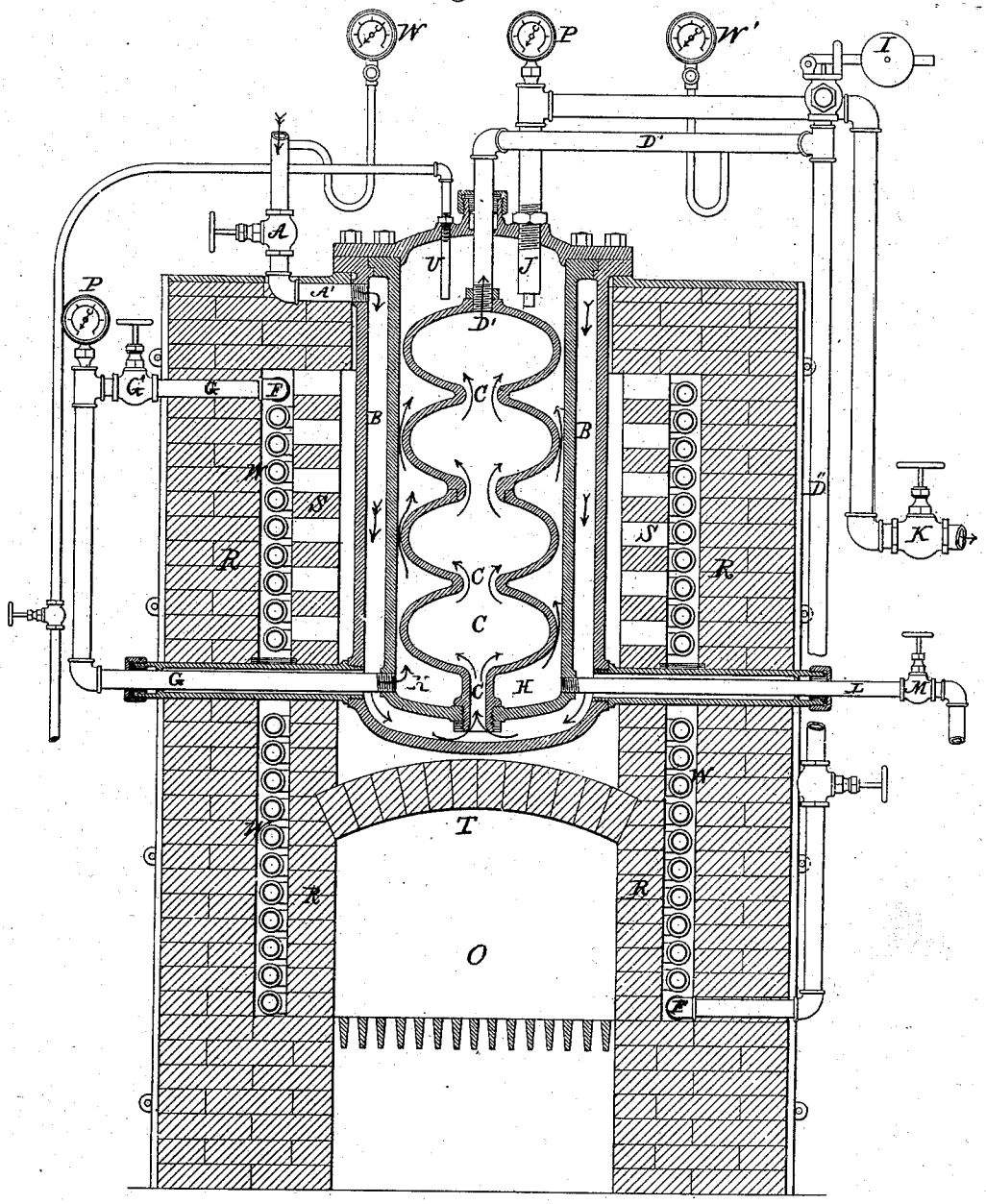
(No Model.) 2 Sheets—Sheet 1.

H. F. HAYDEN.

APPARATUS FOR GENERATING VAPOR FROM LIQUID HYDROCARBONS.

No. 254,871. Patented Mar. 14, 1882.

Fig. 1.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

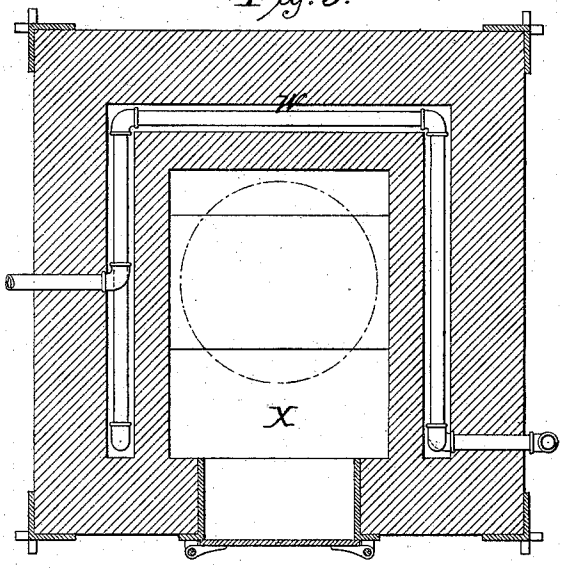
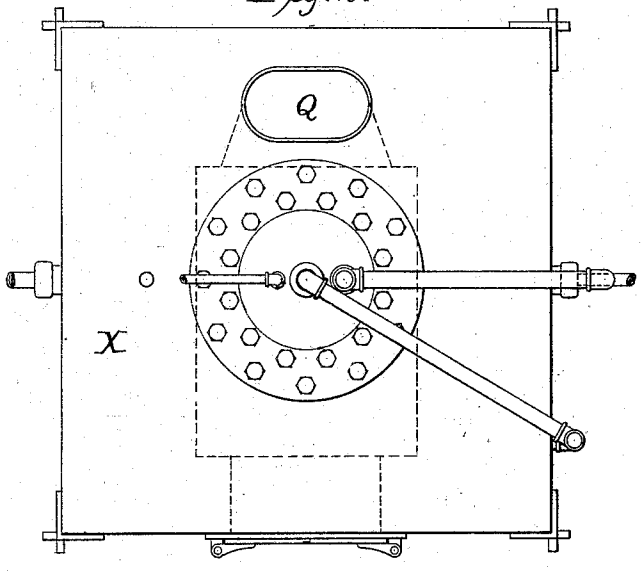


Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY F. HAYDEN, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE INTERNATIONAL VAPOR FUEL CARBON IRON AND MANUFACTURING COMPANY, OF SAME PLACE.

APPARATUS FOR GENERATING VAPOR FROM LIQUID HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 254,871, dated March 14, 1882.

Application filed June 11, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. HAYDEN, a citizen of the United States of America, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Apparatus for Generating Vapor from Liquid Hydrocarbons; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to that class of vapor-generators in which steam is used for causing the vaporization of liquid hydrocarbons; and the nature thereof consists in certain improvements in the construction of such generators and novel combinations of the parts thereof, hereinafter described.

In the accompanying drawings, in which corresponding parts are designated by similar letters, Figure 1 is a section taken in a vertical plane through the center of the apparatus. Fig. 2 is a top view of the apparatus. Fig. 3 illustrates in horizontal section the arrangement of the superheating-pipes.

The cylindrical chamber H, in which the vapor is generated, is jacketed by an annular steam-space, B, which communicates by means of the pipe A′ with the steam-supply, and has arranged within it an interior steam-space, C, communicating with the steam-jacket, through which steam continuously flows. The steam admitted through the pipe A′ is regulated by the valve A, and flows downward to the bottom of the steam-jacket B, heating in its passage the exterior of the generating-chamber, from whence it rises through the interior steam-space, C. This interior steam-space, which I prefer should consist of two or more communicating receivers of spheroidal form, is connected by means of the pipe D with a system or series of superheating-pipes, F, arranged within the masonry which incloses the apparatus. These superheating-pipes are arranged within a receptacle, W, which communicates by means of a perforated wall, S, with the furnace, and are arranged, the one above the other, in such a manner as to form a series of communicating superheaters, the uppermost of which is connected by means of the pipe G, having a valve, G′, and pyrometer P, with the interior of the generating-chamber H.

Near the base of the apparatus is a furnace, O, from whence the products of combustion rising expand into the space P around the apparatus through the perforated wall S, and finally pass off through the smoke-pipe Q.

The liquid hydrocarbon is introduced into the generating-chamber above the interior steam-space, C, by means of the pipe U, which communicates with source of supply, and the hydrocarbon vapor is carried off by the pipe J, which is provided with a pyrometer, P, and valve K. Any residuum which may remain in the generating-chamber may be drawn off through the pipe L, which is provided with a suitable valve, M.

The pipe A′, communicating with the steam-jacket B, and the pipe D, which connects the interior steam-space, C, with the superheater, are provided with steam-gages W W′, by which the pressure may be noted.

The operation of the apparatus is as follows: The requisite amount of steam is admitted by means of the valve A through the pipe A′ into the annular steam-jacket on the outside of the generator, from whence it flows upward through the interior steam-space and pipe D′ to the superheater F, where additional heat is imparted to it by the heated gases from the furnace and the hot brick-work R. The steam thus superheated flows through the pipe G to the generating-chamber H, where it comes in contact with the liquid hydrocarbon which enters through the pipe U and flows on the surface of spheroidal receivers. The arrangement of the spheroidal receivers is such as to cause the evaporation of the hydrocarbon flowing over them, according to their volatility—that is to say, the most volatile hydrocarbons are evaporated first and the least volatile last—and to permit the highly-heated steam to attack the carbonaceous residua and form carbonic-oxide and hydrogen gas. The steam should flow from the generator under sufficient pressure to

carry the hydrocarbons in vaporous form to the point where they are required, and mix the vapor with an air-blast to insure complete combustion.

The superheating-surface presented by the steam-jacket B is sufficient to raise the temperature of free steam to about 500°, and the continuous flow of the steam into the spheroidal receivers transmits to generating-chamber an amount of heat sufficient to prevent any condensation of the superheated steam admitted for the purpose of vaporization.

The circulation or continuous flow of steam through the apparatus, as above described, gradually increases its temperature until it passes from the generating-chambers, and no chilling can occur, except that which must always result from the amount of heat absorbed by the liquid hydrocarbon in passing into a state of vapor.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In the apparatus for generating vapor from liquid hydrocarbons, herein described, the generating-chamber having an internal steam-space consisting of two or more communicating spheroidal receivers, as and for the purposes described.

2. In the apparatus for generating vapor from liquid hydrocarbon, herein described, the generating-chamber provided with internal spheroidal steam-spaces and external steam-jacket, as and for the purposes described.

3. The combination of the spheroidal receivers, the pipe through which the superheated steam enters the generating-chamber, and the oil-supply pipe.

4. The combination of the outer steam-jacket, B, spheroidal receivers C, connecting pipe D, superheater F, and generating-chamber H, as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY F. HAYDEN.

Witnesses:
C. S. WHITMAN,
F. M. BURNHAM.

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