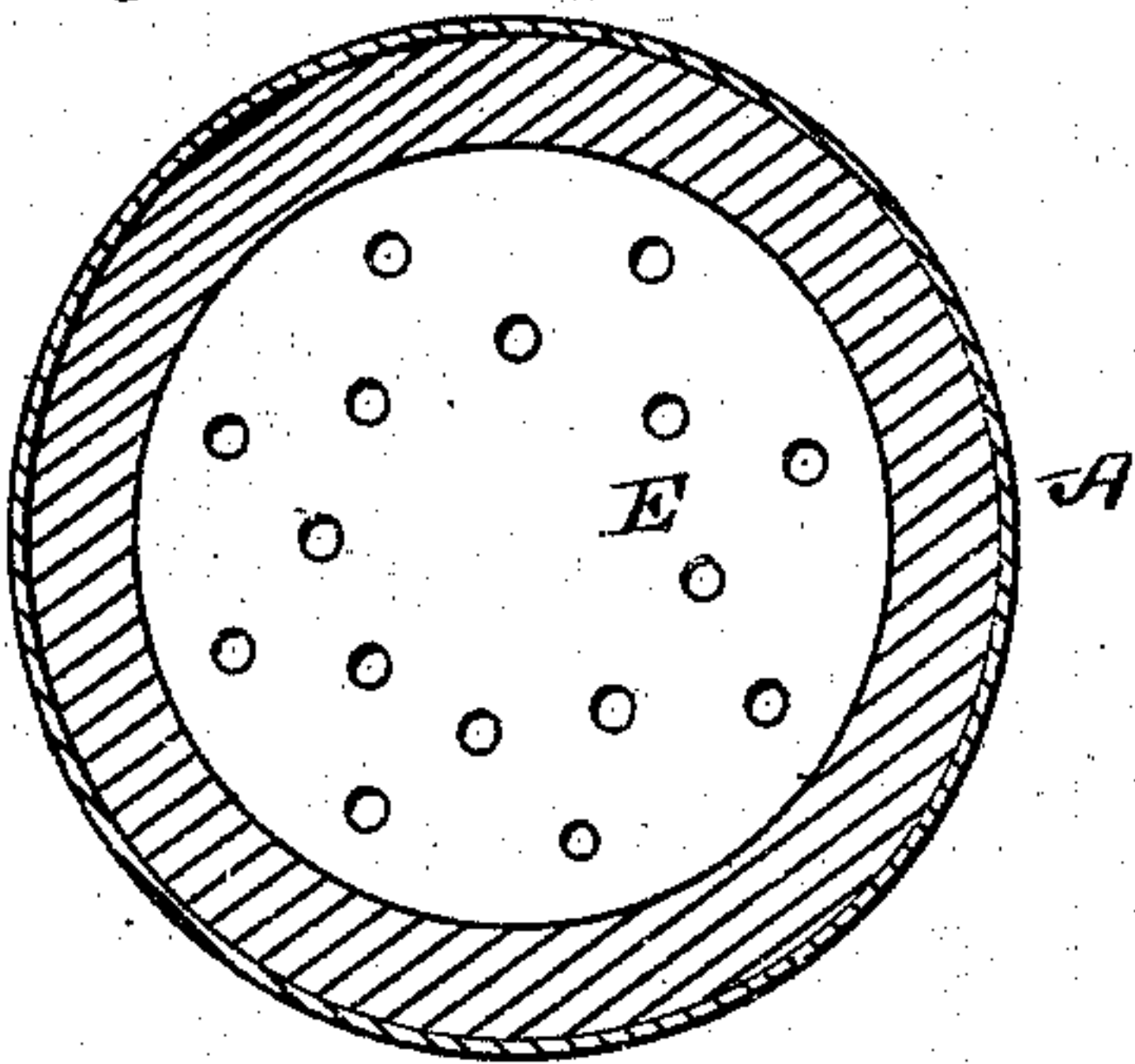


Fig. 3.

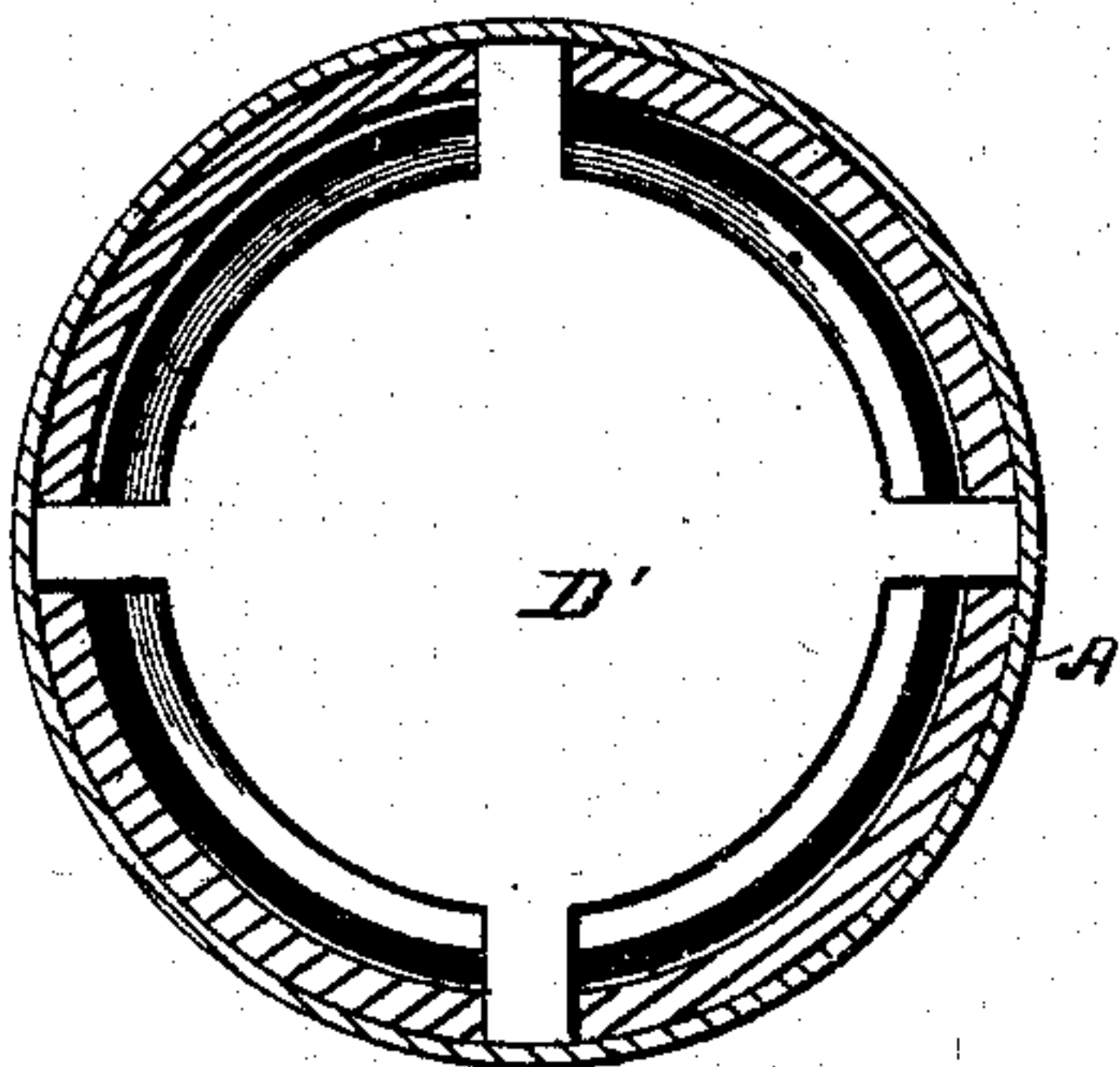
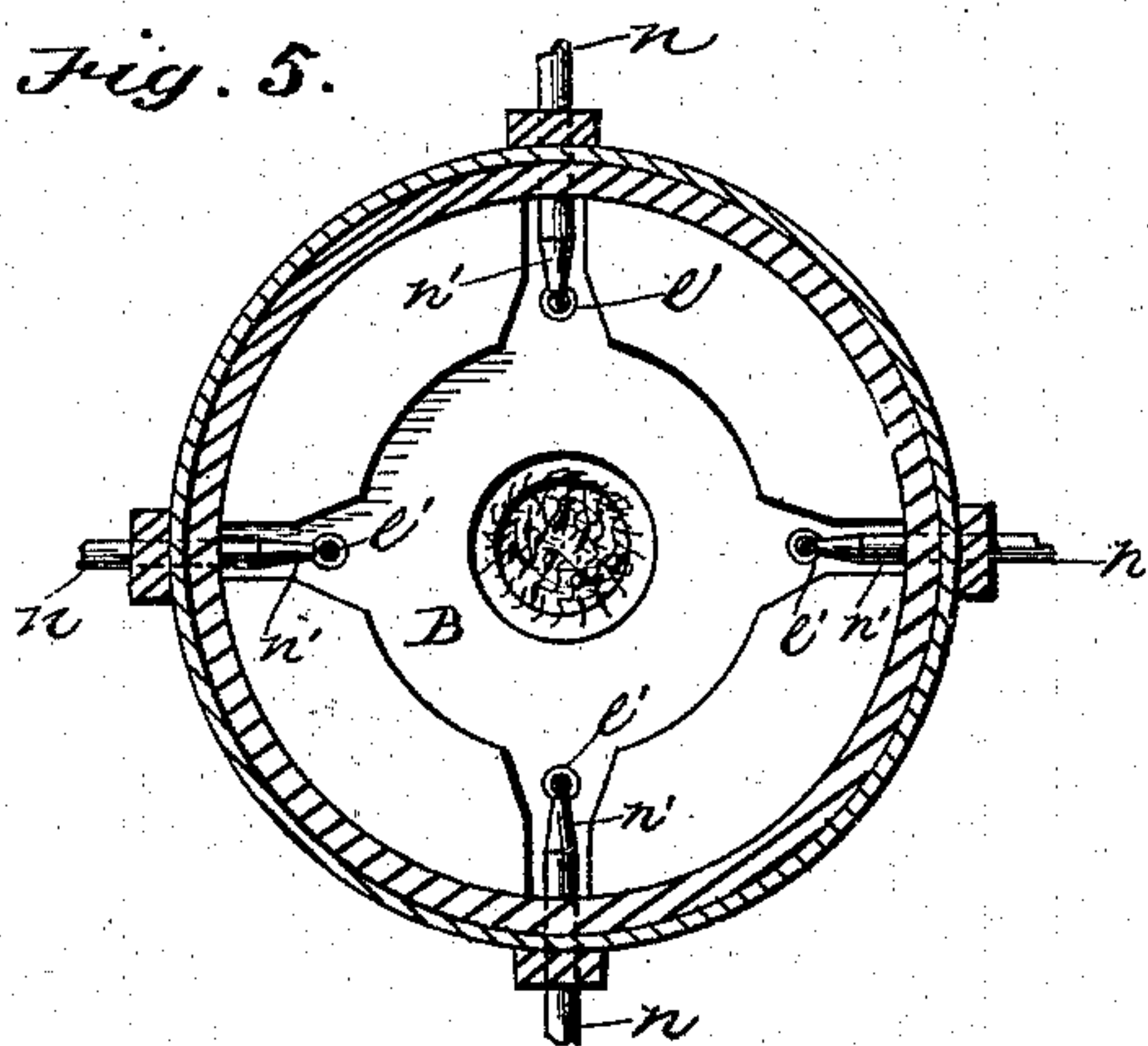
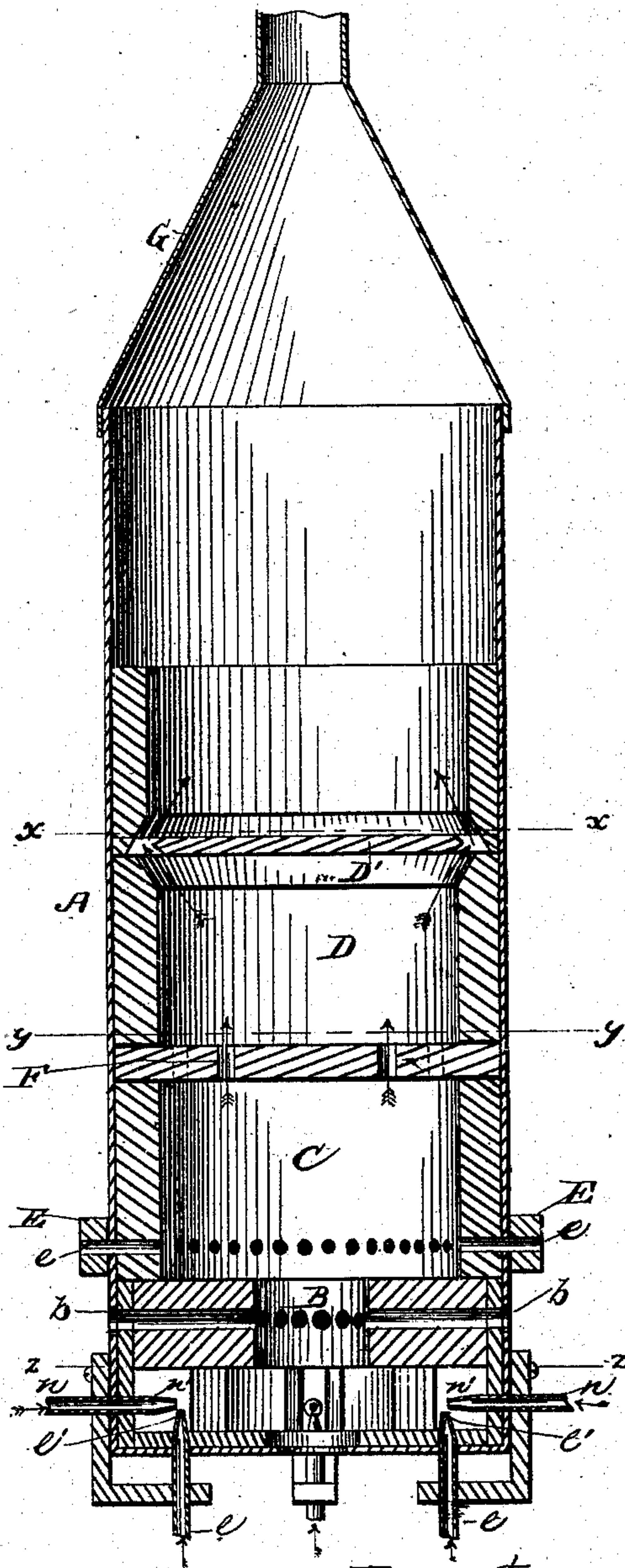


Fig. 5.



Attest
W. H. H. Knight.
Fred. P. Blum.

Fig. 2.



Inventor,
Charles Lyman Garfield
By Alice V. Church,
His atty.

UNITED STATES PATENT OFFICE.

CHARLES L. GARFIELD, OF ALBANY, NEW YORK.

FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 249,236, dated November 8, 1881.

Application filed January 7, 1881. (Model.)

To all whom it may concern:

Be it known that I, CHARLES LYMAN GARFIELD, of Albany, Albany county, New York, have invented certain new and useful Improvements in Fire-Extinguishers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents an elevation of the apparatus complete; Fig. 2, a longitudinal vertical section of the furnace in which the fire-extinguishing gases are evolved and liberated; Fig. 3, a cross-section taken through the furnace on the line *x x*, Fig. 2; Fig. 4, a similar section taken on the line *y y*, same figure; and Fig. 5, a similar section taken on the line *z z*, same figure.

Similar letters of reference in the several figures denote the same parts.

This invention relates to that class of fire-extinguishers which employ gases as the extinguishing agent instead of liquids, and it has particular relation to those apparatuses which are adapted to the deoxygenation of atmospheric air by the combustion of carbonaceous materials in a furnace, and which are supplied with means for conveying or forcing the deoxygenated air to the fire to be extinguished, or to storing tanks or reservoirs for future use.

The invention has for its object the utilization of hydrocarbon oils, or other inflammable liquids, in the process of deoxygenating the air; and it consists in a novel apparatus for accomplishing said object, which I will now proceed to describe.

In the drawings, A represents the furnace in which the deoxygenation of the air is effected. It is provided with three combustion-chambers, B C D, which are preferably lined with soapstone, lava, graphite, fire-brick, or other material adapted to resist a high degree of heat. The wall B' of the lower chamber, as well as the outer casing of the furnace opposite said wall, is pierced with a series of radial holes or perforations, *b*, for the admission of external air into said chamber, and a series of perforations, *e*, are made through an external ring, E, which surrounds the lower portion of the second combustion-chamber, and likewise through the casing and lining of said chamber, for the

admission of external air to that chamber also.

A perforated wall or partition, F, is located between the second and third chambers, and the third chamber, D, is provided with a transverse wall or partition, D', which extends nearly to its side walls, leaving only a narrow passage, as shown in Fig. 2.

The top G of the furnace is preferably cone-shaped, and to it is connected a pipe, H, which passes through a water-tank, I, or other cooler, and thence to a suction and forcing fan-blower, J, provided with an exit or discharge pipe, *k*.

Below the furnace is arranged a chamber or receptacle, L, containing hydrocarbon oil or other liquid fuel, and kept supplied from an elevated reservoir, M, or otherwise, and extending upward from this oil-receptacle, and through the bottom of the furnace into the lower part of chamber B are a number of small tubes, *l*, each of which is provided at its upper end with a tip or nozzle, *l'*, of small bore. Immediately over the tips of the oil-tubes are arranged the tips *n'* of a series of air-pipes, *n*, that connect with a main air-pipe, N, leading from a fan-blower, O, as shown in Fig. 1. The fan-blowers J and O are preferably, for convenience, arranged alongside each other, and are respectively driven by gear-wheels P Q, mounted on a main drive-shaft, R, and geared respectively to pinions S T on the shafts of the two blowers, as shown in Fig. 1.

The operation of the apparatus is as follows: The main drive-shaft R being set in motion by power derived from any suitable source, the fan-blowers are both put into active operation. The air forced by blower O rushes in fine streams out of the tips *n'* and causes the oil to rise in the tubes *l* and tips *l'*, and to be atomized or blown in fine spray toward the center of the lower part of chamber B, where it is ignited or fired by the flame from a wick, U, (see Fig. 1,) held in an oil-cup, V, introduced through the lower part of the furnace and supplied with oil from the oil-receptacle L. The burning of the vaporized hydrocarbon produces a most violent combustion and intense heat in the chamber B, and the fresh external atmospheric air rushing in through the perforations *b* becomes decomposed, its oxygen operating to increase the combustion,

while its liberated nitrogen passes out with the remaining volatile products of combustion—viz., carbureted hydrogen and carbonic oxide—into the second combustion-chamber, C, where, meeting with the atmospheric air entering through the perforations *e*, said air in turn becomes decomposed, its oxygen assisting to increase the combustion, and its nitrogen, uniting with that previously disengaged, passing up in a volume, mixed with a small quantity of carbonic oxide, through the perforated wall or partition F into the third combustion-chamber, D, from whence it is drawn by blower J into pipe H, through cooler I and blower J, and forced out through exit-pipe K to the fire, to be extinguished, or to suitable storing-tanks for future use.

The apparatus herein described with slight adaptation can be made to serve the purposes of a fire-extinguisher for use on ships, or as a portable contrivance that can be transported from place to place like an ordinary fire-engine.

I do not intend to limit myself to the use of hydrocarbon oils, as any other suitable liquid fuel might be employed with good effect.

Instead of cooling the extinguishing-gases by passing them through tubes arranged in a water-tank, as herein described, any other mode of cooling said gases may be resorted to, if preferred.

Having thus described my invention, I claim as new—

1. In an apparatus for producing fire-extinguishing gases, the combination of a combustion-chamber, means for vaporizing or atomizing hydrocarbon oil or other liquid fuel in said chamber, and means for drawing off the gases and volatile products of combustion from said chamber, substantially as described.

2. In an apparatus for producing fire-extinguishing gases, the combination of a combustion-chamber, a series of oil-tubes arranged therein, a series of air-pipes co-operating with said oil-tubes, means for forcing air through said air-pipes to atomize or vaporize the oil supplied by the oil-tubes, and means for drawing off the gases and volatile products of combustion, substantially as described.

3. In an apparatus for producing fire-extinguishing gases, the combination of a combustion-chamber having openings for the admission of external atmospheric air, a series of oil-tubes arranged therein, a series of air-pipes co-operating with said oil-tubes, means for forcing air through said air-pipes to atomize or vaporize the oil supplied by the oil-tubes, and means for drawing off the gases and volatile

products of combustion, substantially as described.

4. In an apparatus for producing fire-extinguishing gases, the combination of a combustion-chamber, a series of oil-tubes arranged therein, a series of air-pipes co-operating with the oil-tubes, means for forcing air into the air-pipes to vaporize the oil supplied by the oil-tubes, and a holder for carrying a lighted wick or other means for firing the vaporized oil, substantially as described.

5. In an apparatus for producing fire-extinguishing gases, the combination of a combustion-chamber, a series of oil-tubes arranged therein, a series of air-pipes co-operating with the oil-tubes, means for forcing air into the air-pipe to atomize the oil supplied by the oil-tubes, a holder for carrying a flaming wick or other means for firing the vaporized oil, and means for drawing off the gases and volatile products of combustion, substantially as described.

6. In an apparatus for producing fire-extinguishing gases, the combination of a combustion-chamber, a series of oil-tubes arranged therein, a series of air-pipes co-operating with the oil-tubes and arranged to blow currents of hydrocarbon vapor from the oil-tubes toward the center of the combustion-chamber, a holder carrying a lighted wick or other means for firing the vaporized oil, located in the center of the combustion-chamber, and means for drawing off the gases or volatile products of combustion.

7. The combination, with the lower chamber of the furnace, of the oil-tubes arranged therein, the oil-receptacle below said chamber, and the holder having a wick supplied from the oil-receptacle, substantially as described.

8. The combination, in the furnace, of the lower chamber, D, containing the means for atomizing and firing hydrocarbon oil, and provided with apertures for the introduction of atmospheric air, with the second chamber also perforated for the admission of air, the perforated wall between the second and third chambers, and the third chamber, substantially as described.

9. The combination, with the furnace constructed as described, of the air-forcing fan-blower, its air-pipes, the oil-tubes and their supplying means, and the suction fan-blower for drawing off the deoxygenated air from the furnace, and the cooler for cooling the deoxygenated air, substantially as described.

CHARLES LYMAN GARFIELD.

Witnesses:

RUSSELL C. CASE,
H. W. GARFIELD.