No. 700,374. Patented May 20, 1902.

J. S. ROAKE.

DISTILLING APPARATUS.

(Application filed June 21, 1901.)

(No Model.)

Fig. 1.

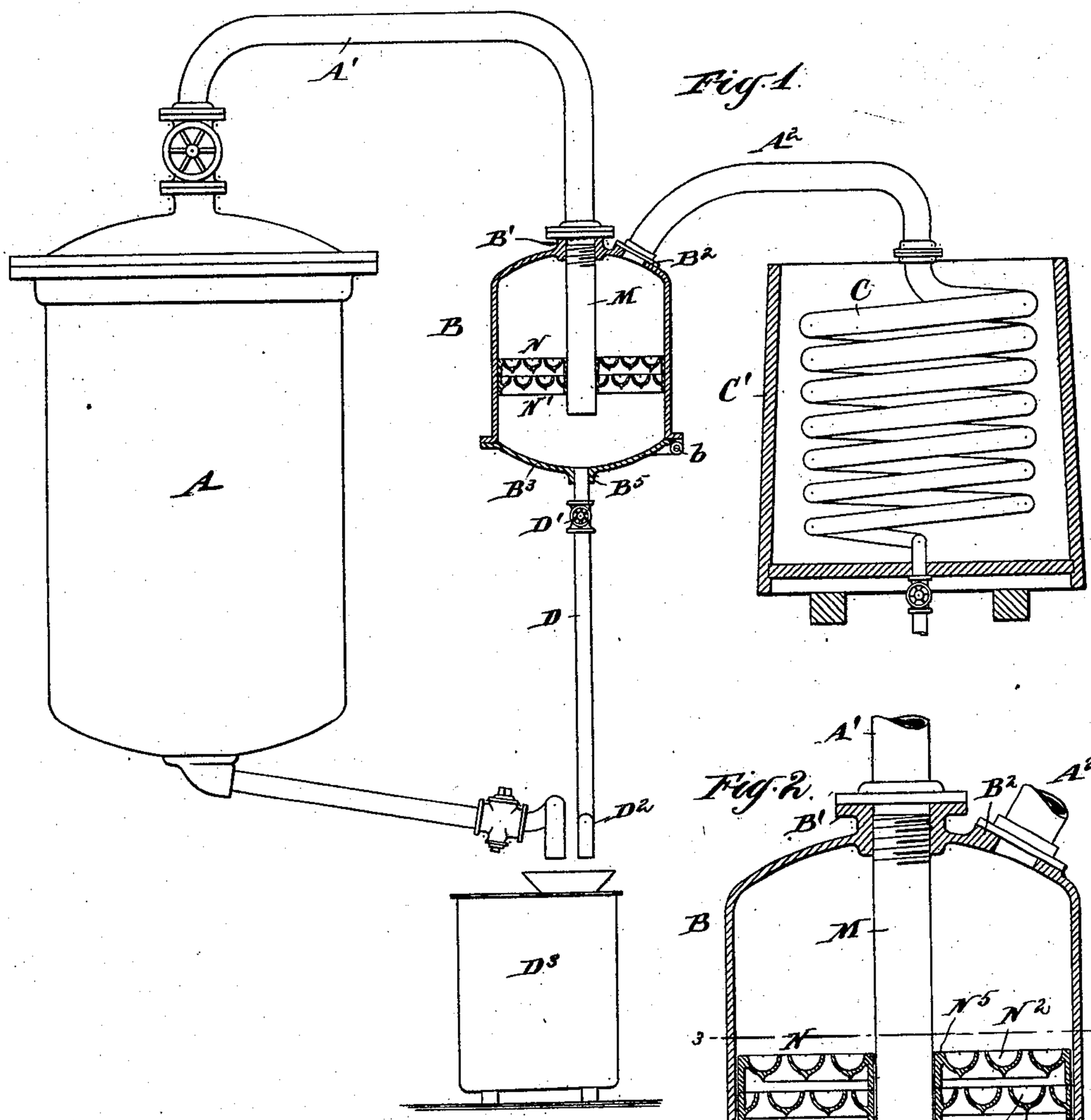
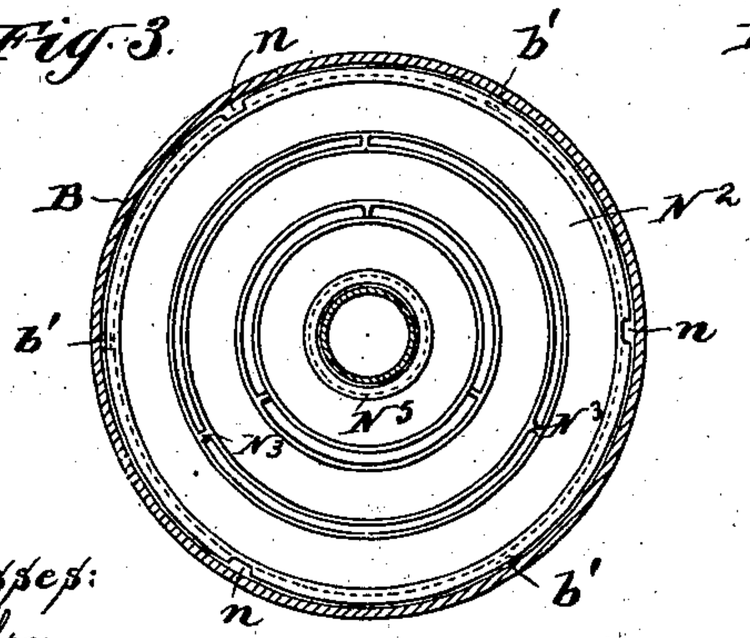


Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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DISTILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 700,374, dated May 20, 1902.

Application filed June 21, 1901. Serial No. 65,399. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. ROAKE, a citizen of the United States, residing in the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Distilling Apparatus, of which the following is a specification.

The invention relates to means for separating certain heavy portions and impurities carried over in the vapor from the retort and removing them before liquefaction in the condenser.

The invention is intended more particularly for service in the distillation of wood in obtaining turpentine, pyroligneous acid, and other products.

The novel features will be specifically defined by the appended claims.

The accompanying drawings form a part of this specification and show the invention as I have carried it out.

Figure 1 is a side elevation, partly in vertical section, showing the separating-chamber and so much of the other portions of the distilling apparatus as is necessary to a clear understanding of the invention. The remaining figures are on a larger scale and show the chamber alone. Fig. 2 is a vertical section corresponding to Fig. 1, and Fig. 3 is a transverse section taken on the line 3 3 in the preceding figure.

Similar letters of reference indicate the same parts in all the figures.

A is a retort, which may be of any ordinary or approved construction, provided with means for supplying heat to its contents and with other usual equipments, and A′ is the vapor-pipe leading therefrom to the separating-chamber B, to be described.

A^2 is practically a continuation of the vapor-pipe from the chamber B to the worm C, inclosed in a tank C′ and provided with means (not shown) for cooling the vapor and inducing condensation, as usual.

The chamber B is preferably cylindrical, with its axis vertical, having the top domed, as shown, and provided with the flanged central boss B′, to which is secured the vapor-pipe A, and the angularly-faced boss B^2, receiving the exit vapor-pipe A^2. The bottom B^3 of the chamber is concave and is hinged at *b*, so that it may be swung downward to expose the whole open area of the chamber, and B^4 is a fastening means by which the bottom may be secured in the closed position. A boss B^5 at the center of the bottom receives a pipe D at the lowest point, provided with a valve D′ and trap D^2, leading to a receptacle D^3.

M is a pipe secured on the inner face of the top of the chamber and extending axially downward nearly to the bottom B^3 and is in effect an extension of the pipe A′, serving to deliver the vapor received through the latter at a low level in the chamber.

N N′ are two gratings or trays, each comprising a series of annular troughs N^2, of semicircular section, joined at intervals by the connecting-ribs N^3 and having a downwardly-projecting annular fin N^4, forming the termination of the under face of each trough. The open-work trays are supported on lugs *b′ b′* on the interior of the chamber matching to corresponding notches *n n* in the peripheries of the trays, allowing them to be easily introduced from below when the bottom B^2 is swung open. The troughs are so arranged that when in place in the chamber the fins N^4 on the uppermost tray N will lie immediately above the annular openings between the troughs on the lowermost N′, so that liquid dripping from the fins may fall unobstructedly to the bottom of the chamber. Each tray has a central guide-ring N^5 encircling the pipe M and serving to maintain the trays in the desired position.

Vapor produced in the retort A flows through the pipe A′ and is projected downwardly in the chamber through the pipe M. Any heavy matter entrained or held in suspension mechanically in the vapor will be thrown by its momentum upon the bottom B^3, to which it will adhere and if sufficiently fluid will gather and flow downward through the pipe D to the receptacle D^3. The vapor rises in the chamber, as indicated by the arrows; but as the diameter of the chamber is considerably greater than that of the pipes A′, A^2, and M the ascent is proportionately slower, and op-

portunity is thus afforded for any remaining heavy matter in the vapor to separate by gravity and accumulate in the lower portion of the chamber, whence it flows to the receptacle D^5, or the heavy particles may adhere in the form of liquid upon the surfaces of the trays N N′ and drop from the annular fins N^4 to the bottom and flow away. The lighter portions of the vapor pass out of the chamber through the pipe A^2 and flow to the worm C and are condensed, as usual.

The delivery of vapor from the retort to the worm is not retarded nor interrupted; but by reason of the great difference in cross-sectional area between the vapor-pipe and chamber the flow through the latter is much slower and the entrained heavy matter is given time to separate and descend.

The material supplied to the trays N N′ may be varied to suit requirements. Lime supplied in certain portions of the process of wood distillation will serve usefully in combining with pyroligneous acid and aiding in its removal. The lime thus combined may on its removal from the trays be treated to produce acetate of lime.

Modifications may be made in the forms and proportions without departing from the invention and parts may be used without the whole. The trays N N′ may be differently formed and a greater or less number than here shown may be employed.

The relative sizes of the vapor-pipe and chamber should be such as to produce the required slow movement of the vapor through the chamber and allow the heavy matter to separate and will be determined by the materials treated and the conditions of the distilling process.

Although I have described the invention as applied to the distillation of wood, it will be understood that it will serve successfully in other distilling operations.

I claim—

1. In a distilling apparatus, a vapor-pipe leading from the retort to the worm, combined with a chamber of greater cross-sectional area than said pipe interposed in the same between the retort and worm, and a series of open-work trays in said chamber said trays having alternately-arranged fins, as and for the purpose specified.

2. In a distilling apparatus, a retort, a vapor-pipe therefrom, a chamber of greater cross-sectional area than said pipe and to which said pipe leads, a downward extension of said pipe within said chamber, a vapor-pipe of less cross-sectional area than said chamber leading from the upper portion of the latter to the worm, and a plurality of receptacles within the chamber above the lower end of the extension and having alternately-arranged fins, all combined and arranged to serve substantially as described.

3. In a distilling apparatus, a retort, a vapor-pipe therefrom, a chamber of greater cross-sectional area than said pipe and to which said pipe leads, a downward extension of said pipe within said chamber, one or more open-work trays inclosed in said chamber with their annular troughs alternately arranged and adapted to support and present a combining agent to the vapor in said chamber, and a vapor-pipe of less cross-sectional area than said chamber leading from the upper portion of the latter to the worm, all combined and arranged to serve substantially as herein specified.

4. The retort A, vapor-pipe A′ and chamber B, the extension M within said chamber, the open-work trays N N′ inclosed in the latter one above the other, each comprising a series of annular troughs N^2 having the annular fins N^4, the fins on the uppermost tray coinciding with the annular spaces between adjacent troughs on the lowermost, the vapor-pipe A^2 leading from the upper portion of said chamber to a worm, the hinged bottom B^3 for said chamber, and a pipe D leading therefrom, all combined substantially as and for the purposes herein specified.

5. A retort, a chamber, a vapor-pipe connecting the two and having an extension within said chamber, open-work trays inclosed in said chamber one above the other, each comprising a series of annular troughs having annular fins, the fins on the one corresponding with the annular spaces between adjacent trays on the next adjacent, a vapor-pipe leading from the upper portion of the chamber to a worm, and an outlet from the bottom of said chamber, all substantially as described.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

JOHN S. ROAKE.

Witnesses:
ROBT. CONNOR,
CHARLES R. SEARLE.