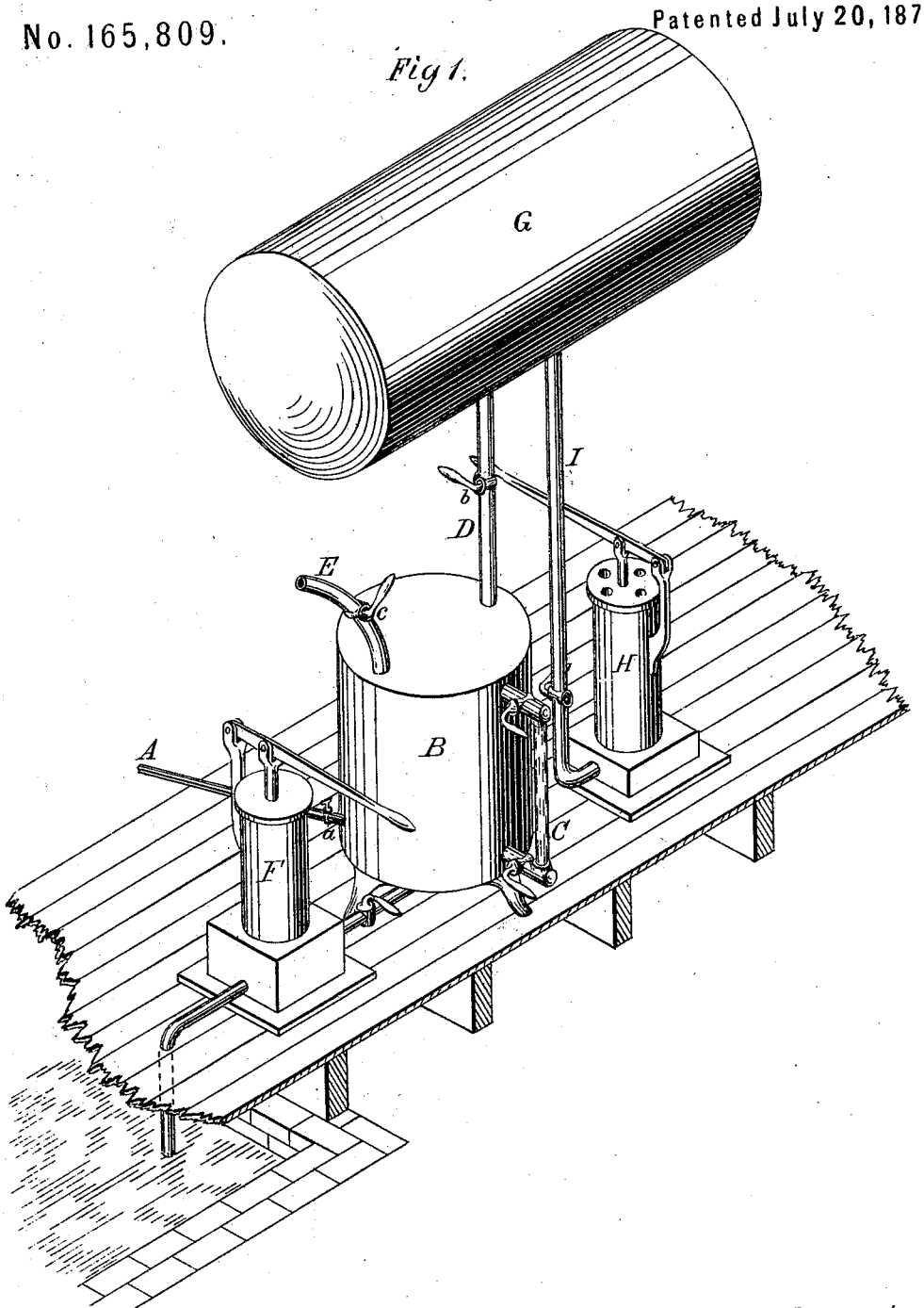
2 Sheets--Sheet 1.

F. H. EICHBAUM.

Apparatus for Supplying Liquid Hydrocarbon to Gas-Making Retorts.

No. 165,809. Patented July 20, 1875.

Fig 1.



Witnesses:
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R. N. Dyer

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2 Sheets--Sheet 2.

F. H. EICHBAUM.

Apparatus for Supplying Liquid Hydrocarbon to Gas-Making Retorts.

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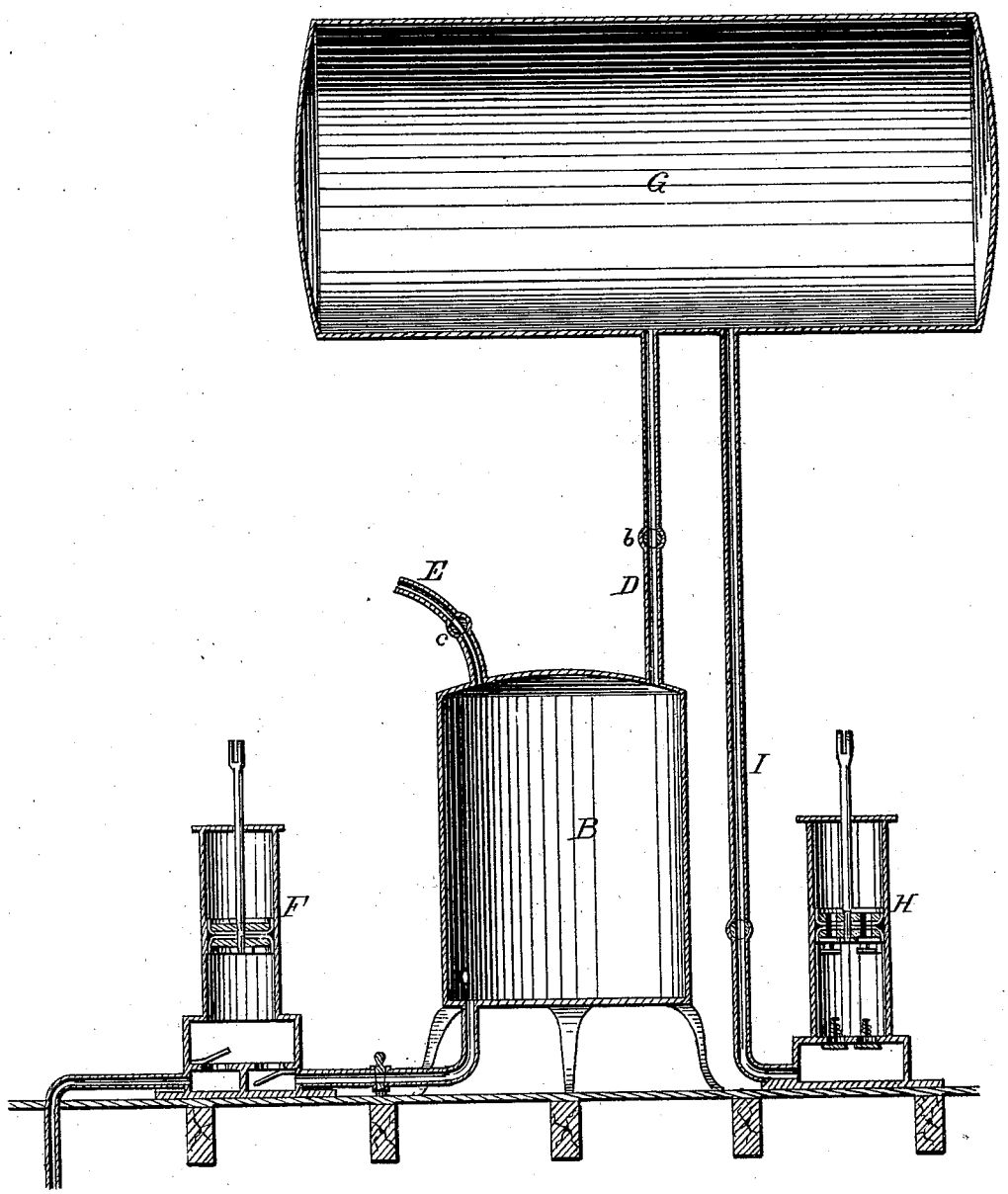
Fig 2.



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UNITED STATES PATENT OFFICE.

FREDERICK H. EICHBAUM, OF DETROIT, MICHIGAN, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO WILLIAM W. HORTON, J. T. SALTER, J. H. SHELDON, AND JAMES AIKEN, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN APPARATUS FOR SUPPLYING LIQUID HYDROCARBON TO GAS-MAKING RETORTS.

Specification forming part of Letters Patent No. **165,809**, dated July 20, 1875; application filed January 13, 1875.

To all whom it may concern:

Be it known that I, FREDERICK H. EICHBAUM, of Detroit, in the county of Wayne and State of Michigan, have invented a new Improvement in Apparatus for Supplying Liquid Hydrocarbons to Retorts for Gas-Making; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The object I have in view is an apparatus which shall be capable of supplying automatically a certain and desirable supply of fluid hydrocarbons to one or more retorts, in which woods or other suitable vegetable products are in course of destructive distillation, for the purpose of enriching illuminating-gas produced by such distillation to the requisite candle-power; and my invention therein consists in the peculiar construction and combination of the principal operative parts, all as more particularly hereinafter described.

In order to enable those skilled in the art to make and use my apparatus, I proceed to describe the same in connection with the drawing, in which—

Figure 1 is an elevation of my apparatus; Fig. 2, a vertical central section of the same.

Similar letters denote corresponding parts in each figure.

I use one or more retorts, constructed in any ordinary way, of proper material, and set and adapted to be heated in any convenient way, furnished with the usual lid or cover, adapted to be luted and to close tightly the mouth of the retort. A pipe, A, enters the upper part of the retort near its front end, and is bent back directly after entering such retort, and extends along its upper inner portion to a point near the back end of the retort, where it terminates; or this pipe may be tapped into the upper part, near the rear end of the retort. This same pipe extends a sufficient distance away from the same, and is carried to the under side of a vessel or reservoir, B. In this pipe there is placed, near the vessel or reservoir B, a valve or cock, *a*, to regulate the flow of the liquid hydrocarbon into the retort, and also wholly cut it off under certain conditions, which will be hereafter named. The vessel or reservoir B is preferably of metal, and strong enough to resist a pressure of fifteen to thirty pounds to the square inch, and is supported in any convenient or safe way. Upon one side of it is an indicator-gage, C, preferably of glass, to denote the height at all times of the fluid contained in said vessel or reservoir. This vessel has tapped into its upper part a suitable air-pipe, D, with a proper cock or valve, *b*, by means of which pressure is made within said vessel or reservoir, as is hereinafter explained, and also a vent-pipe, E, controlled by a proper valve, *c*. There is also connected with it a suitable filling-pump, F, which is used for filling the reservoir or vessel immediately from a barrel, cask, tank, or other vessel containing the fluid hydrocarbon. In many cases it may, however, be found most convenient to fill this vessel B by gravity alone, the hydrocarbon flowing directly from some elevated vessel, tank, or reservoir. A pressure is given to the contents of the vessel or reservoir B in any convenient manner. I prefer to use an air chamber or reservoir, G, connected directly with the vessel B by the pipe D, before mentioned, and preferably, for convenience, placed above it; and the requisite air-pressure may be given within the air chamber or reservoir G by any proper air-pump, H, connected with said reservoir or chamber by a pipe, I; or the same result may be accomplished by a piston within the air-chamber; or I may employ gravity for the purpose, and instead of an air-chamber, as described, may use a reservoir, into which, at a sufficient altitude, a proper quantity of fluid hydrocarbon may be placed, which, by its own gravity, would displace and force out that which was contained in the vessel B. In this case I should connect the vessel B and the pipe A with any of the known fluid-meters.

The mode of operation of my apparatus is as follows: It being understood that the retort to which my apparatus is applicable has been previously charged with a certain quantity by weight of suitable woods or vegetable

substances, which by destructive distillation will not evolve an illuminating-gas of sufficient candle-power for commercial uses, and it being further understood that the process of distillation has proceeded to the point where the gases are freely evolved, it is now desirable to raise the candle-power of this gas by enriching the same by the introduction of fluid hydrocarbons, and this, in order to have the gas produced of a certain definite candle-power, must be introduced in a certain, precise, well-known, and definite quantity. The gas-producing elements of fluid hydrocarbons are capable of exact estimate by weight or measurement. I therefore fill the vessel or reservoir B by means of the pump, or, at least, as full as would be at all times indicated by the gages. I have then a retort filled with wood, from the destructive distillation of which a gas will be evolved of a certain candle-power, which I have estimated. I wish then to introduce from the reservoir or vessel B just so much, and no more, of the fluid hydrocarbons contained in it as will raise the gas produced in the retort to a certain candle-power. This flow I regulate by means of the cock or valve in the pipe, which will permit such a flow as may be desired. This flow of fluid hydrocarbons will be found in practice to be very small to accomplish the result required, and it should not be permitted until the act of distillation of the wood in the retort has become active, and should be cut off before such distillation ceases to be active. By means of the glass gage the flow of hydrocarbons is readily perceived, and it can be regulated by the cock or valve, as before explained.

A requisite pressure upon hydrocarbons in the vessel B is at all times maintained by means of the air stored in the air-chamber described, and the loss of air in this chamber can be made good at any time by means of the air-pump.

The advantages of this apparatus will be so obvious to those skilled in the art that they scarcely require mention. It may be proper to say, however, that the principal advantages consist in the certainty and uniformity of result accomplished thereby in the manufacture of gas.

Having thus described my apparatus, and its manner of use, what I claim as new therein, for which I desire Letters Patent, is—

In an apparatus for supplying hydrocarbons to gas-distilling retorts, the combination of the reservoir B, provided with gage C, the air-chamber G, and a pump to exert an air-pressure in said chamber, all substantially as described.

This specification signed and witnessed this 12th day of January, 1875.

FREDERICK H. EICHBAUM.

Witnesses:
J. H. SHELDON,
CHARLES THURMAN.