H. H. EAMES & C. J. EAMES.

Improvement in Vaporizing Hydrocarbons for Heating, &c.

No. 132,266. Patented Oct. 15, 1872.

Fig 1.

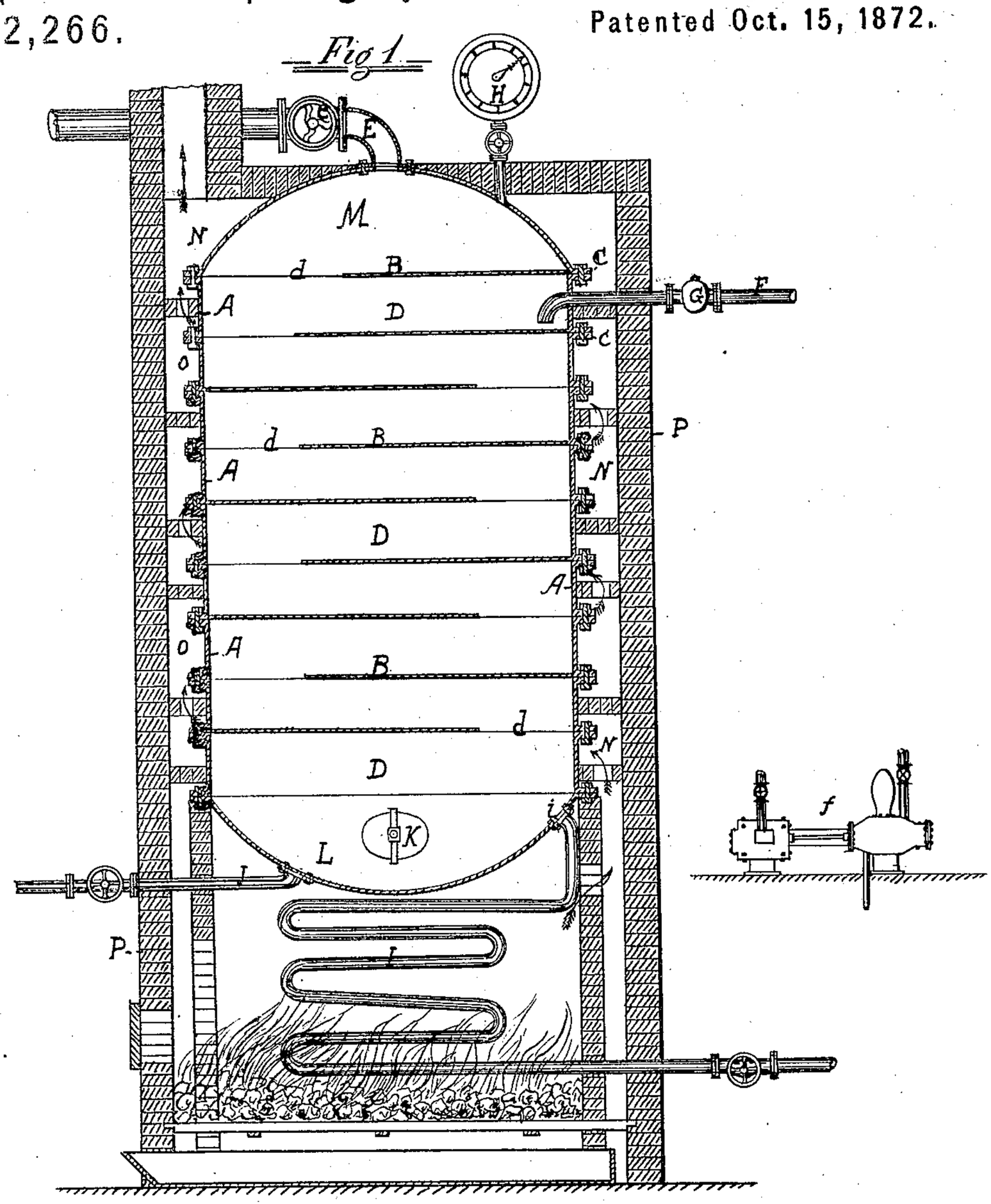
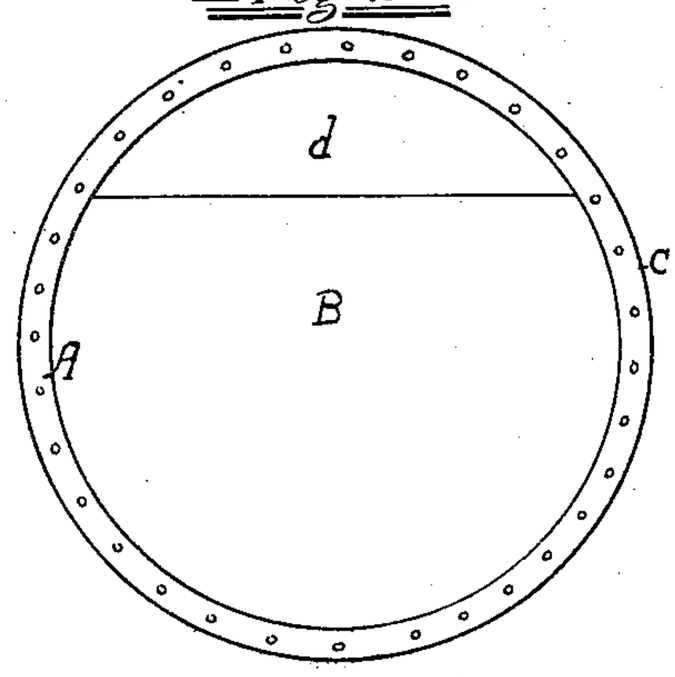


Fig 2.



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UNITED STATES PATENT OFFICE.

HENRY H. EAMES, OF PHILADELPHIA, PENNSYLVANIA, AND CHARLES J. EAMES, OF NEW YORK, N. Y.

IMPROVEMENT IN VAPORIZING HYDROCARBONS FOR HEATING, &c.

Specification forming part of Letters Patent No. **132,266,** dated October 15, 1872.

To all whom it may concern:

Be it known that we, HENRY H. EAMES, of Philadelphia, State of Pennsylvania, and CHARLES J. EAMES, of the city, county, and State of New York, have invented a certain new and useful Improved Apparatus for Vaporizing Hydrocarbons.

The nature of our invention consists in the construction of an apparatus that will completely vaporize the constituents of petroleum or other hydrocarbons by subjecting a continuous stream of the material to be vaporized in thin stratums upon descending alternate diaphragms, and hold under pressure the said vaporized constituents, so that they may be regulated at will. The object of our invention is to obtain the vapor of petroleum or other hydrocarbons mixed with superheated steam or air, to be used more particularly for heating purposes and the reduction of metallic ores. We have found that when large bodies of petroleum are heated in an apparatus for this purpose only the naphtha and other very volatile constituents are eliminated, and that, unless an extremely high temperature is attained, none of the more dense products will form into vapor, thereby preventing a uniform quality of flame when the vapor is consumed, and causing great loss from residuum in the vaporizing process.

Figure 1 is a vertical section of an apparatus embodying our invention. Fig. 2 is a detail view of a part of the same.

A A A are cylinders, made of metal, and may be of oblong or other than circular form, provided with metal plates or diaphragms B and flanges C. (See Fig. 2.) These cylinders A are firmly bolted together, one above the other, by their flanges C, with cement packing between said flanges, so as to form a vapor-tight chamber divided into a series of compartments, D, communicating with one another through openings *d* in diaphragms B, which are placed two inches (more or less) apart, and form the partitions between compartments D, as clearly illustrated in Fig. 1. The diaphragms B may be bolted on the inside of a cylinder formed of one piece, instead of the series of cylinders A, and thus form the desired vapor-tight chamber. As to the diaphragms B or compartments D, they may be varied in number and size to suit the nature and quantity of the hydrocarbon to be vaporized. E is the pipe to convey the vapor as desired from the dome M, and *e* is the valve, which is operated when it is required to permit the vapor to escape. F is a pipe to convey the oil into the vaporizing-chamber from a steam-pump, *f*. G is a check-valve in the petroleum-supply pipe to prevent the back pressure of the vapor. H is a pressure-gage. I is a "coil" in which to superheat the steam used. A steam-tight jacket may be substituted for the "coil" I, in which case the steam-jacket will entirely inclose the chamber for vaporizing, forming a chamber around the vapor-chamber, and ordinary steam be admitted from the top of this jacket to pass thence down the outside of the vapor-chamber to the inlet *i*, the heat of the furnace surrounding the jacket and superheating the steam therein contained. J is a pipe to draw off residuum. K is a hand-hole plate to clean out apparatus. L is the lower compartment of apparatus to hold residuum. M is a dome for holding vapor. N and O are flues constructed to pass around the apparatus, making their exit at top. P represents the furnace within which our apparatus is inclosed, the vapor-chamber properly secured and set over the fire.

The operation of our apparatus, when constructed substantially as above described, is as follows: Having started the fire, and the apparatus being sufficiently heated, and the pump *f* having supplied a continuous flow of petroleum from the wells to the upper compartment D through pipe F, from upper compartment D the petroleum freely flows over the heated diaphragm B of that compartment, through the opening *d* in said diaphragm into the compartment next below, and so on down from the upper compartment to the lowest compartment. At this moment the steam is admitted into coil I, where it is rapidly superheated and passes from the coil into the compartment at *i*, and thence up through the opening *d* of diaphragm B, through the series of compartments D, where the petroleum is steadily flowing in diffused stratums, and in opposite direction to the ascending superheated steam, which will very materially hasten the complete vaporization of the petroleum. By

means of the pressure-gage H the pressure of the vapor can be determined and regulated. The valve *e* to exit-pipe E is then opened and the vapor allowed to pass to the desired point of use.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The method herein described for converting petroleum and other hydrocarbons into vapor, the same consisting in subjecting the hydrocarbons to the direct action of superheated steam while flowing in a stream, substantially as set forth.

2. The apparatus composed of vapor-generator and steam-superheater combined, as arranged, substantially as set forth.

3. The vapor-generator composed of the cylinders and diaphragms, as set forth.

4. The steam-gage and pressure-regulating valve, in combination with the generator described.

5. The fire-space and steam-space surrounding the generator so as to heat the same, substantially as set forth.

In testimony that we claim the above-described certain new and useful improved apparatus for vaporizing hydrocarbons, we have hereunto signed our names this 10th day of September, 1872.

HENRY H. EAMES.
CHARLES J. EAMES.

Witnesses:
V. C. CLAYTON,
EDM. F. BROWN.