No. 753,376. PATENTED MAR. 1, 1904.

W. C. DOUGLAS.

APPARATUS FOR DISTILLING WOOD.

APPLICATION FILED SEPT. 1, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

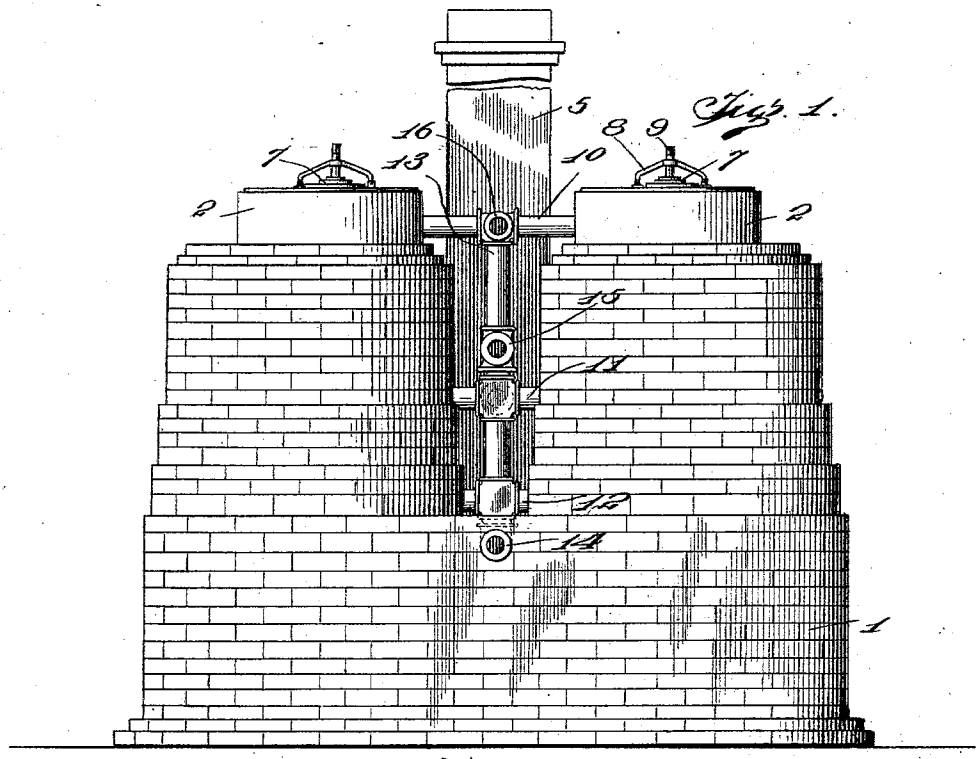
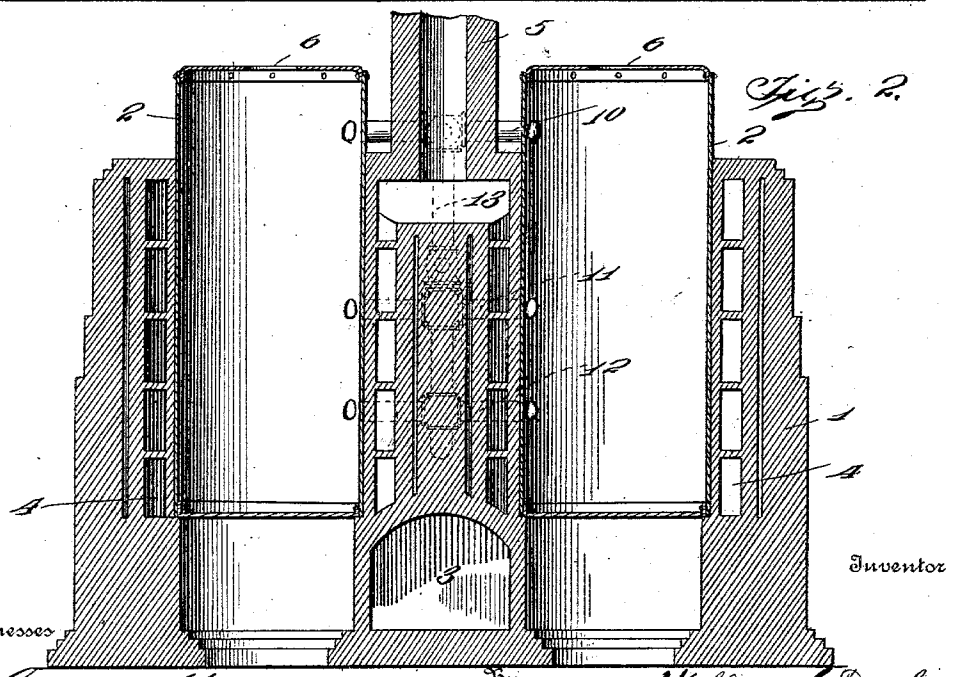


Fig. 2.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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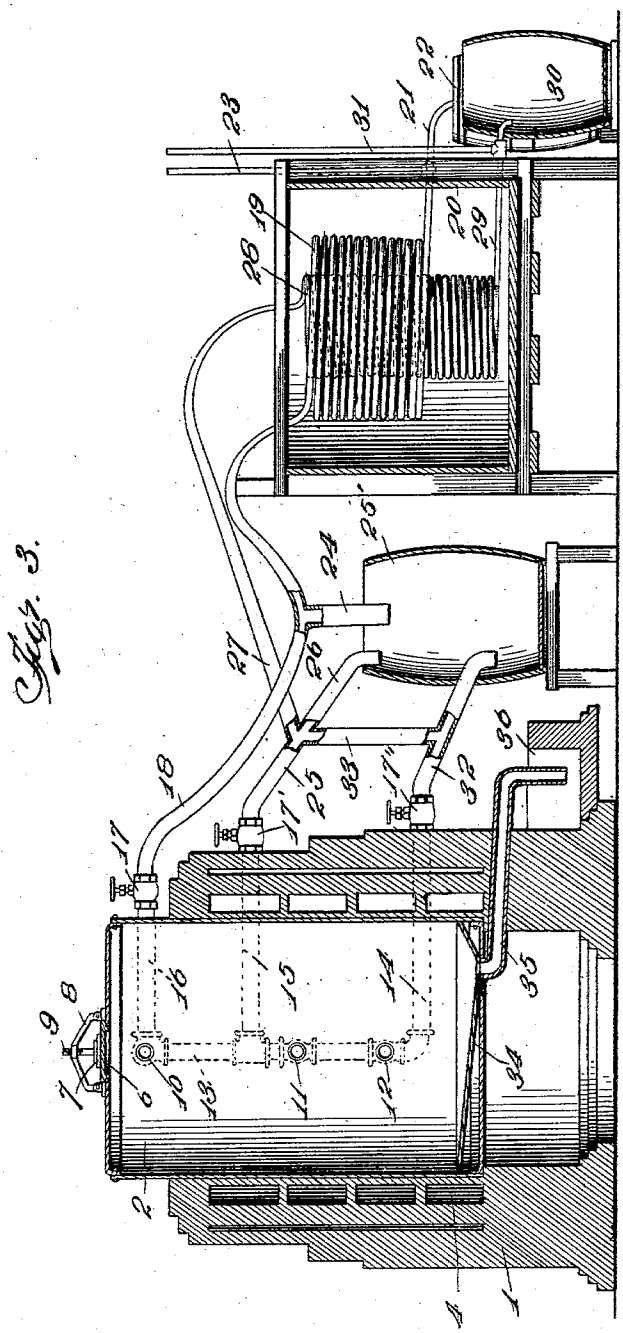
NO MODEL. 2 SHEETS—SHEET 2

Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM C. DOUGLAS, OF RALEIGH, NORTH CAROLINA.

APPARATUS FOR DISTILLING WOOD.

SPECIFICATION forming part of Letters Patent No. 753,376, dated March 1, 1904.

Application filed September 1, 1903. Serial No. 171,519. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. DOUGLAS, a citizen of the United States, residing at Raleigh, in the county of Wake and State of North Carolina, have invented certain new and useful Improvements in Apparatus for Distilling Wood; 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.

This invention relates to improvements in the distilling apparatus, and particularly such as are adapted for use in operating upon wood for obtaining products therefrom.

The object in view is the distillation of wood for the obtaining of turpentine in various grades, and this object is obtained by the employment of an improved system of tubes in combination with suitable retorts and heating means.

The invention consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 represents a view in rear elevation of a still embodying the features of the present invention. Fig. 2 represents a transverse vertical section taken centrally through the retorts. Fig. 3 represents a longitudinal vertical section through the entire system.

In the present art it has been found desirable to obtain spirits of turpentine as free as possible from foreign substances and solids, and by the present improved apparatus I contemplate producing different grades of turpentine, the best of which shall be chemically pure. To obtain this and other desirable results, I employ devices such as are illustrated in the accompanying drawings, in which the numeral 1 indicates any suitable structure of masonry designed to inclose a plurality of suitably-constructed retorts 2. The masonry 1 is preferably formed centrally with the firebox 3, of any suitable construction, communicating with preferably helical flues 4 4, extending about the retorts 2 and at their upper ends discharging into stack 5. The retorts 2 are spaced apart and each formed with an aperture 6 in its upper end adapted to be closed by a suitable head 7, provided with any preferred form of retaining device for locking the same in position for closing the aperture 6. The said device, as illustrated, consists of a bracket 8, carried by the retort 2 and extending above the said aperture and receiving a threaded bolt 9 in position for engaging the head 7. When it is desired to obtain access to the interior of one of the retorts 2, it is only necessary to thread the bolt 9 back a sufficient distance for permitting the removal of the head 7.

A tube 10 extends in a horizontal plane and communicates between the retorts 2. A similar tube 11 is spaced beneath the same parallel thereto, also communicating between said retorts. A third tube 12, similar to tubes 10 and 11, affords communication between the retorts 2 near the base thereof, the tube 11 being arranged approximately centrally of the retorts and the tube 10 at the top. A vertically-positioned pipe 13 connects all of the said tubes and discharges at its lower end into a pipe 14. Pipe 15 communicates with pipe 13 preferably slightly above the intersection of pipe 11, and pipe 16 communicates with the upper end of the pipe 13, each of pipes 14, 15, and 16 extending beyond the walls of the masonry 1, provided with controlling-valves 17 17′ 17″. A pipe 18 communicates with pipe 16 and extends to and communicates with a condensing-coil 19, positioned within a cooling-chamber 20. The chamber 20 may be of any preferred structure and may contain any common well-known cooling medium, and coil 19 may be formed with any preferred number of convolutions and of any desired diameter. Pipe 21, communicating with the lower end of the coil 19, extends beyond the wall of chamber 20 and is adapted to discharge into any preferred containing-receptacle 22. A gas-discharge pipe 23 communicates with pipe 21 and extends, preferably, to a suitable point above the same for leading off gases which may be freed from the wood during the distilling operation. Interposed in the length of the pipe 18 there is a downwardly-extending

discharge-spout 24, having its lower end open and forming an open discharge beneath which may be positioned any suitable receptacle 25′, adapted to receive the heavier products which may be discharged by gravity through said spout 24. A pipe 25 communicates with pipe 15 and is provided with a discharge-spout 26, having its lower end open and forming an open discharge emptying into the receptacle 25′. A brass pipe 27 leads in an upwardly-inclined plane from the pipe 25 and communicates with a condensing-coil 28, positioned within the chamber 20 and preferably constructed of a greater number of convolutions and of less diameter than the coil 19. A pipe 29 communicates with the lower end of coil 28 and discharges outside the chamber 20 into any suitable receptacle 30. A gas-discharge pipe 31 rises vertically from the pipe 29 and is adapted for leading off gases in a similar manner to the operation of pipe 23. A pipe 32 communicates with pipe 14 and discharges into the receptacle 25′. A vertical by-pass 33 communicates with pipe 32 and opens into pipe 25, preferably just below the juncture therewith of the pipe 27.

Each retort 2 is preferably provided with a funnel-shaped bottom or false bottom 34, discharging at its lowermost point into a pipe 35, said pipe extending beyond the masonry 1 and discharging into a trough 36.

In operation the wood is broken or cut up into blocks and placed within the retorts 2 and a fire started in the box 3 sufficient for roasting the contained wood. As the heat begins to affect the wood lighter vapors will rise to the upper ends of the retorts and the heavier products descend. As the operation continues the lighter gases and white vapors pass from the retorts 2 to the tube 10, into tube 16 and down tube 18, above the discharge-spout 24, creosote and other heavy substances which may possibly be carried with the lighter products into tube 18 being discharged at this point. The vapors continue moving through pipe 18 and eventually pass about coil 19, where condensation takes place and spirits of turpentine is discharged into receptacle 22, the gases being discharged through pipe 23. The vapors of a medium weight will find their way out through pipe 11 and into pipe 25 through pipe 25, any of the products from pipe 10 which may have been caused to condense falling down pipe 13 and passing out with said medium-weight vapors through pipe 15. The vapors passing out pipe 15 and through pipe 25 divide upon arriving at the intersection of pipe 27 and lighter products move up said pipe, while creosote and heavier products pass out the discharge 26. The products of sufficient specific gravity which pass down the pipe 25 fall through by-pass 33 into pipe 32. The heaviest of the vapors pass through pipe 12 into tube 14 and the products from pipe 11, which descend through pipe 13 to pipe 12, pass out through pipe 14, the said products passing out pipe 14 and discharging directly into the receptable 25′, except for those lighter gases and vapors which find their way up through by-pass 33 and pass off to the condenser through pipe 27. The tar and other similar heavy substances collect on the bottom 34 and are discharged down trough 36.

The valves 17 are provided for controlling the passage of gases and vapors and may be opened or closed to any degree desired—as, for instance, when it is desired to produce only second-grade turpentine the valve to pipe 16 may be closed entirely and all of the vapors passing out pipe 10 forced down pipe 13 and out pipe 15.

It is to be observed that the arrangement of retorts 6 is such that the intercommunicating vertical pipe 13 and the two lower horizontal pipes connected therewith are inclosed between the masonry surrounding said retorts and the stack arranged in the rear thereof. Said vertical pipe is positioned above the furnace 3, whereby the temperature of said pipe will be maintained at such degree while the retorts are in operation as to prevent condensation of the contained vapors. The pipe 10, however, is arranged at the upper ends of the retorts in position for being maintained at a slightly-lower temperature and not so completely inclosed as the pipes 11 and 12 and the greater portion of pipe 13.

The tubes or pipes 10, 11, and 12, with the connecting-pipe 13, are so arranged between the retorts that they are protected against the cooling action of the atmosphere by means of the stack 5, which stack serves to prevent the movement of air between the retorts.

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

1. In a still, the combination with a plurality of retorts, of tubes communicating with and arranged between the retorts, a pipe connecting said tubes, a conducting-pipe leading from said connecting-pipe at one end thereof, a second conducting-pipe at the other end thereof, condensing means for said conducting-pipes, and means for heating said retorts and tubes to a degree preventing condensation of lighter vapors therein.

2. In a still, the combination with a plurality of retorts spaced apart, of heating means arranged centrally beneath the space between said retorts, tubes communicating between said retorts above said heating means, a pipe connecting said tubes, conducting-pipes leading from said connecting-pipe, and means for protecting said tubes and connecting-pipe against the cooling action of the atmosphere.

3. In a still, the combination with a plurality of retorts spaced apart, of tubes communicating with said retorts interposed between the

same, intercommunicating means connecting said tubes, means for heating said retorts and tubes to a degree sufficient for preventing condensation of the lighter vapors therein, one of the tubes being at a greater distance from the source of heating than the others, and conducting-pipes leading from the intercommunicating means.

4. In a still, the combination with a retort, of a plurality of tubes extending from the same, a vertical pipe connecting said tubes, a conducting-pipe communicating with said vertical pipe near one end thereof, a second conducting-pipe communicating with said vertical pipe intermediate the length thereof, means for heating said vertical pipe and tubes to a degree preventing condensation of the lighter vapors therein, and means for protecting said pipes and tubes against the cooling action of the atmosphere.

5. In a still, the combination with a retort, of a plurality of tubes extending from said retort, a pipe connecting said tubes, walls partially surrounding said tubes and pipe for preventing the cooling action of the atmosphere thereon, conducting-pipes leading from various points on said connecting-pipe, means for heating said retort and tubes to a degree preventing condensation of the lighter vapors therein, and condensing means for said conducting-pipes.

6. In a still, the combination with retorts and means for heating the same, of a plurality of horizontal tubes communicating between said retorts and partially inclosed thereby, a vertical pipe conecting said tubes, upper, lower and intermediate conducting-pipes communicating with said vertical pipe extending beyond the retorts.

7. In a still, the combination with a retort, of a plurality of tubes leading therefrom, a partially-inclosed intercommunicating pipe connecting said tubes, an upper exposed conducting-pipe communicating with said intercommunicating pipe, partially-inclosed intermediate and lower conducting-pipes communicating with said intercommunicating pipe, and heating means for said retort and inclosed elements.

8. In a still, the combination with a retort, of a plurality of partially-inclosed tubes leading therefrom, an exposed tube leading therefrom, a pipe connecting all of said tubes and being exposed at that end connected with the exposed tube, conducting-pipes leading from said pipe, and means for heating the retort.

9. In a still, the combination with a plurality of retorts spaced apart, a furnace arranged beneath the space between said retorts, tubes communicating between said retorts above said furnace, a pipe connecting said tubes, conducting-pipes leading from said connecting-pipe, and a stack leading from said furnace and closing the space between said retorts and preventing atmospheric draft therebetween.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WILLIAM C. DOUGLAS.

Witnesses:
JOHN L. FLETCHER,
EDWIN E. VROOMAN.