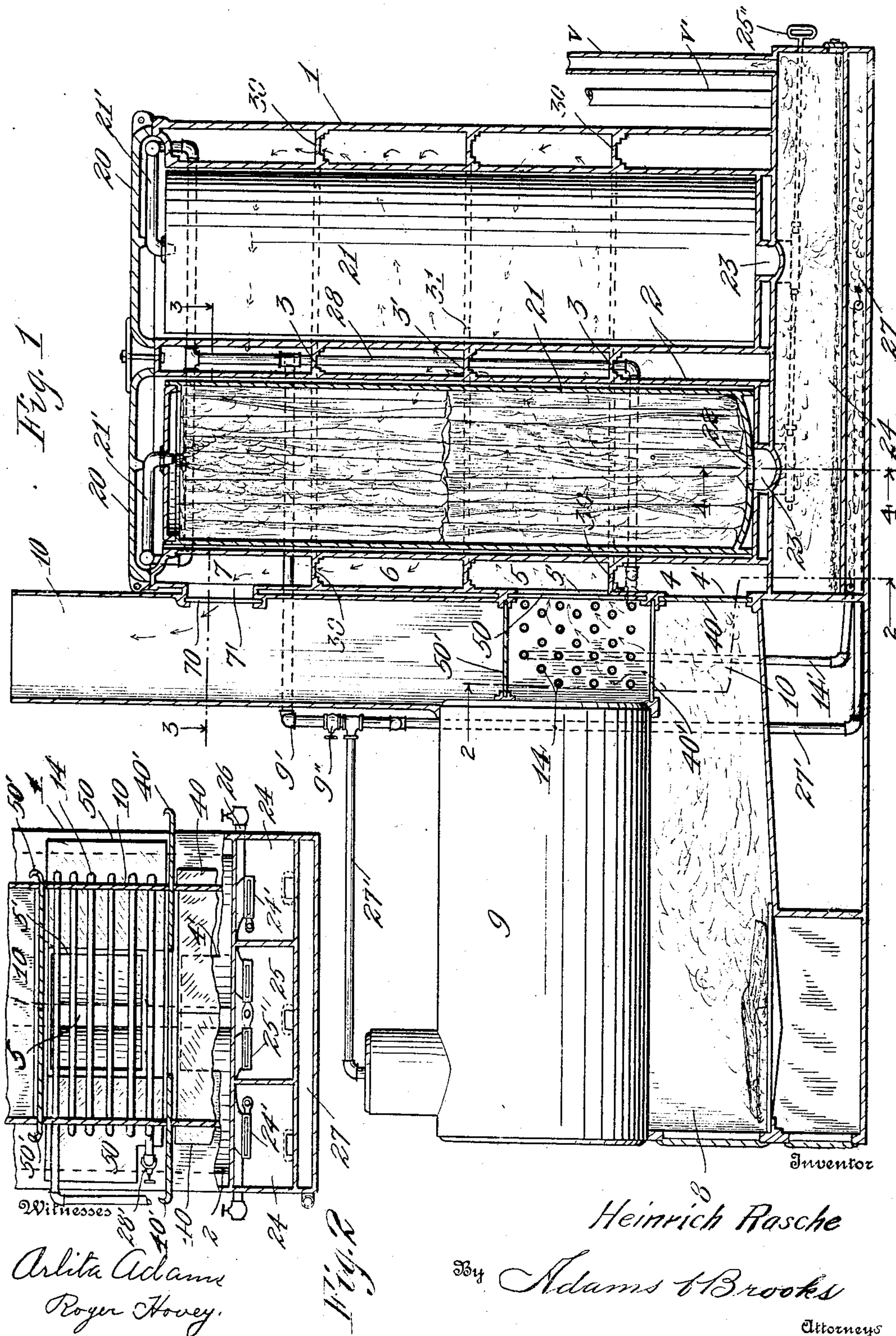


962,668.

H. RASCHE.  
ART OF WOOD DISTILLATION.  
APPLICATION FILED AUG. 3, 1908.

Patented June 28, 1910.

2 SHEETS—SHEET 1.



Witnesses  
Arleta Adams  
Roger Hovey.

Fig. 2

Heinrich Rasche

By Adams & Brooks

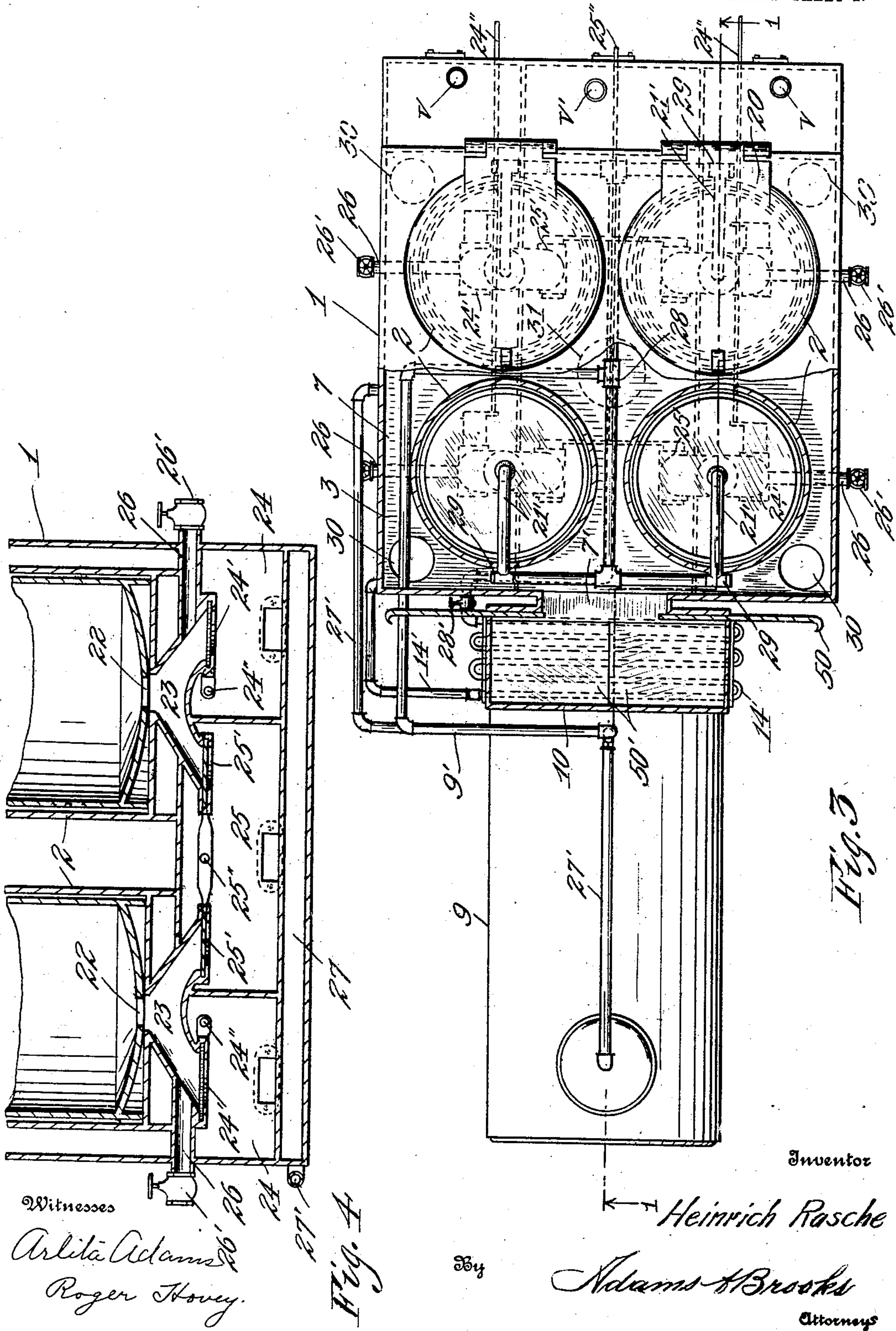
Attorneys

962,668.

H. RASCHE.  
ART OF WOOD DISTILLATION.  
APPLICATION FILED AUG. 3, 1908.

Patented June 28, 1910.

2 SHEETS—SHEET 2.





# UNITED STATES PATENT OFFICE.

HEINRICH RASCHE, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-HALF TO FRANK H. OSGOOD, OF SEATTLE, WASHINGTON.

## ART OF WOOD DISTILLATION.

962,668.

Specification of Letters Patent. Patented June 28, 1910.

Application filed August 3, 1908. Serial No. 446,776.

*To all whom it may concern:*

Be it known that I, HEINRICH RASCHE, a subject of the Emperor of Germany, and a resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in the Art of Wood Distillation, of which the following is a specification.

The primary aim of my invention is an improved process of effecting decomposition of coniferous wood whereby a greater percentage of the turpentine contained therein may be secured in a comparatively pure state and a high percentage of the resinous constituent obtained as a marketable resin, one product separate from the other.

Further objects and advantages will be set forth as the description progresses, and those features on which I desire protection defined in the appended claims.

For the carrying on of my improved process I have designed an apparatus illustrated in the accompanying drawings wherein—

Figure 1 is a longitudinal sectional view of the apparatus taken on line 1—1 of Fig. 2. Fig. 2 is a fragmentary sectional elevation on line 2—2 of Fig. 1. Fig. 3 is a plan view in partial section on line 3—3 of Fig. 1, and Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 7.

The apparatus herein disclosed includes an oven 1 provided with retorts, as 2, and divided into a series of chambers, as 4, 5, 6 and 7, which extend about the retorts, by horizontal partitions 3 and 3' having openings, as at 30 and 31 respectively, which connect adjacent chambers one with the other.

In connection with oven 1 I have shown a furnace 8 containing a boiler 9 and communicating with a flue 10 extending upwardly alongside a wall of said oven in which intake openings 4' and 5' and an exit opening 7' are located for communication between said flue and chambers 4, 5 and 7 respectively. For these openings suitable doors, as slides 40, 50 and 70 are provided, and in flue 10 deflectors or slides as 40' and 50' are mounted for adjustment to direct the products of combustion to openings 4' or 5' as will be later understood.

The retorts 2 are provided with suitable

lids or covers 20 and are adapted to receive containers for the material to be distilled, said containers being in the form of cylinders 21 provided in their lower heads with openings 22 for communication with discharge passages 23 of the retorts which communicate with a blow off conduit 26 having a shut off valve, as 26'.

Beneath the oven are receivers or tanks 24, 24' and 25 connected with respective discharge passages 23 through slide valves as 24', 24' and 25' and lying directly above a chamber 27 which is connected with a pipe 27' leading from boiler 9. The slides of valves 24' and 25' have connection with respective rods, as 24'' and 25'', for adjustment to direct the flow from passages 23 to respective receivers 24, receiver 25 or conduits 26 as may be desired.

Reference numeral 14 designates a pipe coil or superheater located in flue 10 intermediate the deflectors 40' and 50' and connected with a pipe 14' leading from chamber 27 and with a pipe 28 leading into oven 1 and provided with a shut off valve 28'. Pipe 28 communicates through suitable swiveled connections as 29 with nozzles 21' having downwardly projecting tips or discharge ends normally engaged in suitable apertures provided in the upper heads of cylinders 21. The connections 29 are of suitable form to permit nozzles 21' to be swung upwardly clear of the cylinders 21 when desired to remove the same from the retorts. Connected with the pipes 27' and 28 is a pipe 9' provided with a shut off valve 9''.

Granted that the retorts are charged with wood to be distilled and fire started in the furnace with the deflectors 40', 50' and valves 24' standing open, and the slides 40, 50' and 70 and the valves 25', 26', 27' 28' and 9'' closed the process of distillation is carried on as follows: After the fire has gained sufficient headway to generate steam in the boiler and superheat the same in passage through the coil 14 to a temperature approximately 25° F. above the boiling point of turpentine, or 310° Fahrenheit, valve 28' is opened. Steam from the boiler will then pass through pipe 27' into chamber



27 thence through pipe 14', to coil 14 and from the latter through pipe 28 to the nozzles 21'. Steam of the above temperature in a superheated state blowing downwardly in direct communication with the wood in the retorts extracts the turpentine without obtaining any material flow of the liquefiable constituents and carries the turpentine extract and such of the liquefiable constituent as may have been caused to flow through the passage ways 23 to the receivers 24 which are adapted to retain the liquid product while the vapors containing the turpentine extract are conducted to suitable condensing apparatus through pipes, as V connected with the upper portions of said receivers. This step of the process is continued for such period of time as required to extract most of the turpentine. The time required will obviously vary according to the density of the wood. In case ordinary pine or fir wood is being distilled two hours or thereabout will be sufficient to obtain satisfactory results. The slides 50 and 70 are then opened and the slides 50' closed to direct the products of combustion, as indicated by the arrows in Fig. 1, to that portion of the oven lying above chamber 4 until the temperature in said portion is raised to approximately 420° Fahrenheit, which temperature is sufficient to effect a free flow of the resin contained in the wood under action of steam in the retorts without converting the same into tar. This application of dry heat to the retorts in conjunction with the direct application of steam for approximately two hours or during such period of time is required to extract most of the resin. The action of the dry heat combined with that of the steam effects extraction of the resinous constituent in its most favorable composition as marketable resin and recovers a material percentage of turpentine remaining from the first step of the process which turpentine carried by the steam passing with the liquid extract into the receivers 24 is conveyed away through the pipes V.

During the foregoing the liquid product collecting in the receivers 24 is subjected to heat from the steam passing into chamber 27 to maintain the product in a boiling state for the economical recovery of such turpentine as may still be contained therein. The turpentine thus secured passes into the pipes V in company with the vapors flowing through the receivers from passage ways 23. Steam is now shut off from the retorts by closing valve 28' and decomposition of the material in the retorts continued by further application of dry heat. At this stage the valves 24' are closed and valves 25' opened and the products of combustion from the furnace directed to pass into the oven

about the lower portions of the retorts by closing deflector 40' and opening slides 40. A temperature of approximately 800° Fahrenheit is now maintained in the oven to effect extraction of the remaining melt-able ingredients of the material contained in the retorts and convert the residue into charcoal and gas. During progress of this step the liquid product, mostly in the nature of tar, flows through valves 25' into receivers 25 and the vaporous and gaseous products escaping in a like manner from the retorts are conveyed to suitable separating apparatus, for the recovery one from another, through a pipe V' connected with the upper portion of said receiver. After the raw material charged in the retorts has been reduced to charcoal the deflectors in flue 10 are opened, and the valves 25' and all of the doors to the oven closed. The valves 9' and 26' are then opened to permit steam to pass from the boiler through the containers and thereby deaden the glowing charcoal.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States of America, is:

1. In wood distillation, a process consisting in directing steam downwardly through wood contained in a retort and permitting steam to discharge through the lower portion of said retort with the ingredients extracted from the wood, and then applying heat externally to said retort.

2. In wood distillation, a process consisting in directing steam downwardly through wood contained in a retort for discharge through the lower portion of said retort, applying heat externally to said retort above the lower portion thereof, cutting off the steam from said retort, and then applying heat externally to the entire retort.

3. In wood distillation, a process consisting in directing steam downwardly through wood contained in a retort to extract the turpentine therefrom and permitting said steam to discharge with the extracted turpentine through the lower portion of said retort, and then applying heat externally to said retort to act conjointly with the steam.

4. In wood distillation, a process consisting in directing steam through wood contained in a retort to extract turpentine therefrom, permitting the steam to discharge through the lower portion of said retort with ingredients extracted from the wood, then applying heat externally to said retort to effect with the steam the extraction of the resin from the wood, and maintaining the resin in a heated condition after it leaves said retort.

5. In wood distillation, a process consisting in directing steam through wood contained in a retort to extract turpentine there-



5 from, permitting the steam to discharge through the lower portion of said retort with ingredients extracted from the wood, then applying heat externally to said retort to effect with the steam the extraction of the resin from the wood, collecting the heavier ingredients flowing from said retort, and maintaining such collected ingredients

in a heated condition to vaporize turpentine combined therewith.

Signed at Seattle, Wash., this 27th day of July, 1908.

10

HEINRICH RASCHE.

Witnesses:

FRANK E. ADAMS,

EDWARD W. CRESSMAN.