

No. 834,875.

PATENTED OCT. 30, 1906.

J. T. DENNY.  
METHOD OF DISTILLING TURPENTINE.

APPLICATION FILED MAR. 30, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

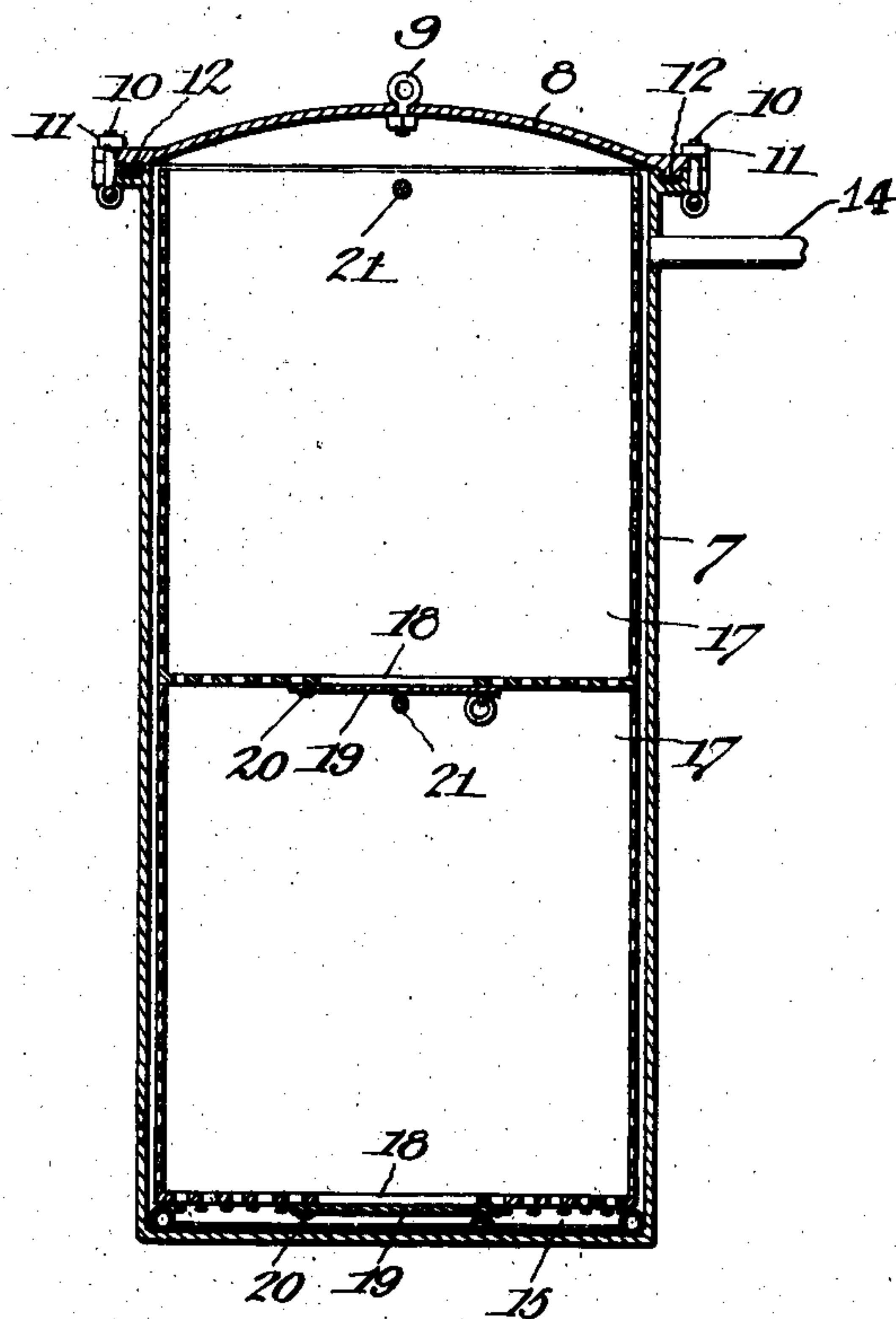
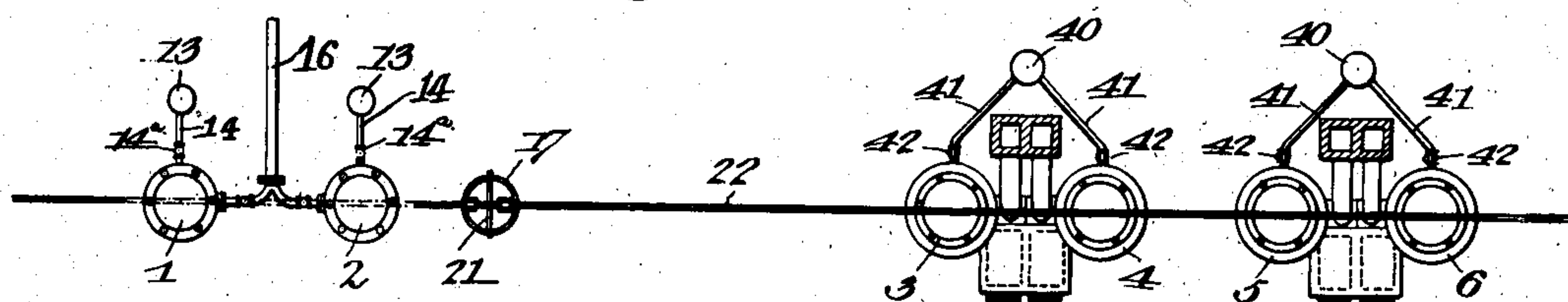


Fig. 2.

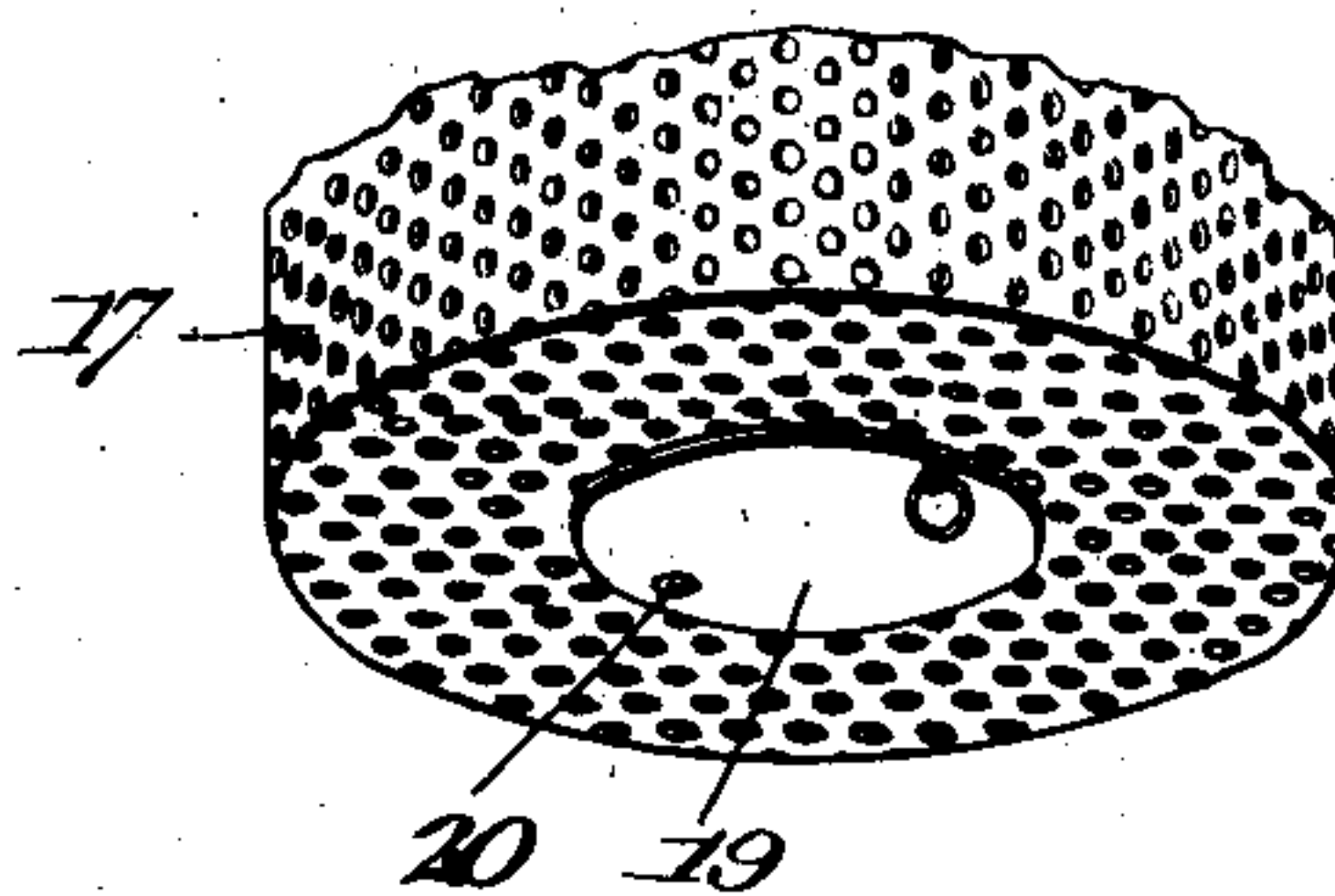


Fig. 3.

Witnesses:

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*R. M. Elliott*

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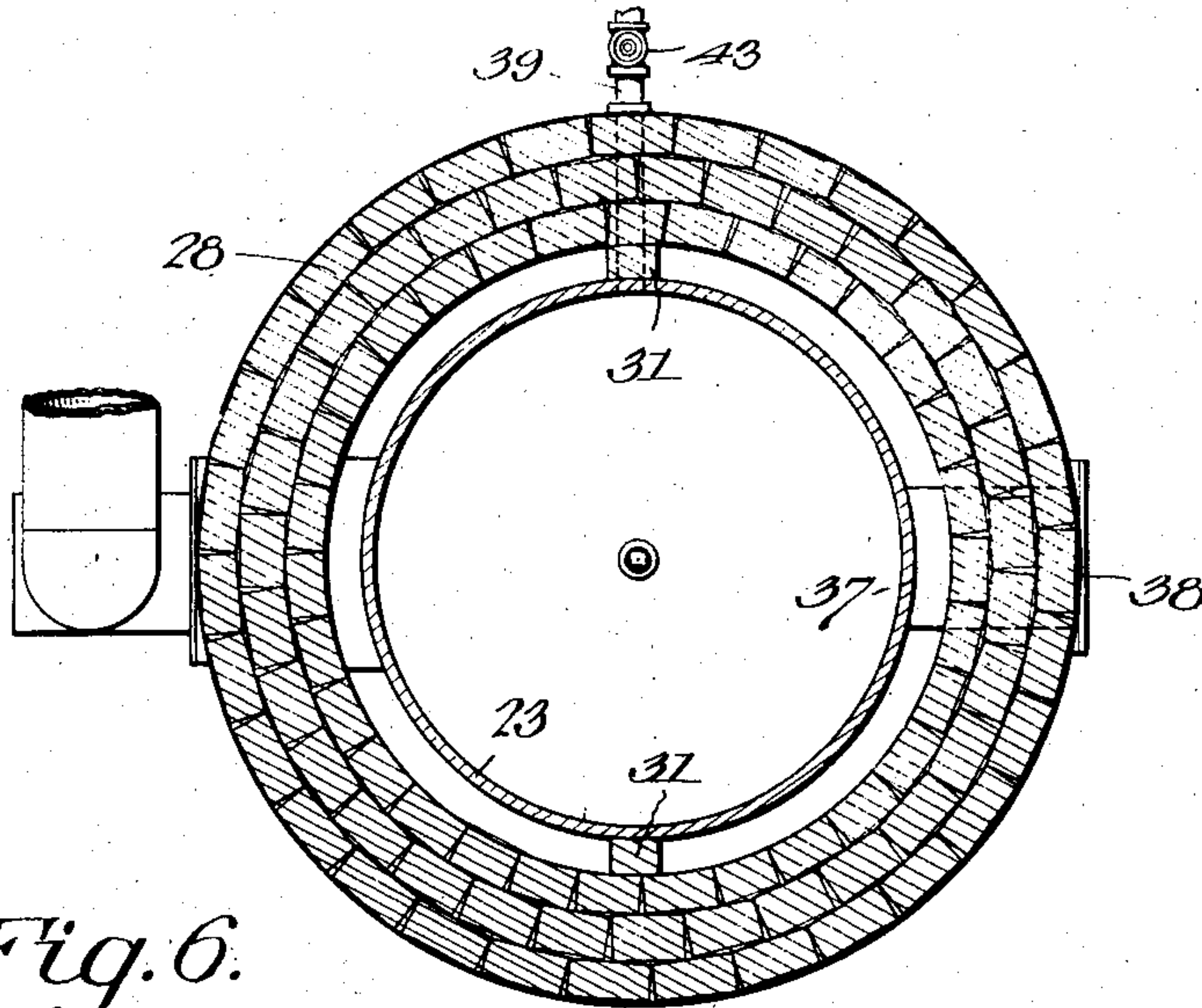
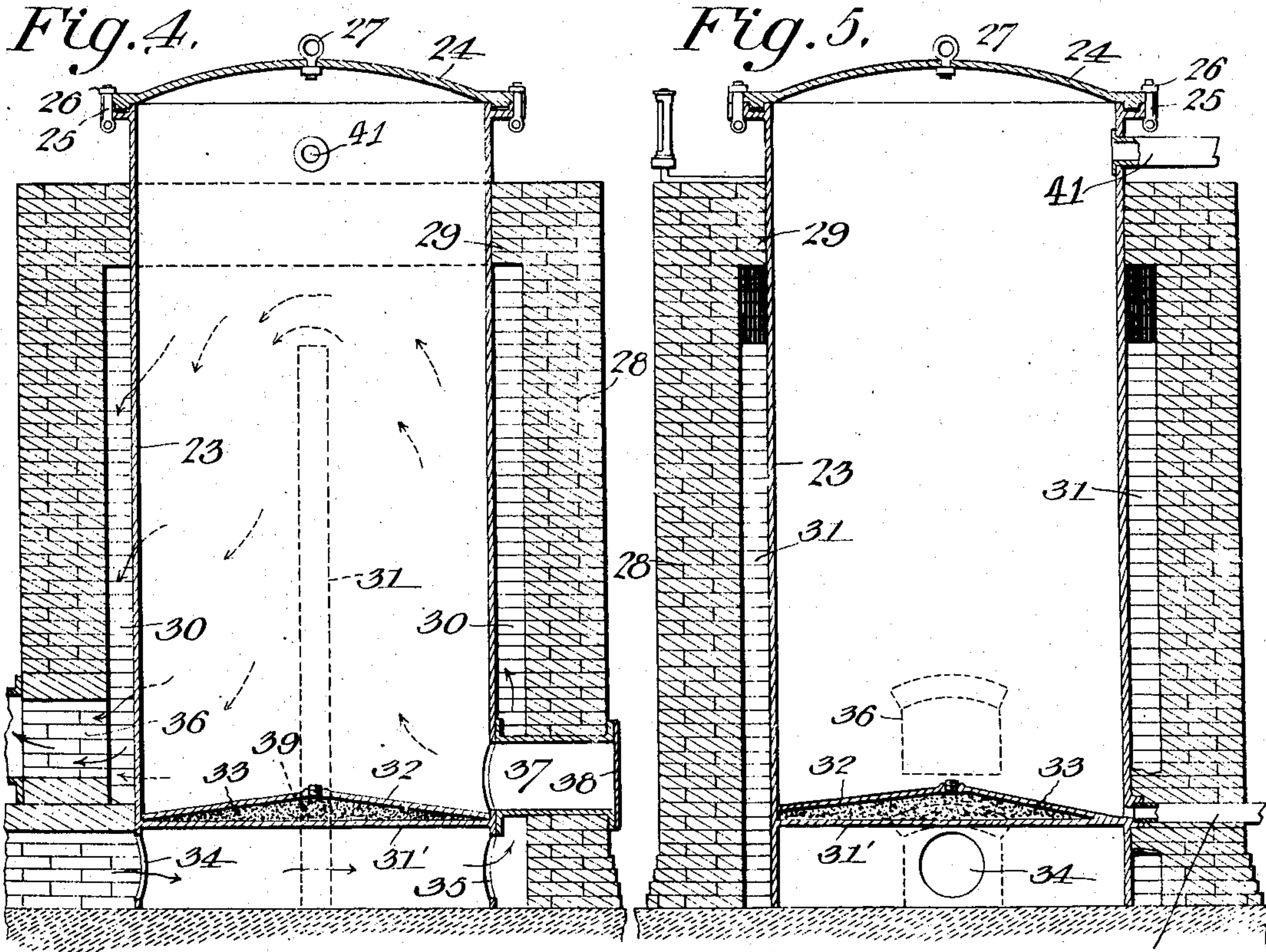


Fig. 6.

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Witnesses:

*E. J. Stewart*  
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# UNITED STATES PATENT OFFICE.

JOHN T. DENNY, OF CROMARTIE, NORTH CAROLINA.

## METHOD OF DISTILLING TURPENTINE.

No. 834,875.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed March 30, 1904. Serial No. 200,795.

*To all whom it may concern:*

Be it known that I, JOHN T. DENNY, a citizen of the United States, residing at Cromartie, in the county of Robeson and State of North Carolina, have invented a new and useful Method of Distilling Turpentine, of which the following is a specification.

This invention relates to a method of distilling turpentine.

The object of the invention is a ready, simple, and thoroughly practical manner to conserve the first distillate intact and pure; positively to prevent fouling or contamination of the retort; to conserve the heavier or second distillate together with the creosote, pyroligneous acid, and other volatile by-products; to trap the tarry products, and to convert the wood into charcoal of high grade.

The different objects are obtained in the following manner: The wood having been reduced to proper size is placed in holders having open-work sides and bottom, and these are placed in a retort and subjected to the action of steam heat. Combined with each retort is a condenser, and as the lighter turpentine or first distillate is freed from the wood it passes to the condenser and is thus conserved in pure and colorless condition. When the wood has been steamed for the proper length of time, which can be determined by the character of the wood and by experience as to the degree of heat necessary, the steam is shut off and the retort is opened, and the holders are then moved to a second dry-heated retort, into which their contents are dumped bodily, and this retort is then sealed. In the second retort the wood is subjected to the action of dry heat which is of an intensity to cause slow distillation of the remaining turpentine within the wood, together with the creosote pyroligneous acid and volatile by-products, these being passed to a condenser combined with the retort. The tarry and carbonaceous substances settle to the bottom of the retort and are removed in any preferred manner, as by an escape-pipe. After all the by-products have been eliminated the heat is then continued until the mass of wood becomes charred and presents a charcoal of high grade, and this is then removed from the retort through a manhole provided at its bottom for the purpose.

In order that the application of the heat to the second or dry-heated retort shall be thoroughly effective to heat all portions thereof, so that the wood will be thoroughly subject-

ed to the action of the heat, the retort is set in a casing of masonry closed at its top and spaced from the retort a sufficient distance to present ducts or passage-ways for the heat, there being baffle-plates disposed at appropriate points between the retorts and the masonry to cause the heat to be deflected, and thus secure its proper application to the retort.

As before stated, the first distillation is only carried up to the point where the highest grade of turpentine is freed, so that there will be no precipitation of tar or the like upon the holder, thereby causing the latter to remain clean and free from contamination.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is a view in plan, exhibiting diagrammatically a plant capable of carrying the method into effect. Fig. 2 is a sectional detail view of one of the steam-retorts, exhibiting the holders positioned therein. Fig. 3 is a perspective detail view of one of the holders. Fig. 4 is a sectional detail view of one of the dry-heated retorts. Fig. 5 is a sectional detail view of the retort shown in Fig. 4, taken on a plane at right angles thereto. Fig. 6 is a horizontal sectional view of one of the dry-heated retorts.

Owing to the fact that the first distillation can be effected in about one-half the time of the second distillation, a plant will have twice as many dry-heated retorts as steam-heated retorts, and in this instance there are shown two steam-retorts and four dry-heated retorts.

Referring to the drawings, 1 and 2 designate the two steam-heated retorts, and 3, 4, 5, and 6 the dry-heated retorts.

Each steam-retort comprises a shell 7, of heavy boiler-iron, and is provided with a removable cover 8, having a ring-bolt 9 to present a means by which the cover can be lifted by any suitable overhead tackle. (Not shown.) The cover is held combined with the shell in this instance by a plurality of hinged bolts 10, carrying nuts 11, adapted to be clamped upon the margin of the cover, a suitable packing 12, interposed between the cover and the shell, serving to present a steam-tight juncture at this point. Combined with each retort is a condenser 13 of the usual or any preferred construction, the pipe 14 between the condenser and the retort being provided with a valve 14<sup>a</sup>, by which to close communication



between the parts when desired. Arranged upon the bottom of each retort is a coil of pipe 15, which communicates with a steam-supply pipe 16 in the usual manner. The shell is of a size in this instance to contain two holders 17, each holder being made of heavy boiler-iron provided with perforations to present an open-work structure and having the center of its bottom formed with an opening 18, covered by a door 19, which is pivoted at 20 to the holder and moves in a plane parallel with the bottom thereof. The upper portion of the holder has combined with it one or more cross-bars 21, which present a means by which the holders may be lifted from the retort by any suitable overhead tackle. To transfer the holders with their charge from the steam-retorts to the dry-heated retorts, there is an overhead track 22 provided, upon which will run a suitable trolley or trolleys for supporting the holders.

Each of the dry-heated retorts is a duplicate of the other, so that a description of one will serve for both. The retort comprises a heavy iron shell 23, closed at its top by a cover 24, which is held associated with the shell by pivoted bolts 25, carrying nuts 26, the cover being provided with a ring-bolt 27, by which it may be lifted. The shell is inclosed by a casing 28 of masonry, but at its upper portion 29 is built against the shell, thus to prevent escape of heat at this point. The masonry is spaced from the shell to present a circular heating-conduit 30, and on the opposite sides of the shell, and preferably in alignment, is arranged a baffle-plate 31, which terminates short of the top of the casing and serves in the usual manner to deflect the currents of heated air, thus to cause them to travel and be carried around and impinge on the entire exposed surface of the shell. The bottom of the shell is double, the under one, 31', being flat and the upper one, 32, cone-shaped, and between these two bottoms is interposed a packing of sand 33, which will serve to lag the bottom and shield the stock from excessive heat. The shell extends below the double bottom and is provided with an intake-opening 34 and an outtake-opening 35, the heated products passing under the bottom 31, thence around the shell and over the baffles, and escaping through an arch 36. The lower portion of the shell in alignment with the bottom 32 is provided with a manhole 37, closed by a cover 38, and is further provided with a valved pipe 39, through

which the tar and other heavy by-products are removed. In rear of each pair of retorts is a condenser 40, which is connected with the retorts by pipes 41, carrying valves 42 for controlling the passage of vapors between the parts.

The operation of the apparatus is as follows: The wood being cut into pieces of the proper size is supplied to the holders, and these are then placed within the retorts 1 and 2 and the covers thereof are secured in position. Steam is then admitted to the retorts, and when the wood has been subjected to treatment for the time requisite to effect complete separation of the first distillate or pure turpentine the steam is cut off and the holders are removed and conveyed to the retorts 3, 4, 5, and 6, where their contents are discharged by opening the doors 19, and the wood is subjected to a dry heat in the manner described. The heavier or residual turpentine, together with a certain percentage of creosote and pyroligneous acid, is distilled and passes to the condensers 40. When all of the volatile portions of the stock have been distilled, communication between the retort and the condensers is cut off through the medium of the valves 42, and the heat is then continued until the wood has been burned to charcoal. During this latter step the tar and heavy carbonaceous matter is freed from the wood and settles to the bottom of the retorts, whence it is withdrawn through the pipes 39, each of which carries a valve 43 for keeping the pipes normally closed. When the complete coking of the wood is effected, it is removed from the manholes 37.

I claim—

The herein-described method of distilling wood, and of recovering valuable products therefrom, which consists in placing the wood in a holder, inclosing the holder in a still and subjecting the contents to non-destructive distillation to recover the spirits of turpentine in pure condition, thence removing the holder with the contained wood and charging the wood bodily from the holder into a retort and subjecting it to destructive distillation in the ordinary manner.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN T. DENNY.

Witnesses:

EMORY H. BOGLEY,  
C. E. DOYLE.