

No. 677,204.

Patented June 25, 1901.

G. O. GILMER.

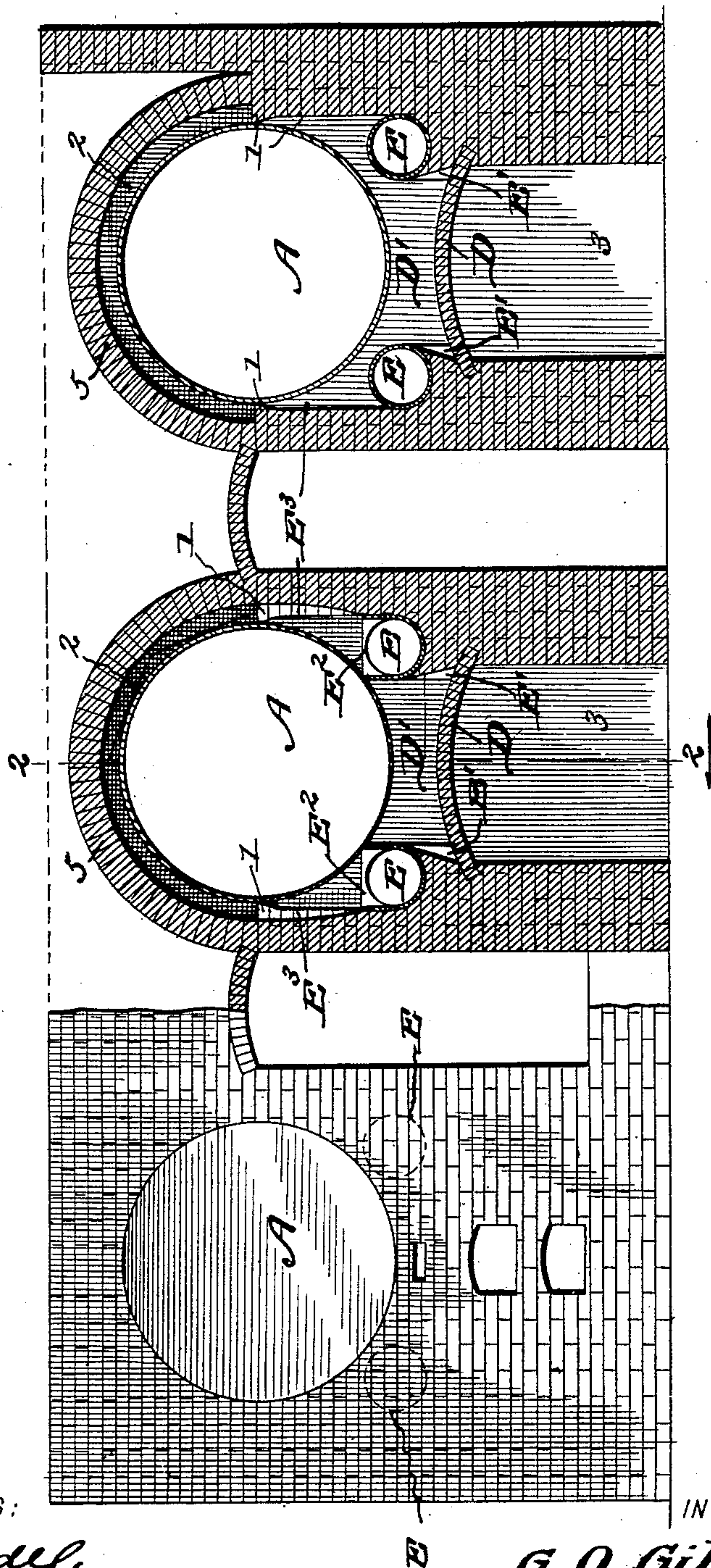
APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF WOOD.

(Application filed Aug. 18, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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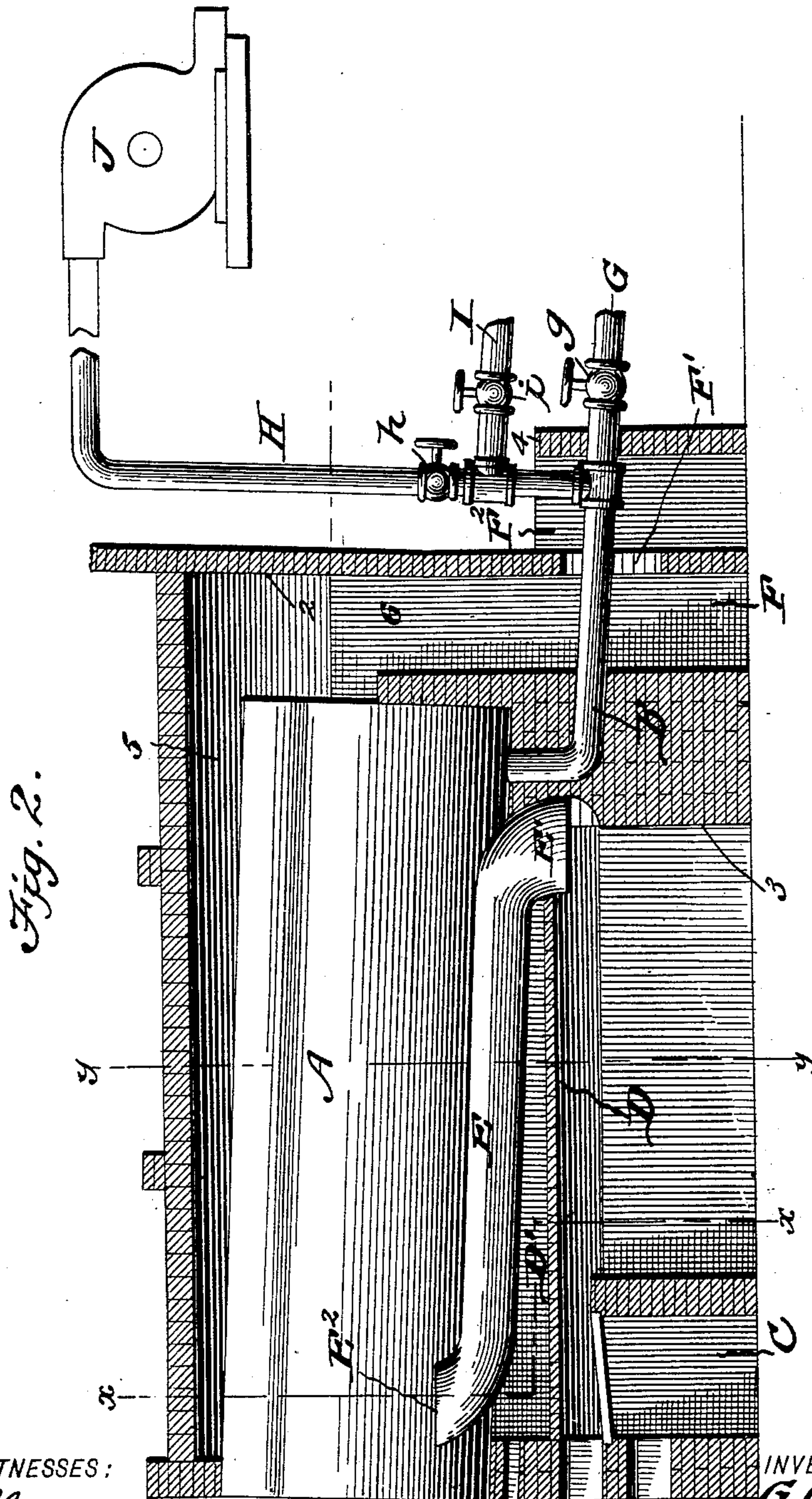
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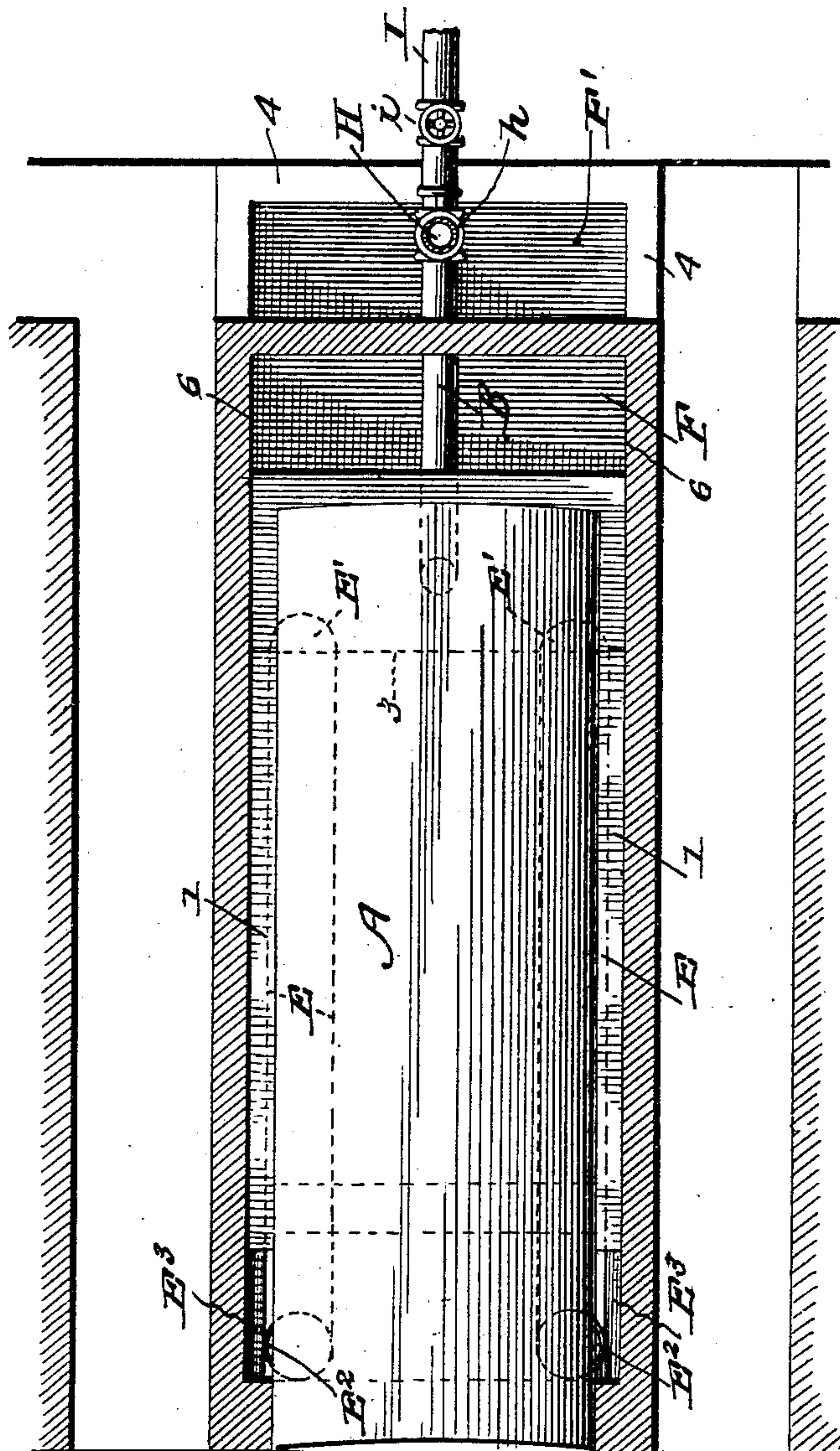
APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF WOOD.

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(No Model.)

3 Sheets—Sheet 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF WOOD.

SPECIFICATION forming part of Letters Patent No. 677,204, dated June 25, 1901.

Application filed August 18, 1900. Serial No. 27,302. (No model.)

To all whom it may concern:

Be it known that I, GEORGE O. GILMER, residing at New Orleans, in the parish of Orleans and State of Louisiana, have made certain new and useful Improvements in Apparatus for the Destructive Distillation of Wood, of which the following is a specification.

My invention is an improved apparatus for use in producing turpentine, tar, wood-alcohol, and charcoal from fat pine, and has for an object to provide a simple construction by which the vapors from the closed retort will be drawn from the bottom thereof while the heat will be applied to the top of the retort, so that the top portion of the wood in the retort will give off its vapors first, which vapors will descend through the cool wood below, so that the turpentine-vapors, which will be given off first, will be discharged from the vapor-discharge-free from any contaminating impregnation by the tarry or creosotic vapors.

The invention has for further objects to provide a novel construction by which to control the separate discharge of the products of distillation; and the invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation, partly in section, showing a battery of retorts and their furnaces embodying my invention. In this figure the still at the left is shown in front elevation, that in the middle in section on about line $x x$ of Fig. 2, and that at the right on about line $y y$ of Fig. 2. Fig. 2 is a longitudinal section drawn through one of the retorts on about line 2 2 of Fig. 1, and Fig. 3 is a sectional plan view of one of the retorts on about line 3 3 of Fig. 2.

In carrying out my invention I employ a closed or hermetically-sealed retort, from the bottom of which leads a vapor-discharge, together with heating devices arranged to discharge the heat directly to the top of the retort. It is well understood that heat ascends and that the top wood in the retort will be first heated and will therefore give off its vapors first. The first vapor from fat pine is turpentine, which is given off at 321° Fahrenheit. When the heat reaches 400° Fahrenheit at the top of the retort, the wood at

such point will give off tar and creosote oils, while the wood below it, being cooler, is still giving off turpentine vapors. If the turpentine-vapors should be passed through the wood that is giving off creosote and tar vapors, the turpentine, being a powerful solvent of these oils, will become impregnated with them, and as creosote and turpentine are so nearly of the same specific gravity it is practically impossible to separate them in distillation. As creosote is a non-drier, it makes the turpentine discharged merely in the nature of a solvent oil worthless as a drier for paint. By my invention I obviate all this by drawing off vapors with a vacuum-pump from the lowest point of the retort, it may be from the bottom or from one end on a line with the bottom of the retort, as shown in Fig. 2. By doing this the turpentine-vapors are all drawn down and out before the wood in the bottom of the retort gets hot enough to give off tarry and creosotic fumes, which enables me to produce by distillation a pure spirits of turpentine that is a perfect drier and in all respects as good as orchard turpentine.

In the construction shown the retorts A are preferably of steel in cylindrical form and arranged to incline toward one end, preferably the rear, from which point, at the bottom thereof, leads the vapor-discharge pipe B, which will be more fully described. In practice this retort is packed with wood, then hermetically sealed. It should be noted here that in the practice of my invention I do not introduce live steam into the retort, because the introduction thereof has the effect of partially saponifying the turpentine given off by the wood, with the result that when the turpentine is used in paint it leaves a soapy or fatty finish when it dries, rendering the turpentine worthless as a drier for paint. The furnace C is arranged below the retort at the front end of the latter, and a protecting-wall D extends above the furnace and rearwardly below the retort to a point near the rear end of the retort and operates to form a dead-air space D' below the retort for nearly the full length of the latter. The products of combustion pass from the furnace rearwardly below the wall D and discharge at the rear end of said wall to the flues E, of which I provide

two, one at each side of the apparatus and extending forwardly from their inlet ends E' in lines on opposite sides of and below the retort A to a point near the front end of said
 5 retort, where they discharge upwardly at E^2 to upwardly-extending flue-passages E^3 in the walls of the furnace, which conduct the heat, smoke, &c., and discharge the same directly
 10 to the top of the retort at a point near the front end thereof, as will be understood in Figs. 1 and 2 of the drawings.

Walls 1 are arranged to close the space on opposite sides of the retort above the flues E to a point near the front ends of the retort,
 15 where the flues E discharge at their forward ends to the spaces above the upper edge of the walls 1, so the heat discharged by the flues E will operate upon the upper portion of the retort and not upon the lower portion.

20 In Fig. 1 the shaded portion at 2 represents the back wall, also indicated by 2 in Fig. 2, and the portion 3 is the front face of the wall which supports the rear end of the retort. The part designated by 4 in Figs. 2 and 3 is
 25 the top of the wall which forms a support for the extended portion of the pipe B. In Fig. 2, 5 indicates the under side of the arch, and 6 in Figs. 2 and 3 indicates the inner faces of the upright walls at the opposite sides of the
 30 smoke-chamber F.

At the rear of the retort I provide a smoke-chamber F, to which the products of combustion are discharged and which communicates at F' with a smoke-uptake F^2 . The vapor-
 35 discharge pipe B leads through the smoke-chamber F and is provided with separate discharges for the different products of distillation, as will be presently described. By leading this discharge-pipe B through the smoke-
 40 chamber the heat in the latter operates to keep the native tar warm and soft, so it will discharge properly. The tar and pitch, which are not volatile, are drawn off at G, a valve g being provided to control the discharge of such
 45 matter. From the pipe B leads the turpentine-vapor pipe H, which extends upward and is provided at h with a valve, by which it may be closed at a point a short distance above the main vapor-pipe B. A short distance be-
 50 low the valve h I connect with the pipe H the pipe I, which is provided with a valve i . Through this pipe I the tar-oils, the creosote, and the pyroligneous acids pass to their condensers. By the several valves described I
 55 am able to control the discharge of the several products of the distillation and to direct the same to the desired point.

In the operation of the apparatus the steel retort is filled with wood and hermetically
 60 sealed. The fire is lighted in the furnace and the draft will draw the flames back under the protecting-wall D, and thence forward through the flues E, and then up, as indicated by the arrows, to the top of the retort, thus
 65 heating the wood at the top of the retort first, so that the turpentine-vapors, which are drawn off at the bottom or in a line with the bottom

of the retort, will pass only through cold wood and will not be contaminated by tarry or creosotic fumes. The valve h is open while the
 70 wood is giving off turpentine-vapors, and the other valves are closed. As is well understood, the turpentine-vapors are given off first and are drawn from the retort by a pump, which is indicated at J, and is preferably a
 75 vacuum-pump located in the distillery. These turpentine-vapors are discharged through the pipe H to a suitable condenser, (not shown,) and the operation of which is well understood
 80 by those skilled in the art. As soon as the turpentine in the wood has been extracted and creosotic and tarry vapors are given off the valve h is closed and the valve i is opened. The vapor is then discharged through the
 85 pipe I to separate condensers and is prevented from passing to and contaminating the condensers for the turpentine. The valve g may be opened as often as necessary to keep the vapor-discharge pipe B free of the native tar.

It will be noticed that the construction of
 90 the heating devices not only enables me to discharge the heat to the right point at the top of the retort, but also, by the construction of the protecting-wall, to produce a dead-air chamber, and enables me to control the tem-
 95 perature in the retort and hold it at the proper degree to cause the wood to give off the turpentine or the tar-oils, as desired.

By the use of the downdraft, as described, I am able to keep the bottom of the retorts
 100 so cool that the native tar-oil will run out instead of being burned up. The native tar and pitch of pine wood must be either drawn off at the bottom of the retort or else be suffered to burn up, and as such tar and pitch
 105 chill and harden the instant cold air operates upon them I provide a smoke-chamber which keeps the discharge-pipe warm until the tar and pitch are discharged.

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

1. In an apparatus for the destructive distillation of wood, the combination substantially as described, of the retort having a va-
 115 por-discharge at its lower end, the furnace, the protecting-wall leading from said furnace rearwardly below the retort and forming a dead-air chamber below such retort, the flues arranged to receive the products of combus-
 120 tion from such protecting-wall at a point near the rear end of the retort and extending thence forward to a point near the front of the retort, and a casing provided with flues and passages for receiving the products of com-
 125 bustion from said flues and directing the same to the top of the retort, substantially as set forth.

2. In an apparatus for the destructive distillation of wood, the retort for receiving the
 130 wood provided with a discharge-pipe having the branch H, the branch I and the branch or discharge G, and provided with the valves h , i and g for controlling the discharge of the

products of distillation, substantially as set forth.

5 3. An apparatus for the destructive distillation of wood comprising the retort for receiving the wood, the furnace, a protecting-partition between the furnace and retort, flues extending between the partition and retort and arranged at their rear ends to receive the products of combustion from the furnace and
10 to discharge the same to the retort at the

front end of the latter, means for directing such products substantially to the top of the retort, and the tar and vapor discharge at the lower end of the retort, substantially as described.

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Witnesses:

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