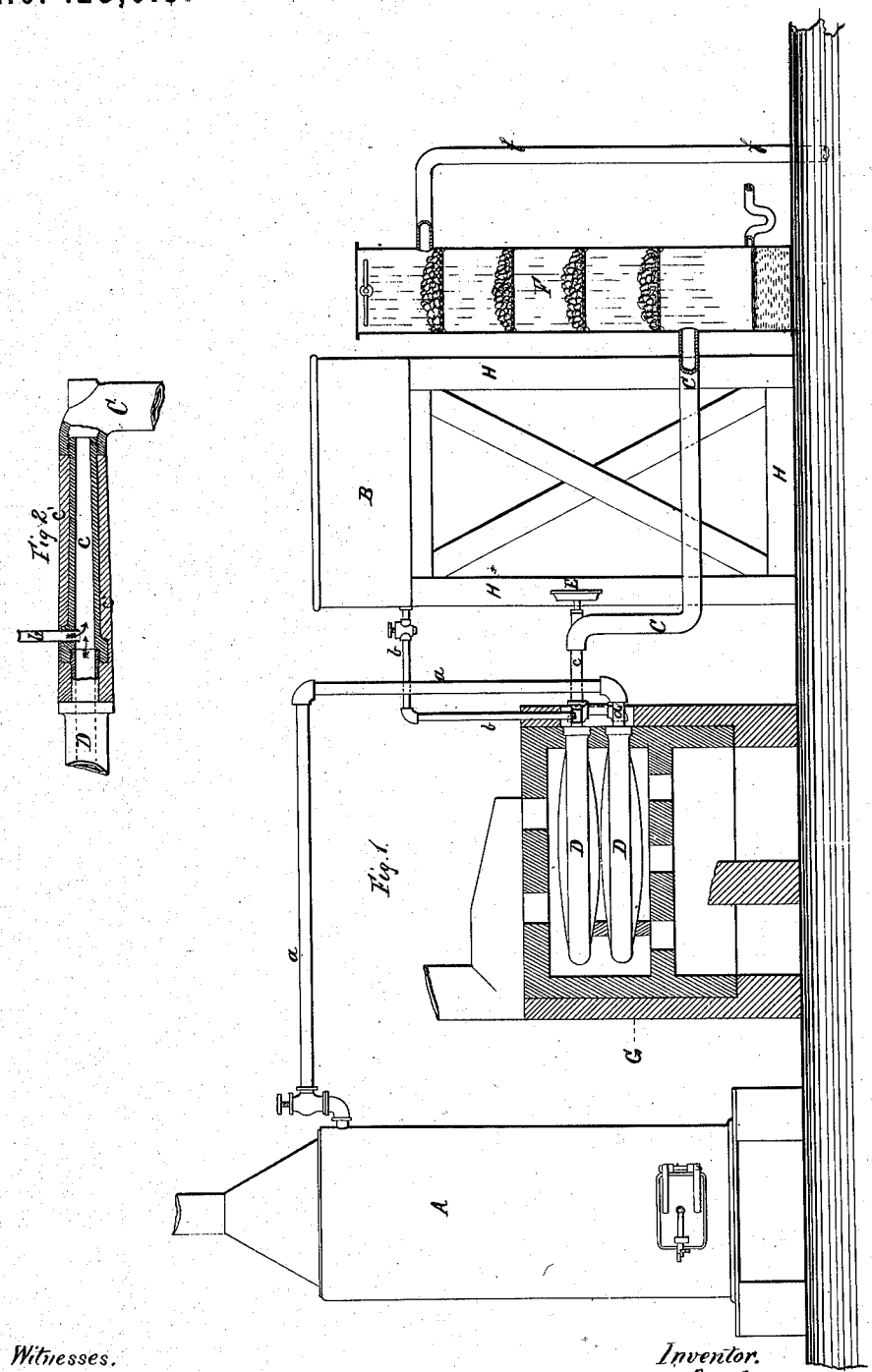
W. H. SPENCER.

Improvement in the Manufacture of Illuminating-Gas.

No. 128,918. Patented July 9, 1872.



Witnesses.

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WILLIAM H. SPENCER, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING GAS.

Specification forming part of Letters Patent No. 128,918, dated July 9, 1872.

To all whom it may concern:

Be it known that I, WILLIAM H. SPENCER, of the city of Brooklyn, Kings county, State of New York, have invented an Improvement in the Manufacture of Illuminating Gas; and the following is declared to be a correct description of the same.

In Letters Patent No. 123,950, granted to me, a mode of making illuminating gas is set forth, in which liquid hydrocarbon is brought into contact with superheated steam for its decomposition.

My present invention relates to a mode of manufacturing illuminating gas by heating the liquid hydrocarbon sufficiently to vaporize the same previous to bringing the superheated steam into contact therewith, so that the chemical affinity between the elements of the hydrocarbon and superheated steam is increased, the hydrogen, oxygen, and carbon being in a nascent state when exposed to the action of the heat from the superheated steam; thereby there will be a more perfect decomposition and recomposition of the elementary substances in the form of illuminating gas, and with less residuum or waste of any kind.

In the drawing, Figure 1 is a general view illustrating the features of the apparatus employed by me by an elevation and partial sections, and Fig. 2 is a section of the mixing and decomposing tube.

The boiler A is of suitable character for furnishing steam, by the pipe *a*, to the superheater D in the furnace G. The gasoline, naphtha, or other liquid hydrocarbon is contained in the vessel B, and runs, by the pipe *b*, in a regulated quantity toward the mixing-tube *c* that is at the end of the superheater D. The pipe *b*, in its passage from B to the tube *c*, is exposed to the heat necessary to vaporize the liquid hydrocarbon without decomposing the same or forming any tarry residuum. Generally there will be sufficient heat in the wall of the furnace G to effect this object, and the drawing shows the pipe *b* introduced in this manner; but it might be laid upon the pipe *c* or pass through the same toward the superheater D, and thereby the liquid will be evaporated by the heat of the escaping illuminating gas. The superheated steam escaping from D and coming directly into contact with the hydrocarbon vapors that pass away from the pipe *b*, there is a decomposition of the steam and hydrocarbon vapors and the production of illuminating gas of a permanent quality.

A pyrometer should be applied at E so as to indicate the heat in the tube C, and indicate whether the heat is too high or too low, as it should be maintained nearly uniform and of a temperature to produce the best results from the liquid hydrocarbon under treatment.

The pipe *c* should be surrounded by non-conducting material, as at C′, Fig. 2.

The pipe C conveys the illuminating gas and any uncombined vapors to the condenser F, which, by preference, is made of perforated trays with a layer of coke, over which water is allowed to run in small streams, and the vapors that are not converted into a permanent gas are condensed, and the liquid hydrocarbon will float on the surface of the water in the bottom of the condenser F, and can be drawn off separately, or a separate vessel may be employed for this purpose. The illuminating-gas is conveyed by a pipe, *f*, to a suitable holder. The tank B is shown as supported upon a frame, H.

I do not claim the mixing of steam in a superheated condition with liquid hydrocarbon or the vapors of the same, and the subsequent exposure to additional heat for the decomposition and recomposition in the form of illuminating gas, for this has been employed; but there is difficulty in regulating the temperature so as to prevent injury to the hydrocarbon vapors, and allow of the condensation of the uncombined vapors of water and liquid hydrocarbon for subsequent treatment of the latter at a higher temperature.

I claim as my invention—

A superheating apparatus for steam, and a

vaporizing apparatus for liquid hydrocarbon, substantially as specified, for bringing into contact with hydrocarbon vapor superheated steam at a temperature sufficient to effect a decomposition and recomposition in the form of an illuminating gas without any subsequent additional heating operation, in combination with a condensing apparatus for removing undecomposed liquid, substantially as set forth.

Signed by me this 20th day of March, A. D. 1872.

WM. H. SPENCER.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.