(No Model.) 2 Sheets—Sheet 1.

C. J. T. BURCEY.

APPARATUS FOR DISTILLING WOOD.

No. 414,938. Patented Nov. 12, 1889.

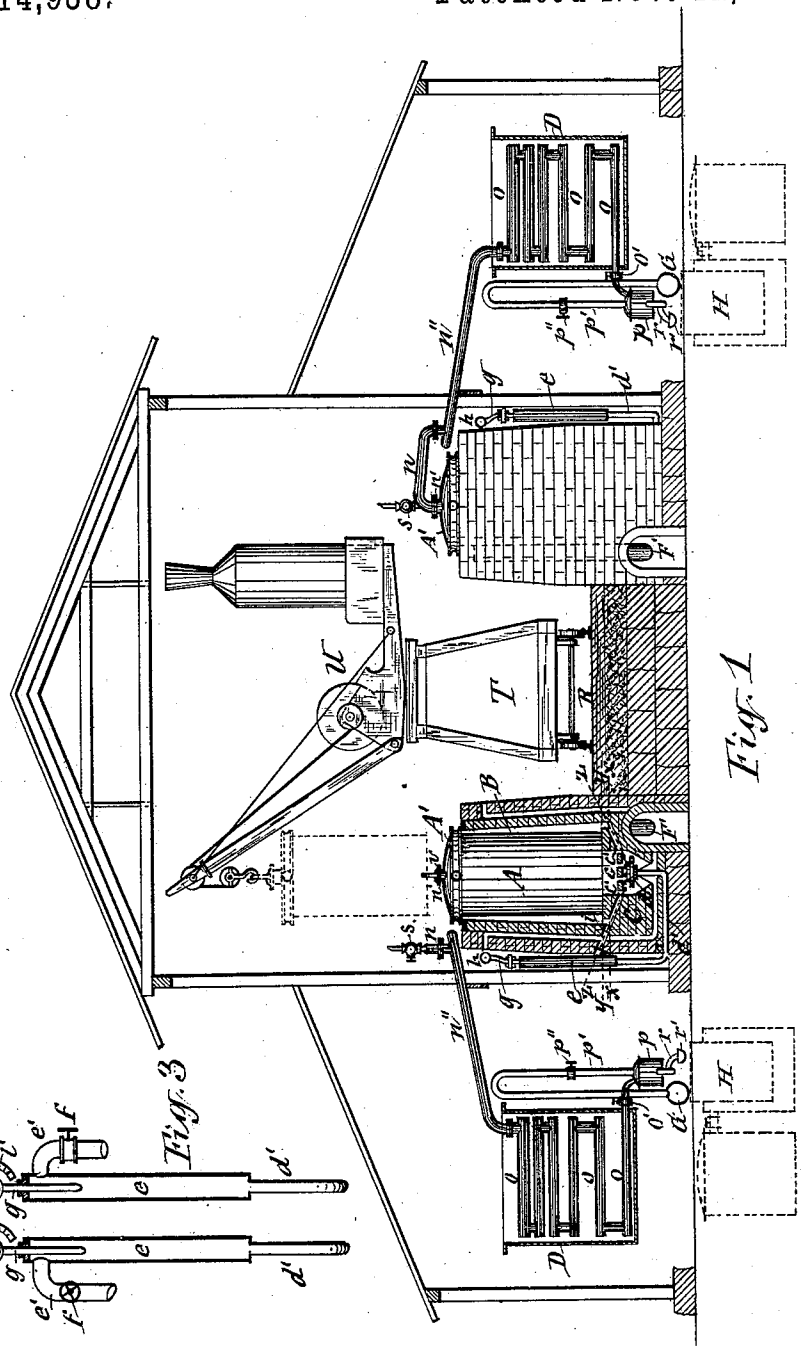


Fig. 1

Fig. 3

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(No Model.) 2 Sheets—Sheet 2.

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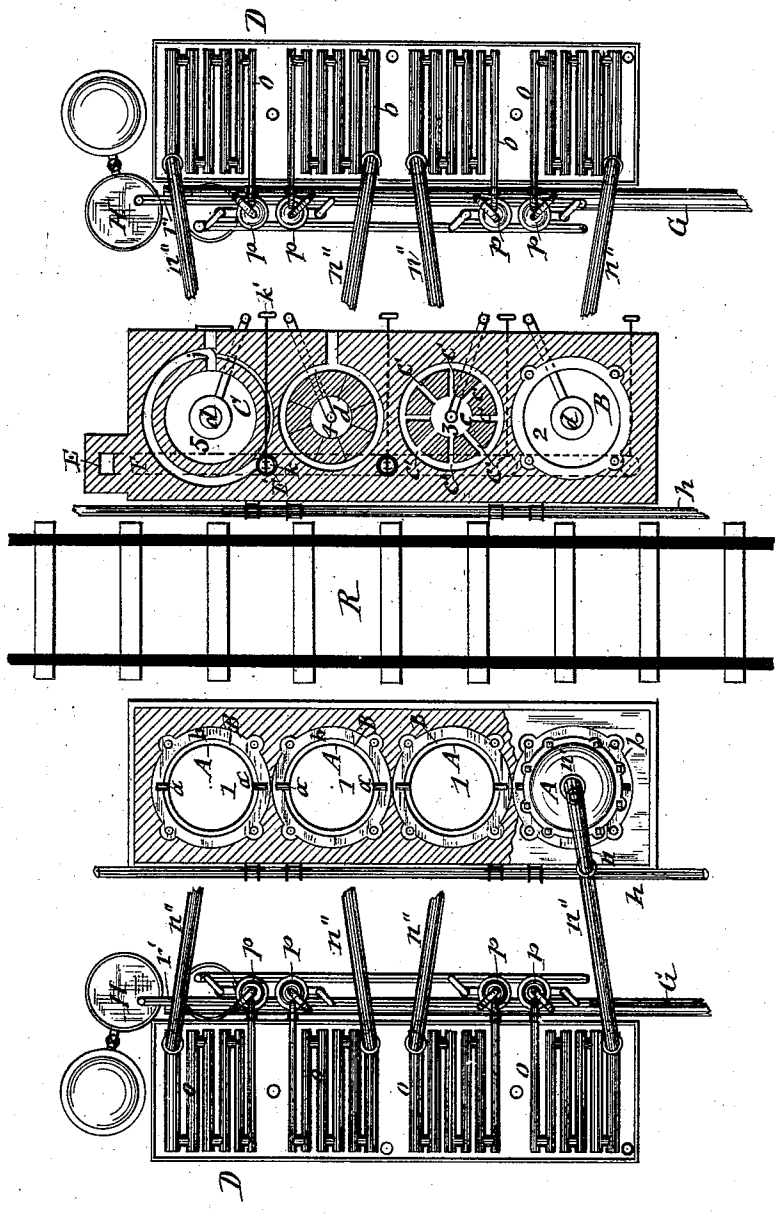


Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES J. T. BURCEY, OF SYRACUSE, NEW YORK.

APPARATUS FOR DISTILLING WOOD.

SPECIFICATION forming part of Letters Patent No. 414,938, dated November 12, 1889.

Application filed November 15, 1888. Serial No. 290,950. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. T. BURCEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Wood-Distilling Apparatus, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in an improved apparatus for charring wood by heat derived from the combustion of gas conducted to furnaces at the bases of the ovens containing the retorts, and by which apparatus a larger amount of charcoal from a given amount of wood is obtained, and also a greater quantity of pyroligneous acid and wood-alcohol is produced, all as hereinafter fully described, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is an end elevation and partly vertical transverse section of an apparatus embodying my invention. Fig. 2 is a plan view and partly horizontal transverse section of the aforesaid apparatus. At 1 1 1 in said figure the retorts are shown minus their covers. At 2 the empty oven is shown, and at 3, 4, and 5 are shown sections respectively on lines *x x*, *y y*, and *z z* in Fig. 1. Fig. 3 is a detail view of the pipes which supply gas mixed with air to the burners in the furnaces of the ovens.

Similar letters of reference indicate corresponding parts.

A A represent retorts consisting of stout metallic tanks provided with removable covers A′ A′ and set in parallel rows and suspended in ovens B B, of masonry, by ears *a a* on the upper ends of the retorts resting on metallic rings *b b*, secured to the top of the ovens. These retorts are charged with the wood to be distilled, and are heated by the combustion of gas in furnaces C C at the bases of the aforesaid ovens. Each of said furnaces I form of a central recess *c*, from which radiate flues *c′ c′ c′*, which are covered part way and communicate with the oven B, adjacent to the sides thereof. In the central recess *c*, I place a gas-burner *d*, the supply-pipe *d′* of which is extended to the exterior of the oven, where it intersects a larger vertical pipe *e*, from which extends a lateral branch *e′*, provided with a valve *f*, said branch communicating with the external air. The gas is introduced into the pipe *e* by a smaller pipe *g*, which projects lengthwise into the upper end of the pipe *e*, beyond the junction of the air-pipe *e′ e′*, and is secured air-tight around the same. The inner end of the pipe *g* is tapered and provided with a small opening for the passage of the gas, and the outer end thereof is attached to a main gas-supply pipe *h*, extending lengthwise the row of ovens and supplying gas to the burner under each in the aforesaid manner.

i represents a port extending from the exterior of the oven to the recess *c* to admit of the introduction of a torch for lighting the burner *d*. Said port is provided with a door having a transparent plate set in it to allow the person in charge of the apparatus to observe the condition of the flame.

The gas-pipe *g* is provided with a valve *g′*, equipped with a pointer *l* and a quadrant *l′*, by which to regulate the said valve, and thus control the flow of gas, and by means of the valve *f* the supply of air is controlled, so that by its mixture with the gas proper combustion is effected. The supply of gas may be obtained either from a natural source, when such exists, or from the distillation of the wood, as hereinafter described, or any other suitable or convenient source.

j denotes a flue which is extended laterally from the furnace C and part way around the oven immediately back of the fire-brick lining thereof, and communicates with a vertical branch flue F′ of a horizontal main flue F, extending lengthwise of the row of ovens and to a chimney E. A damper *k* is arranged in the flue F′, and provided with a handle *k′*, extending to the exterior of the oven to permit of regulating the draft through the flues.

By heating the ovens B B the wood contained in the retorts seated in said ovens becomes charred, and in this process vapor is emitted from the wood, which vapor is conducted from the retorts and condensed by the following appliances: The cover of each retort is provided with a short eduction-pipe *n′*, to which are interchangeably connected a cap *v* and a pipe *n*, which latter extends laterally therefrom and is hinged to another pipe *n″*, which is extended still farther from the side of the oven and is connected to the uppermost of a set of pipes *o o o*, coupled to-

gether and arranged in a serpentine or sinuous course in a cold-water tank D, which tank, with the pipes arranged therein, constitutes a condenser. The lowermost of the pipes *o* extends through the side of the tank D, and is provided thereat with a stop-cock *o'*. At the exterior of the described condenser are situated drums or chambers *p p p*—one for each condenser—and to said drums are connected the discharge ends of the pipes *o o o*. The vapors generated in the retorts pass through the pipes *n n n* and through the pipes *o o o*, and in passing through the latter the vapors become condensed into the form of pyroligneous acid and gas, both of which enter the drums *p p p*. From the top of each of said drums rises a pipe *p'*, provided with a valve *p''*, and deflected downward and connected to a pipe G, which is extended along the exterior of the ovens and to a suitable gasometer, (not shown in the drawings,) from which the pipes *h*, hereinbefore described, may be supplied with gas. In the drums *p p p* the gas becomes separated from the pyroligneous acid and passes off through the aforesaid pipes *p'* and G. The drums are tapped at their bases by pipes *r r*, which draw off the pyroligneous acid and conduct the same to a trough or troughs or other suitable conduits *r' r'*, which convey the said acid to a tank or tanks H, in which it is collected for subsequent treatment.

In order to permit of observing the progress of the process of charring and distilling the wood in the retorts A A, I attach to the pipe *n n* small pipes equipped with petcocks *s s*. By opening the latter and observing the color of the gas issuing therefrom the condition of the contents of retorts can be ascertained.

Between the two rows of ovens I place a railway R, upon which I mount a carriage or truck T, and upon the latter I mount a crane U, which is pivoted to turn in a horizontal plane, so as to permit the crane to be swung over the retorts at either side of the railway. The truck or frame T is made high enough to elevate the crane above the level of the tops of the retorts A. By means of this crane each retort, with the wood charred therein, is lifted out of the oven and carried to the place where the charcoal is to be deposited, and another retort charged with wood is carried to the empty oven and placed therein, the gas being in the meantime cut off from the burner *d* of said oven.

The small vertical pipes, which are provided with petcocks *s*, are connected with and carried by the movable pipes *n*. Each of the pipes *n* is so coupled with a pipe *n''* that said pipe *n* may be turned laterally and disconnected from pipe *n'* of cover A', and a cap *v* may then be secured to said pipe *n'* and connected with the derrick and the retort A raised from the oven.

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

1. The combination, with the oven B and the retort seated therein, of a heating-furnace consisting of a central recess *c*, provided with radiating flues, which communicate with the oven, and a flue *j*, which extends laterally from the furnace and partly around the oven along the lining thereof, the main flue F, communicating with the said flue *j*, and a gas-burner within the recess *c*, substantially as and for the purpose described.

2. The oven B, provided at its base with a central recess *c*, in combination with the retort A, seated in said oven, the gas-burner *d* in said recess, a pipe *d'*, extending from said burner to the exterior of said oven, the enlarged vertical pipe *e*, provided with lateral air-ducts *e'*, and gas-pipe *g*, provided with a valve and extending lengthwise into the end of the pipe *o* beyond the connection of pipes *e* and *e'*, substantially as and for the purpose described.

3. The combination, with a retort A, having a cover which is provided with a short pipe *n'*, of a pipe *n''*, movable pipe *n*, hinged to pipe *n''* and provided with a short pipe which has a petcock *s*, and a cap *v*, constructed to be removably attached to pipe *n'* of the cover, substantially as and for the purposes described.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 13th day of November, 1888.

CHARLES J. T. BURCEY. [L. S.]

Witnesses:
C. H. DUELL,
C. L. BENDIXON.