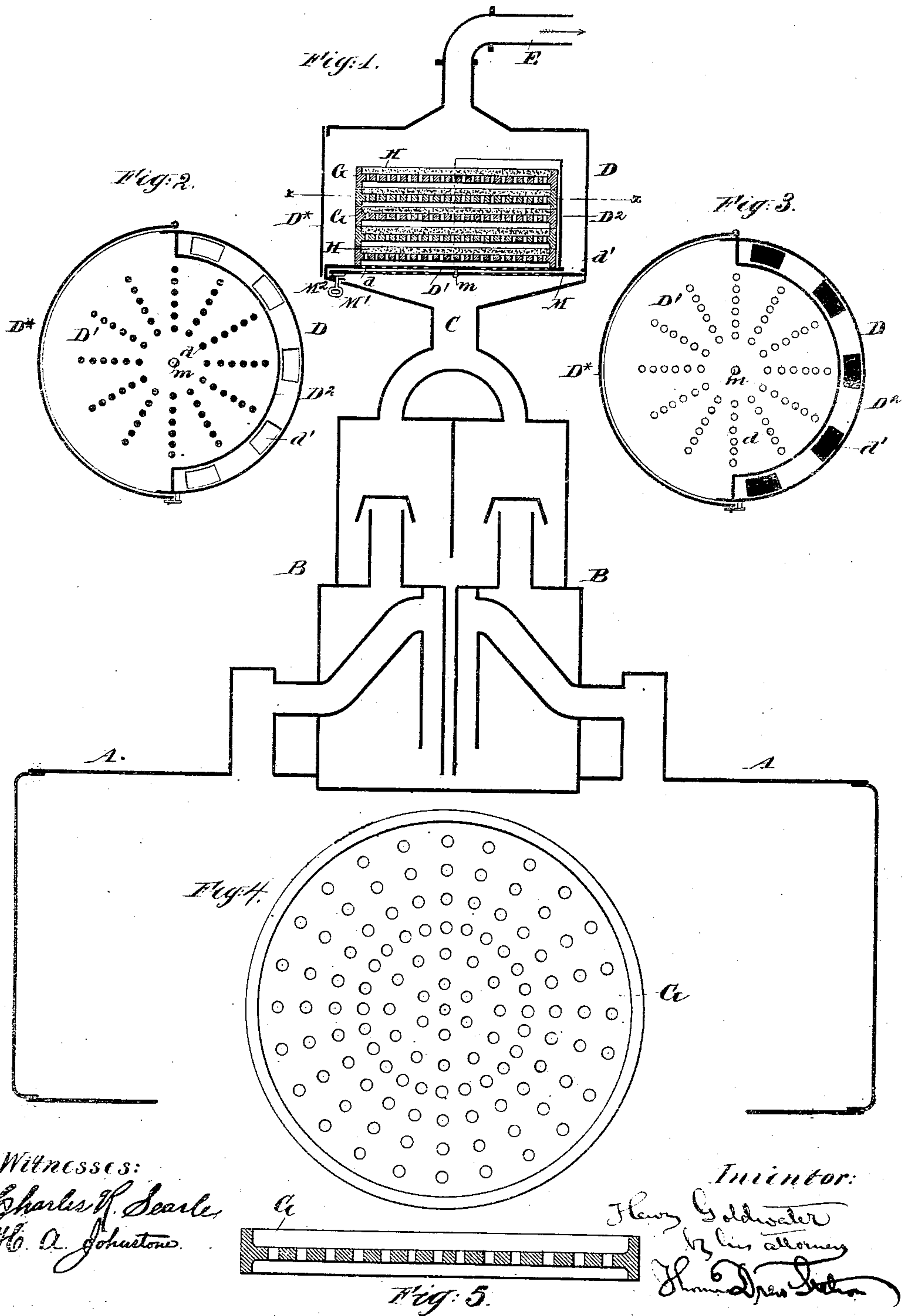


(No Model.)

H. GOLDWATER.
APPARATUS FOR PURIFYING VAPORS.

No. 432,525.

Patented July 22, 1890.



Witnesses:
Charles F. Searle
H. A. Johnston

Inventor:
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UNITED STATES PATENT OFFICE.

HENRY GOLDWATER, OF NEW YORK, N. Y.

APPARATUS FOR PURIFYING VAPORS.

SPECIFICATION forming part of Letters Patent No. 432,525, dated July 22, 1890.

Application filed February 11, 1887. Serial No. 227,341. (No model.)

To all whom it may concern:

Be it known that I, HENRY GOLDWATER, of the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Apparatus for Purifying Vapors, of which the following is a specification.

My invention is intended more particularly for refining petroleum; but it may be used with advantage in the treatment of other material in a vaporous condition or for the purifying of permanent gases.

I provide a tight chamber with a perforated base and with a provision for leading the vapor or gas in at the bottom and taking it away at the top. One side of the chamber opens after the manner of a door and affords free access to the interior, in which I place a series of removable pans, each perforated and containing a layer of charcoal or other purifying material.

In what I esteem the best means of carrying out the invention the chamber is cylindrical and the pans circular, but of less diameter. A series of large apertures are arranged in the annular space between, extending about half-way around on the side opposite the door. A semi-cylindrical partition extends up between this annular space and the central space. In thrusting in the pans this partition serves as a gage to indicate when they are correctly placed. This semicircular partition is also useful to some extent in defending the back edges of the pans against the absorption of the vapors which rise up in the annular space.

The accompanying drawings form a part of this specification.

Figure 1 is a central vertical section showing the novel portions, with so much of the other parts as is necessary to understand their relation thereto. This figure shows the pans in place. Fig. 2 is a horizontal section on the line xx in Fig. 1 with the pans removed. The turning plate has been adjusted to compel the vapors to ascend through the pans. Fig. 3 is a corresponding horizontal section, but with the turning plate shifted to let the vapors go idly past. Figs. 4 and 5 are on a larger scale. Fig. 4 is a plan view, and Fig. 5 is a central vertical section, of one of the pans.

Similar letters of reference indicate corre-

sponding parts in all the figures where they occur.

A is a retort, and B is a series of separating devices adapted to arrest the dense liquid and return it to the retort, allowing only the dry vapor to pass through the neck C into the base of a cylindrical chamber D. To the top of this chamber is connected a pipe E, leading to a condenser or series of condensers. (Not shown.)

D' is a perforated false bottom of the chamber D. There are two sets of perforations. One set near the center are marked d . Another set near the periphery are larger and are marked d' . D² is a partition extending half-way around on the interior and joined tightly to the casing or exterior of D at its ends.

Under the perforated plate or false bottom D' is a partially-revolving plate M, turning on a central pivot m , having perforations adapted to register with those in the false bottom, and provided with a handle M', which moves in a slot in the true base of the chamber, the slot being covered by a plate M², which slides with it as the plate M is partially revolved one way or the other by the handle M'.

I employ circular pans G, adapted to match tightly by their rims one upon another and to be introduced and removed through the side of the chamber D on opening the door D*. These pans are made of carbon—one-third ($\frac{1}{3}$) coke, one-third ($\frac{1}{3}$) wood-charcoal, and one-third ($\frac{1}{3}$) cannel-coal. These three materials pulverized and intimately mixed are molded into shape under moderate pressure. I have in my experiments burned or baked the pans in the molds. I believe it is practicable to do so on a large scale; but this may be varied. The pans are liberally perforated with small holes. These small holes may be made in the molding or by drilling or otherwise afterward. The top and bottom faces of the rims of the pans should be ground or otherwise finished very truly, so that the pans on being rested upon each other will make tolerably tight joints.

H is a layer of finely-broken charcoal or other purifying material laid on the several pans. When the door D* is open, the pans may be removed and new ones introduced, either singly or in a mass, and the door closed and secured.

The pans G, by being made of the material and in the manner specified, serve themselves very efficiently to purify the vapors or gases. The loose material H lying thereon can be replaced by other material at short intervals. The pans themselves are absorbent and become gradually saturated, and after a certain amount of use lose their influence as purifying agents; but they can continue to be used as pans until they become fractured or otherwise defective. I believe it practicable to re-burn the pans from time to time, and thus restore their purifying properties.

When a charge of petroleum or other material having constituents of different degrees of volatility is moderately heated in the retort A, the most volatile parts are vaporized first. It is important that these extremely volatile naphthas, or whatever they may be called, shall not be passed through the charcoal. Their contact with the charcoal and their saturation thereof injuriously affect the subsequent action by causing the charcoal to give out small quantities of the volatile matter, which, mingling with the less volatile parts afterward treated, induces mischief. In commencing the treatment therefor the perforated plate M is turned into the position to close the passages *d* and open the liberal passages *d'*, as shown in Fig. 3. Thus conditioned the light vapors pass up through the liberal passage *d'* and through the semi-annular space between the interior of the casing D and the semi-cylindrical partition D². They are shielded by the partition D² from contact with the edges of the pans. They are not absorbed by the pans or the stratum of purifying material lying thereon, but pass away to the condenser unaffected. When the proper period arrives, the attendant shifts the plate M so as to close the apertures *d'* and open the apertures *d*. This condition is shown in Fig. 2. Now the vapors cannot pass up outside, but are compelled to rise through the perforations in the

several pans and through the interstices in the purifying material H lying thereon. The purifying is effected in the well-known manner.

In operating in a large way I propose to pass the vapors through several chambers D, all provided with the pans and appurtenances, substantially as described, the contents of the first chamber being already partially saturated and the last one being fresh. This economical mode of utilizing the purifying effect of a given amount of material is familiar in many branches of the art and need not be further described.

Other modifications may be made without departing from the principle or sacrificing the advantages of the invention.

I can use perforated pans of sheet metal in place of the carbon pans G.

The apparatus may be used with some advantage in treating permanent gases.

I am aware that many efforts have been made to filter vapors through charcoal and analogous purifying agents. Such, broadly, I do not claim; but,

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

In an apparatus for purifying vapors, a retort and suitable passages, in combination with the casing D and a series of removable pans G, arranged so that a portion of an annular passage is provided between such series and the casing, and with the perforated floor D' and movable perforated plate M, arranged for joint operation as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, this 7th day of February, 1887, in the presence of two subscribing witnesses.

HENRY GOLDWATER.

Witnesses:

H. A. JOHNSTONE,
M. F. BOYLE.