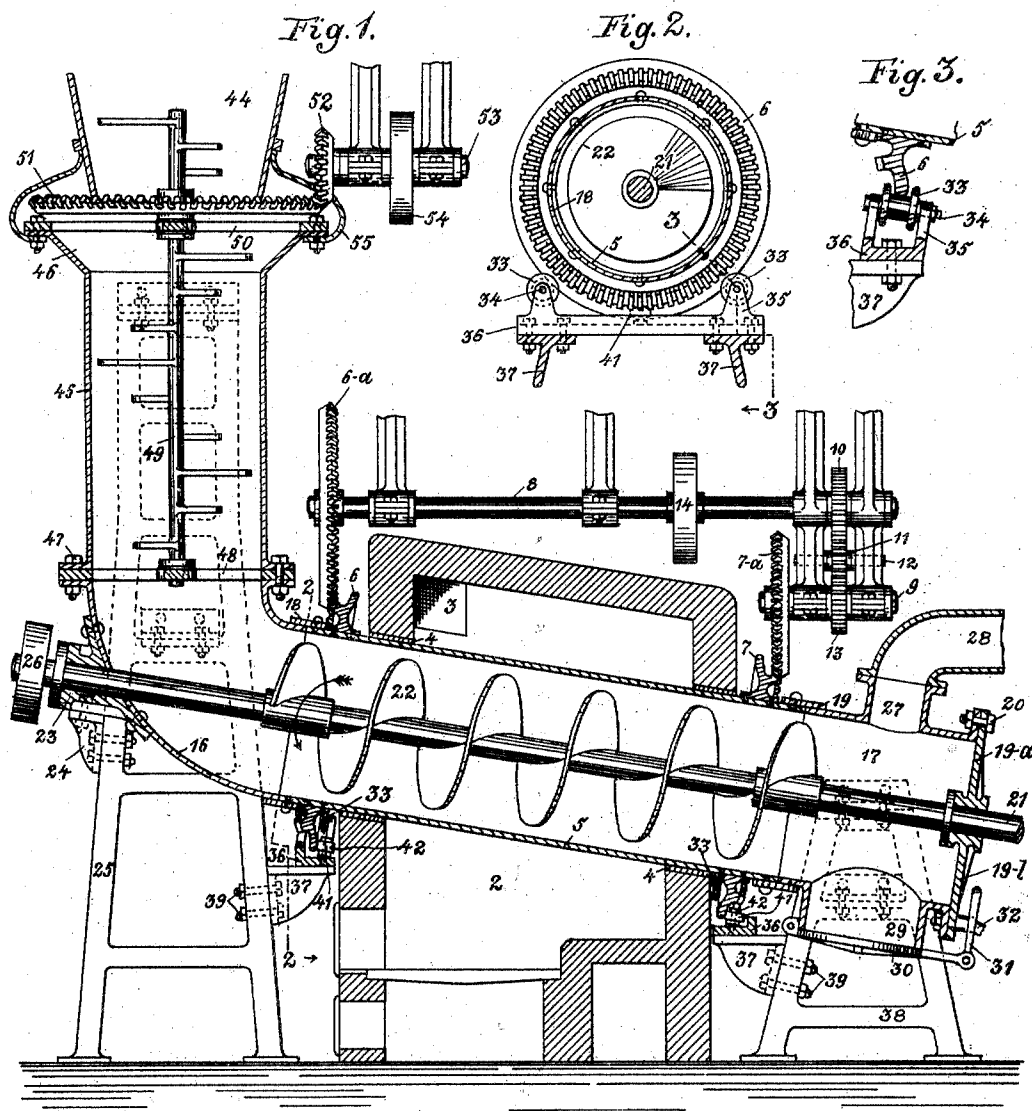


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B. VIOLA.
WOOD DISTILLING APPARATUS.
APPLICATION FILED JAN. 15, 1903.

NO MODEL.



Witnesses:
John A. Paulson by *Partholomew Viola, Inventor*
Mat Helmke *Schreiter & Mathews*
his Att'ys

UNITED STATES PATENT OFFICE.

BARTHOLOMEW VIOLA, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF
TO RICHARD G. G. MOLDENKE, OF WATCHUNG, NEW JERSEY.

WOOD-DISTILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 767,090, dated August 9, 1904.

Application filed January 15, 1903. Serial No. 139,181. (No model.)

To all whom it may concern:

Be it known that I, BARTHOLOMEW VIOLA, a citizen of the United States, and a resident of the borough of Brooklyn, in the city, county, and State of New York, have invented certain new and useful Improvements in Wood-Distilling Apparatus, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, wherein—

Figure 1 is a sectional view, partly elevation, of my improved distilling apparatus; Fig. 2, a sectional view, partly elevation, on line 2 2 indicated in Fig. 1; and Fig. 3 a sectional detail view, partly elevation, on line 3 3 indicated in Fig. 2, of one of the supporting-rolls for the rotating retort.

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

My invention relates to apparatus for the distilling of wood and other carbonaceous materials, more particularly of waste wood—such as sawdust, shavings, small pieces, &c.; and it consists of an apparatus for a continuous distillation of such material.

The apparatus may also be used for distillation of garbage or other carbonaceous residue.

In the drawings numeral 2 designates the combustion-chamber of an oven, preferably built of brick.

3 is the flue leading to the chimney.

4 represents two iron rings interiorly wrought and secured one in the front and the other in the rear wall of the oven. In these rings the rotating retort 5 is mounted, being snugly fitted therein. On each end of drum 5 is secured a flanged gear-wheel, the one at the forward end being designated by 6 and the one at the rear end by 7. These gear-wheels engage with gear-wheels 6^a and 7^a, respectively, of which the former is set on shaft 8 and the latter on shaft 9, but both of which receive motion from the shaft 8, gear-wheel 6^a being directly keyed thereto and gear-wheel 7^a being driven through gear-wheel 10,

keyed to shaft 8, idler 11, set on shaft 12, and gear-wheel 13, keyed to shaft 9. Shaft 8 is driven from a transmission by a belt stretched over pulley 14, keyed thereto. In place of this driving-gear other mechanism may be provided for rotating the retort 5, the only requisite being that the velocity of the motion shall be the same on both ends.

The forward end of retort 5 is connected to the charging apparatus by elbow 16, and its rear end is connected to chamber 17. This connection is effected by interiorly-wrought rings 18 and 19, riveted to the forward and rear ends of the retort, respectively, and snugly fitted upon the exteriorly-wrought ends of elbow 16 and chamber 17. Both elbow 16 and gas-chamber 17 are stationary and serve in a sense as pivots on which retort 5 rotates.

The front wall of chamber 17 is composed of two parts 19^a and 19^b, removably secured thereto and together by screw-bolts 20. Approximately in the center thereof a bore is provided for shaft 21 of a screw conveyer. The projecting end of shaft 21 is set in bearings supported in standards, (not shown in the drawings,) and its other end is set in bearings 23, supported by brackets 24, affixed to standards 25. The bearing is also affixed to elbow 16 to hold the parts of the apparatus more firmly together.

Chamber 17 has two apertures—one, 27, in its top for the volatile products of distillation, connecting with gas-conduit 28, and the other, 29, for the discharge of the non-volatile residue. Aperture 29 may be closed by cover 30, hinged to the bottom thereof, and secured in closed position by hasp 31, clamped and secured to stud 32, as shown in the drawings. This cover is opened from time to time to dump the residue of distillation. In place of this device a chute may be attached to aperture 29, and a tank is provided underneath filled with water. The end of the chute reaches for some distance into the water, approximately six to eight inches below the level thereof. In this

arrangement the water in the tank serves as a seal for closing the chamber 17 and possesses also the advantage of permitting the liquid ingredients of the material which are not desired to be distilled to continually escape from the apparatus.

The residue consists of substances which are specifically lighter and of others which are specifically heavier than water. The latter are mostly liquid. They filter through the solid residue and settle on the bottom of the tank. They are withdrawn from time to time through a culvert connecting with the bottom of the tank. The other substances which are lighter than water accumulate in the chute. They are withdrawn by lowering the level of the water (or raising the chute) so as to withdraw its end from the water, whereupon these substances (mostly charcoal and smudge) drop out and float on the water in the tank. Then, again, more water is added to the tank or the chute lowered, so as to again submerge its end, and thereby to seal the outlet. The residue floating on the top of the water is then gathered and withdrawn.

Shaft 21 is driven by belt drawn over pulley 26 and a second belt drawn over a pulley (not shown in the drawings) set on the other end of shaft 21. In place of these belt-pulleys other suitable driving-gear may be provided to rotate the conveyer in the direction indicated by arrow in Fig. 1 of the drawings, this direction being opposite to that in which the retort is rotated.

Rotating retort 5 is additionally supported on rollers 33, as shown in Figs. 2 and 3 of the drawings. These rollers are mounted to loosely revolve on pins 34, set in lugs 35 of the frame 36, which is supported on brackets 37, secured by bolts to standards 25 and 38, respectively. On these rollers 33 rest the flanges of gear-wheels 6 and 7, extended beyond their toothed faces. In addition to rollers 33 rollers 41 are provided, rotating on pins 42, set in the base of frame 36. Rollers 41 are provided to relieve excessive pressure upon the connection of retort 5 with chamber 17 and prevent friction in the joint, while rollers 33 assist in sustaining the weight of the retort, relieving thereby the pressure that would otherwise be exerted on rings 4, set in the brickwork of the oven.

The material to be distilled is constantly charged into the retort by the apparatus connected to the other end of elbow 16. This apparatus consists of a hollow cylindrical charging vessel 45, secured to the elbow 16 by bolts 47, securing together the deflected flanges of the two parts and spider 48, set between them, hopper 44, stirrer 49, mounted in bearings provided in spiders 48 and 50, and of the gear for driving the stirrer. This mechanism comprises gear-wheel 51, keyed

to the shaft of the stirrer, gear-wheel 52, set on shaft 53, and driving-wheel 54, whereby the mechanism actuating the stirrer is driven.

Hopper 44 is held in position relatively to the charging vessel 45 by brackets 55, whereas charging vessel 45 is supported by lugs, (indicated in dotted lines in Fig. 1 of the drawings,) by means of which it is connected to standards 25. Elbow 16 is similarly supported in standards 25, as indicated by dotted lines in the same figure. Hopper 44 is set upon a platform. (Not shown in the drawings.)

The material to be distilled in this apparatus is mainly sawdust and other refuse of saw-mills and woodworking-factories. This material is dumped in hopper 44 and, falling into charging vessel 45 and elbow 16, closes the apparatus, thus acting as a cover, sealing the retort, and preventing the escape of any gases on that end. Stirrer 49 causes the material packed in the hopper and charging vessel 45 to drop into elbow 16, and conveyer 22 feeds the material into and through the retort. The velocity of the motion of this conveyer may be varied and is so regulated as to keep the material in the retort a sufficient length of time to extract therefrom all desirable ingredients.

The gaseous products of distillation are drawn through opening 27 of chamber 17 into conduit 28, by which they are conveyed in other apparatus for further treatment thereof. The solid residue is discharged from the retort from time to time through aperture 29 by opening cover 30. When constructing such apparatus, care must be taken to so arrange the joints between the retort and the connecting parts as to allow for expansion of the former by heat, and the construction of chamber 17, more particularly in respect to the discharge of the non-volatile ingredients of the distilled material, may be modified as the process to be carried on in the apparatus and the particular material to be distilled may require.

I claim as my invention—

An apparatus for distilling sawdust and similar carbonaceous materials, the apparatus comprising an oven, a cylinder rotatably supported at a slight incline in the oven, a vertically-arranged receptacle at the upper end of the cylinder, a curved elbow connecting said members, a fixed discharge-chamber arranged at the lower end of the cylinder and air-tightly connected therewith, whereby the cylinder can be rotated, the cylinder also having an air-tight connection with said elbow permitting rotation of the cylinder with relation to the elbow; the said cylinder discharge-chamber, elbow and receptacle being of substantially equal cross-sectional area thereby forming a practically continuous channel for the

passage of the carbonaceous material; a discharge-pipe at the top of said discharge-chamber, a conduit at the bottom of the discharge-chamber for discharging the residue, a hinged
5 cover for the end of said conduit, a stirrer arranged in the receptacle, a stirrer arranged in the cylinder and extending into the elbow and also into the discharge-chamber, means

for rotating the cylinder, and means for rotating the stirrer in the cylinder independently thereof.

BARTHOLOMEW VIOLA.

Witnesses:

M. A. HELMKE,
JOHN A. PAULSON.