(No Model.)

R. DEAN.

APPARATUS FOR DISTILLATION.

No. 290,866. Patented Dec. 25, 1883.

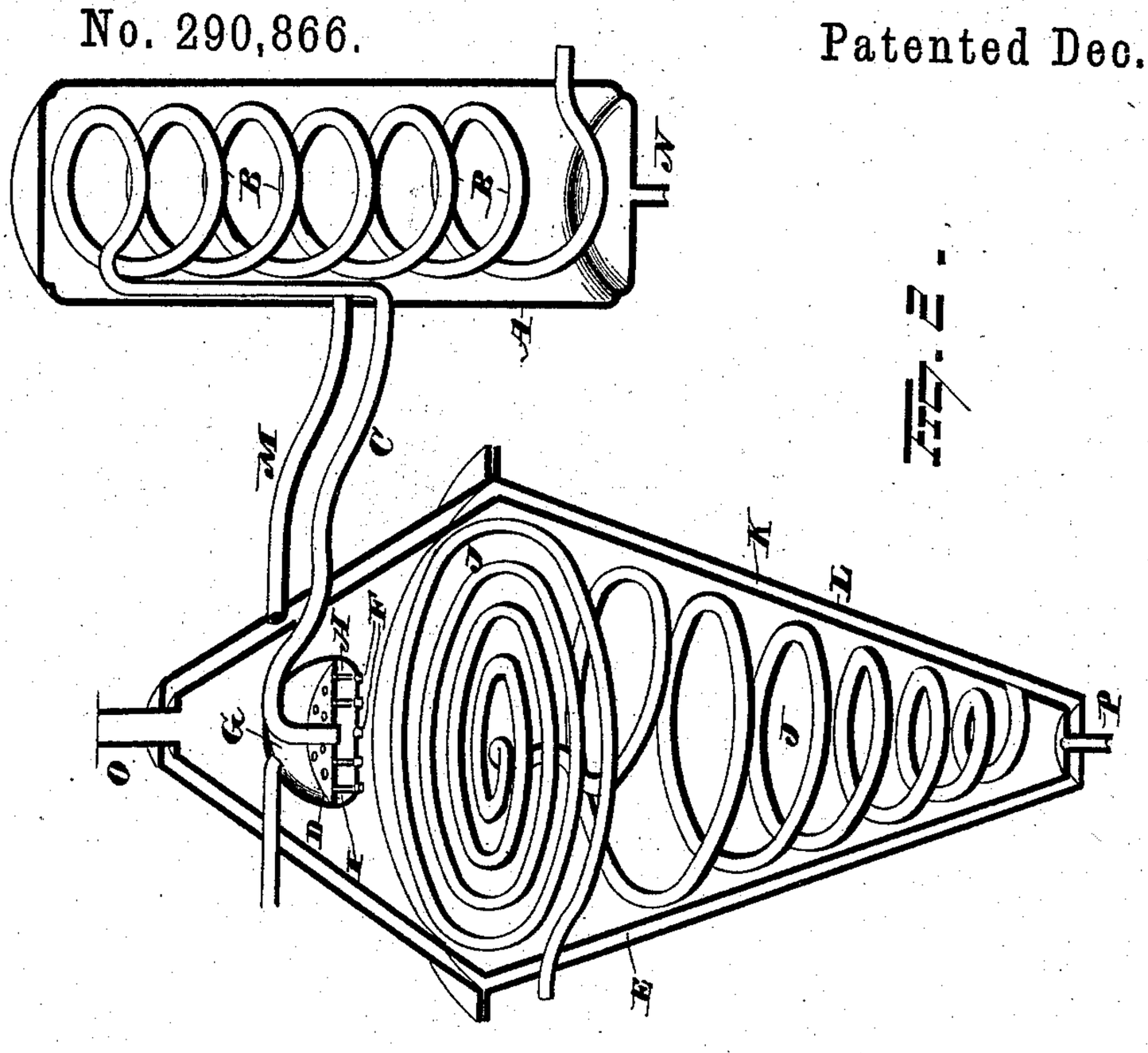

Fig. 2.

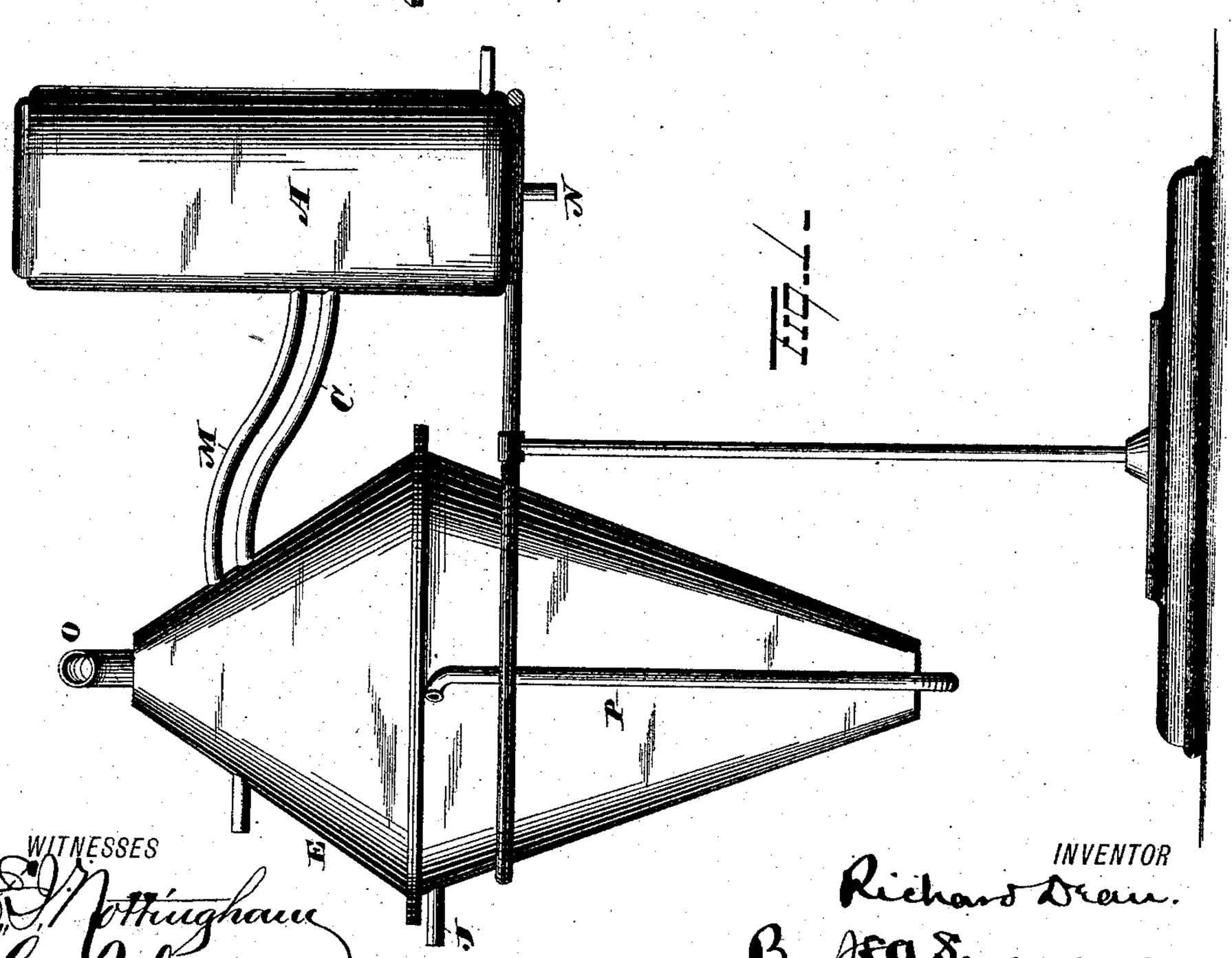

Fig. 1.

WITNESSES

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APPARATUS FOR DISTILLATION.

SPECIFICATION forming part of Letters Patent No. 290,866, dated December 25, 1883.

Application filed September 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, RICHARD DEAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Distillation; 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.

My invention relates to an improvement in an apparatus for distilling, the object being to effect an economical distillation of crude or other materials by the continuous method, and to improve the distillates as well as the residuum in quality.

With these objects in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in elevation of a still embodying my invention, and Fig. 2 is a view thereof in vertical section.

Before being subjected to atomization, the oil is heated in a heater of any suitable construction. As herein shown, this heater consists of a cylinder, A, inclosing a coil, B, through which the oil is passed. After being heated in its passage through the said coil, the oil is conveyed by duct C into an atomizer, D, located in the upper portion of the still E, and having no outlet except through a number of orifices, F, opening downward into the still. A horizontal diaphragm divides the atomizer into a steam-chamber, G, and an oil-chamber, H. Steam, either superheated or raw, is introduced into the said chamber G, while heated oil is brought into the chamber H by the duct C, leading from the heater, as described. Small pipes I, mounted in the diaphragm aforesaid and communicating with the steam-chamber G, extend down into the oil-chamber H and center with and terminate just above the orifices F. In virtue of this construction, the oil will be atomized as it escapes into the still through the orifices F by jets of steam issuing from the pipes I, and also seeking an outlet into the still through the said orifices.

A pyramidal helix, J, having its base uppermost, occupies that portion of the still which is located below the atomizer. Steam is introduced into the base-coil of this helix and issues from the apex-coil thereof into the chamber K, located between the wall of the still and the jacket L inclosing it. After rising through this chamber and heating the still and its contents, the steam is further utilized to heat the heater A, to which it is conveyed by a pipe, M, and from which it is exhausted through the opening N.

The conduit O, located in the upper extremity of the still, collects the vapors of the oil and conducts them away for separation and condensation, while a trap, P, consisting of a pipe rising from the lower end of the still to about the level of the base-coil of the helix J, fulfills the function of removing the residual oil, which may be conducted to a suitable manifold and cooled, or utilized to heat the oil before its introduction into the still, and in this capacity taking the place of or acting in conjunction with steam, which the apparatus herein described employs for that purpose.

Having described the construction of my improved still, I will now proceed to explain the process of distillation as effected by its aid. The material to be distilled is first introduced into the heater, wherein it is raised in temperature to the desired degree, and from which it is introduced into the oil-chamber of the atomizer by the means provided. As soon as the oil begins to flow into the said chamber, steam, superheated or otherwise, is introduced into the steam-chamber above it, and finds an outlet therefrom through the small pipes depending from the diaphragm separating the two chambers. The jets of steam issuing from these pipes operate to atomize the little streams of oil escaping from the oil-chamber into the still from the orifices opening downward thereinto, as described. This atomization of the oil favors vaporization, and a portion of the atomized oil is at once vaporized, the vapor rising to the top of the still and being conveyed away for separation and condensation by the conduit provided for that purpose. Other portions of the atomized oil which are not at once vaporized are subsequently converted by the heat of the still or by contact with the helix, which is continuously heated, as described. Those por-

tions of the oil which are not vaporized at all accumulate in the lower portion of the still and rise to the level of the trap, from which they are continually discharged as a residuum of fine quality. The value of the present process and apparatus for continuous distillation is greatly enhanced by being used in connection with an apparatus for condensation operating upon the principle of separating the different grades of vapors before condensation.

I would have it understood that I do not limit myself to the specific apparatus herein shown, as my invention comprehends any suitable means for carrying out my improved process.

If desired, the jacket of the still may be dispensed with and direct heat applied to assist in the vaporization of the oil.

My improved process and apparatus are especially adapted to operations of reducing petroleum-oils and of raising their fire-test. The process and apparatus may also be used with admirable results in the distillation of alcohol and in the refining of high grades of alcoholic liquors. I would therefore have it understood that I do not limit myself to the exact construction shown, but hold myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a still and a heater for heating the material before it is distilled, of a steam-atomizer located within the still, said atomizer consisting of an oil-chamber having an oil-supply pipe communicating therewith and orifices opening into the still, a steam-chamber provided with steam-induction pipe and with small pipes or tubes extending into the oil-chamber for atomizing the oil, and a steam-coil located below the atomizer, substantially as set forth.

2. The combination, with a still, of a steam-atomizer located therein, and consisting of an oil-chamber provided with an oil-induction pipe and with orifices opening into the still, and of a steam-chamber provided with a steam-induction pipe and with small pipes extending into the oil-chamber, and arranged to atomize the oil as it escapes from the orifices thereof, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

RICHARD DEAN.

Witnesses:
CHAS. T. CARRUTH,
J. C. BLOCK.