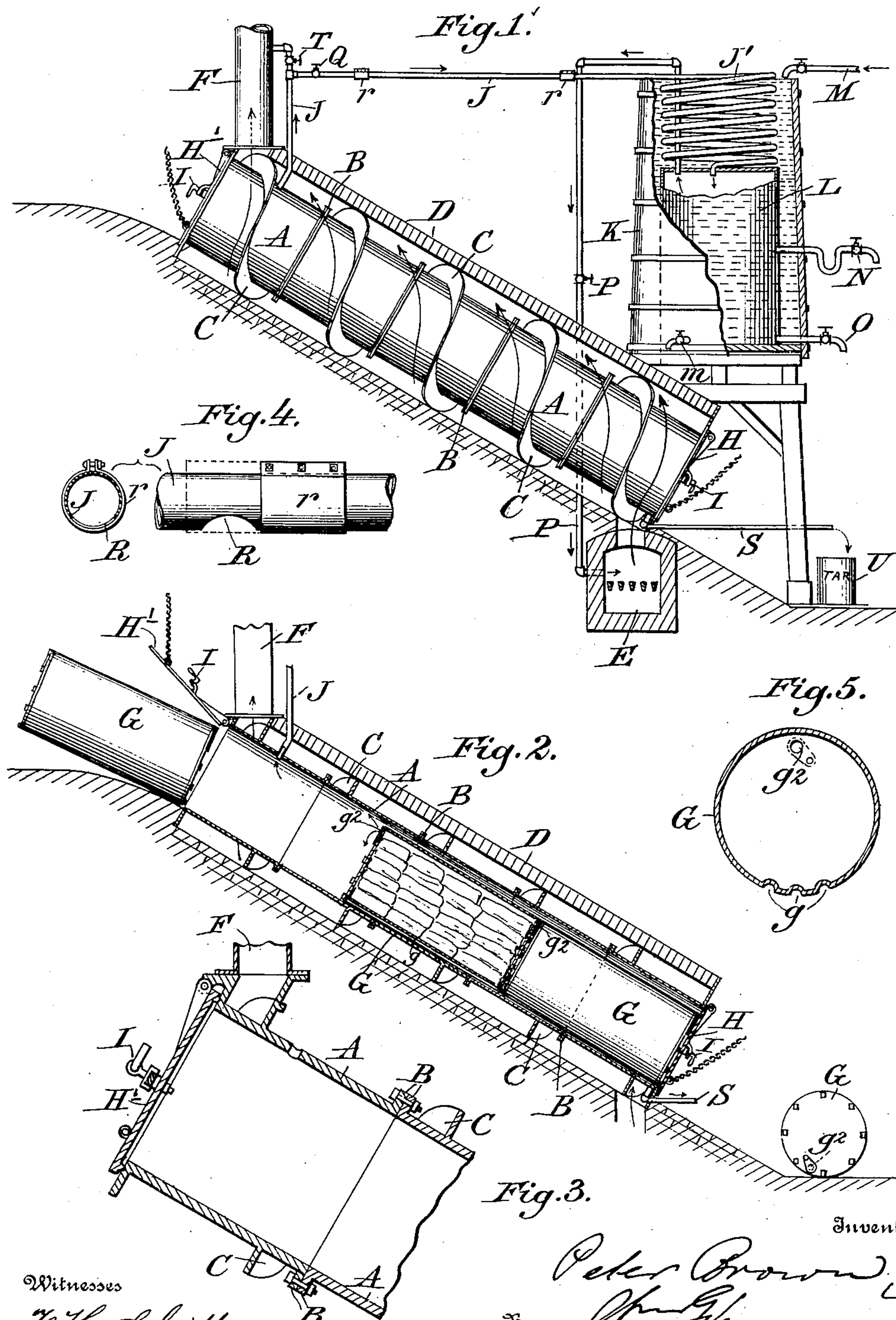


No. 835,747.

PATENTED NOV. 13, 1906.

P. BROWN.
RETORT FOR THE DISTILLATION OF WOODS.

APPLICATION FILED APR. 27, 1903.



Witnesses
J. H. Schott
George T. Bean.

By

Peter Brown,
Associate Attorney

UNITED STATES PATENT OFFICE.

PETER BROWN, OF TACOMA, WASHINGTON, ASSIGNOR TO TROY
CHEMICAL MANUFACTURING COMPANY, (LIMITED,) OF TROY,
IDAHO.

RETORT FOR THE DISTILLATION OF WOODS.

No. 835,747.

Specification of Letters Patent.

Patented Nov. 13, 1906.

Application filed April 27, 1903. Serial No. 154,510.

To all whom it may concern:

Be it known that I, PETER BROWN, a citizen of the United States, residing at the city of Tacoma, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Retorts for the Distillation of Woods, of which the following is a specification.

My invention pertains to retorts for the distillation of woods.

The object of my invention is to produce charcoal and by-products, such as gas, creosote, and tar. I attain this object by means of the devices shown in the accompanying drawings, in which—

Figure 1 represents a side elevation of my retort with the furnace and spiral flue shown in section. Fig. 2 is a lengthwise section of the retort, showing the cylindrical chambers located therein, one chamber and the arch being in section. Fig. 3 is an enlarged section of a portion of the retort, showing its construction. Fig. 4 is an enlarged view of the vapor-transferring pipe, showing a clean-out hole and sliding sleeve for closing the same. Fig. 5 is an enlarged cross-section of one of the cylindrical chambers, showing the corrugations in its side.

Similar letters refer to similar parts in the several views.

My invention comprises a cylindrical-shaped retort A, preferably made of cast-iron, constructed in sections and formed with end flanges B, through which pass bolts for securing the sections together. This retort A is provided on its exterior with a spirally-arranged blade C of uniform width, so as to form a continuous spiral-shaped space or channel from end to end of the retort, as seen in Fig. 1. The retort is preferably located on the side of a hill for convenience of handling the materials distilled therein and rests upon a suitable base of brick or other material, as illustrated. It is inclosed with a brick arch D, built to the outer edges of the spiral blades C and extending from the base upward, as shown in Figs. 1 and 2. The retort is heated by means of a suitable furnace E, located near the lower end of the retort and having its flue connected with the spiral flue of the retort, as shown in Fig. 1. The heat generated in the furnace E passes with the smoke into the spiral flue and continues

its course around the retort from the lower to the upper end of the same and finally out of the smoke-flue F. By this means the retort is heated to any desired temperature.

To operate the retort most successfully, I use a number of cylindrical chambers G. These chambers are made of metal with close-fitting end plates or caps suitably bolted or fastened to the cylinders. These cylinders are filled compactly with wood and the end caps fastened in place, and the cylinders with the wood are placed in the retort at the upper end, as seen in Fig. 2. Each cylinder will be formed with corrugations *g* to permit the tarry products which may pass from the chambers into the retort to flow down the bottom of the retort and with openings *g*², as shown in Fig. 5, to allow the gas and tar-vapors to escape from the cylinders when the wood is heated. Each end of the cylinder will be provided with one of these openings. The retort A being charged with a multiple of these cylinders G, the doors H H' of the retort will be closed and made fast by means of a suitable cross-bar and lever-screw I of any well-known construction, as seen in Fig. 3. The escape-holes *g*² will be opened in both ends of each cylindrical chamber as the chambers or cylinders are placed within the retort. These openings allow the gas and tar-vapors to escape freely as the wood is heated within the retort.

The retort being heated by the furnace E, the wood within the cylindrical chambers will be heated and distilled and finally charred, forming a charcoal and producing the by-products of gas, creosote, and tar. The gas produced from the heating of the wood passes out of the cylindrical chambers G into the retort and upward in the same to the outlet-pipe J and conducted by it into the condenser K. The condenser comprises a coil of pipe J', which is a continuation of J and discharges into a closed tank L. The coil J' and tank L will be kept surrounded with water supplied to condenser K through the pipe M. The water as it becomes warm is drawn off through the valve *m*. The gas passing through pipe J and coil J' is condensed to a liquid form, producing creosote and tar. The creosote being the lighter liquid is drawn off from the tank L through a trap-valve N, located near the center of tank L, as seen in

Fig. 1. The tar or heavier liquids are drawn off from the tank L through the valve O, located near the bottom of the tank, as seen in Fig. 1.

Should the condensation of the gases within the tank be so slow as to produce a pressure, I relieve the pressure by means of an escape-pipe P, which discharges into the furnace E, thus adding the surplus or escaping gas to the fuel of furnace E and utilizing the waste gas.

The gas in passing through pipe J from the retort will at times so condense as to form a crust or coating on the inner side of the pipe, and thus prevent the free passage of gas, requiring the pipes to be cleaned at intervals. To provide for this necessity, I form clean-out holes R at suitable intervals in the pipe J and cover each with a sliding sleeve *r*. This sleeve is loosened and tightened by means of bolts passing through flanges to the sleeve, as seen in Fig. 4. While the pipe is being thus cleaned, the gas can be allowed to escape into the smoke-pipe F by closing valve Q and opening valve T. The tar-vapors formed within the cylindrical chambers G will pass out through opening g^2 into the retort, and the heavier portions settling in the retort will pass to the lower end of the retort and out through the discharge-pipe S into the receptacle U.

The grooves or corrugations *g* in the side of the cylindrical chambers allow the tar to flow freely along the bottom of the retort A, as before mentioned.

The retort having been operated for a certain period, the wood within the cylindrical chambers G at the lower end of the retort being exposed to greater heat will first become thoroughly distilled and charred. The door H is then opened and the lower cylinder removed and the door again closed. The openings g^2 in the ends of cylinder are then closed by the slides or pivoted valves provided for the same, as shown in the end view of the cylinder discharged from the retort, as seen in Fig. 2 of the drawings. The cylinders remaining within the retort now slide to the lower end of same, as seen in Fig. 2. The upper gate H' is opened, and a cylinder filled with fresh wood is inserted in the upper end to fill the vacancy thus made, and the door H'

is then again closed. By this means the wood is gradually heated in the upper cylindrical chambers, and as they are in turn passed down to the lower end of the retort they become thoroughly distilled and charred. This process or operation can be continued indefinitely without allowing the retort to be cooled down, thus saving much time and expense.

It is to be observed that as each cylindrical chamber G is removed from the retort the slide-valve for the opening g^2 is used to close the same. It is thus made practically airtight, and the charcoal contained therein will be allowed to cool without being consumed from burning. As soon as cooled the charcoal is taken out and packed for market, and the cylinder is again ready for another supply of fresh wood for distillation.

Having described my invention and set forth its merits, what I claim is—

1. The combination with a retort for the distillation of wood, of a spiral flue surrounding the retort, a furnace in communication with said flue at the discharge end of the retort, a series of closed wood-receiving chambers located in the retort and each formed with a valve-controlled opening for the entry of gases and tar-vapors from the chamber into the retort, and provided with external longitudinally-extending grooves, a condenser, a pipe for conducting the gases from the retort to the condenser, and a pipe leading from the discharge end of the retort to carry the tar therefrom, substantially as described.

2. A retort having a spiral heating-flue around it, a furnace communicating with the retort-flue at one end thereof, and a series of closed cylinders for containing wood fitting end to end one against the other within the retort and provided with exits for the escape of the gases and distillates and formed with corrugations in their walls, extending from end to end of the cylinders, substantially as described.

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

PETER BROWN.

Witnesses:

A. H. DENMAN,
J. D. KLINGE.