

(No Model.)

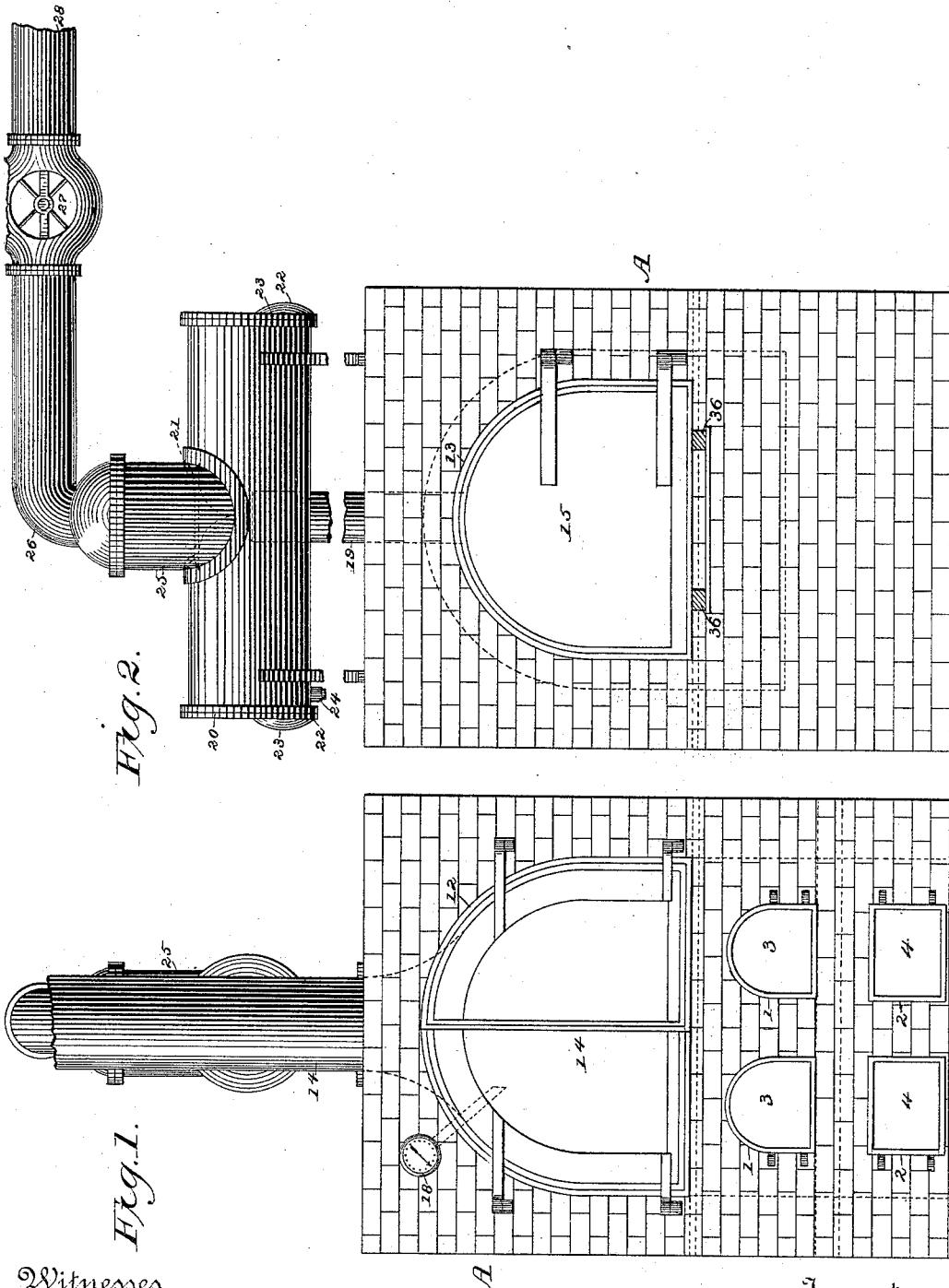
3 Sheets—Sheet 1.

S. H. SPANGLER.

APPARATUS FOR DISTILLING WOOD.

No. 417,752.

Patented Dec. 24, 1889.



Witnesses

*Wm. H. Musser.*  
*B. H. Sommers.*

Inventor

*Samuel H. Spangler.*

By his Attorney

*J. M. Yznaga.*

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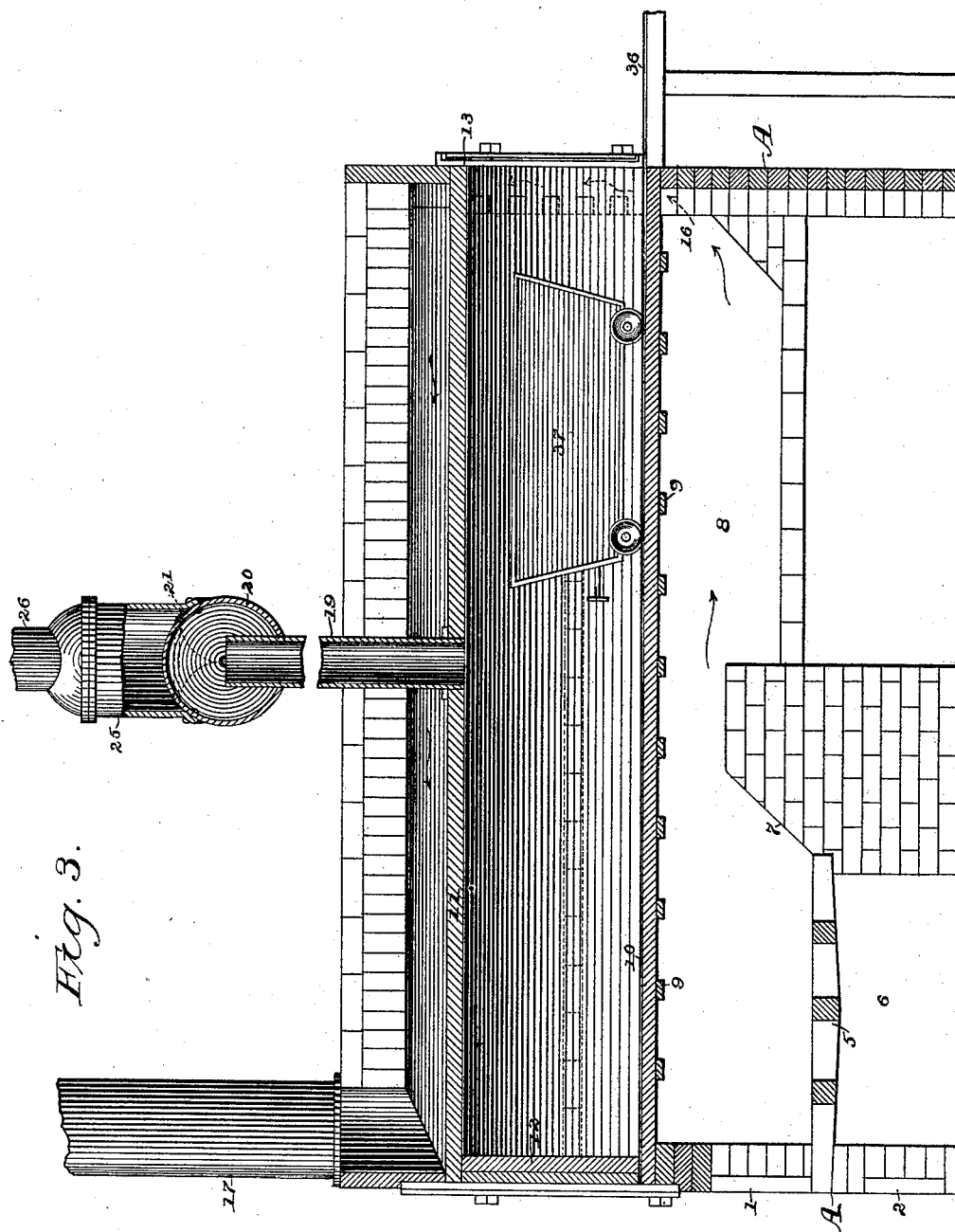


Fig. 3.

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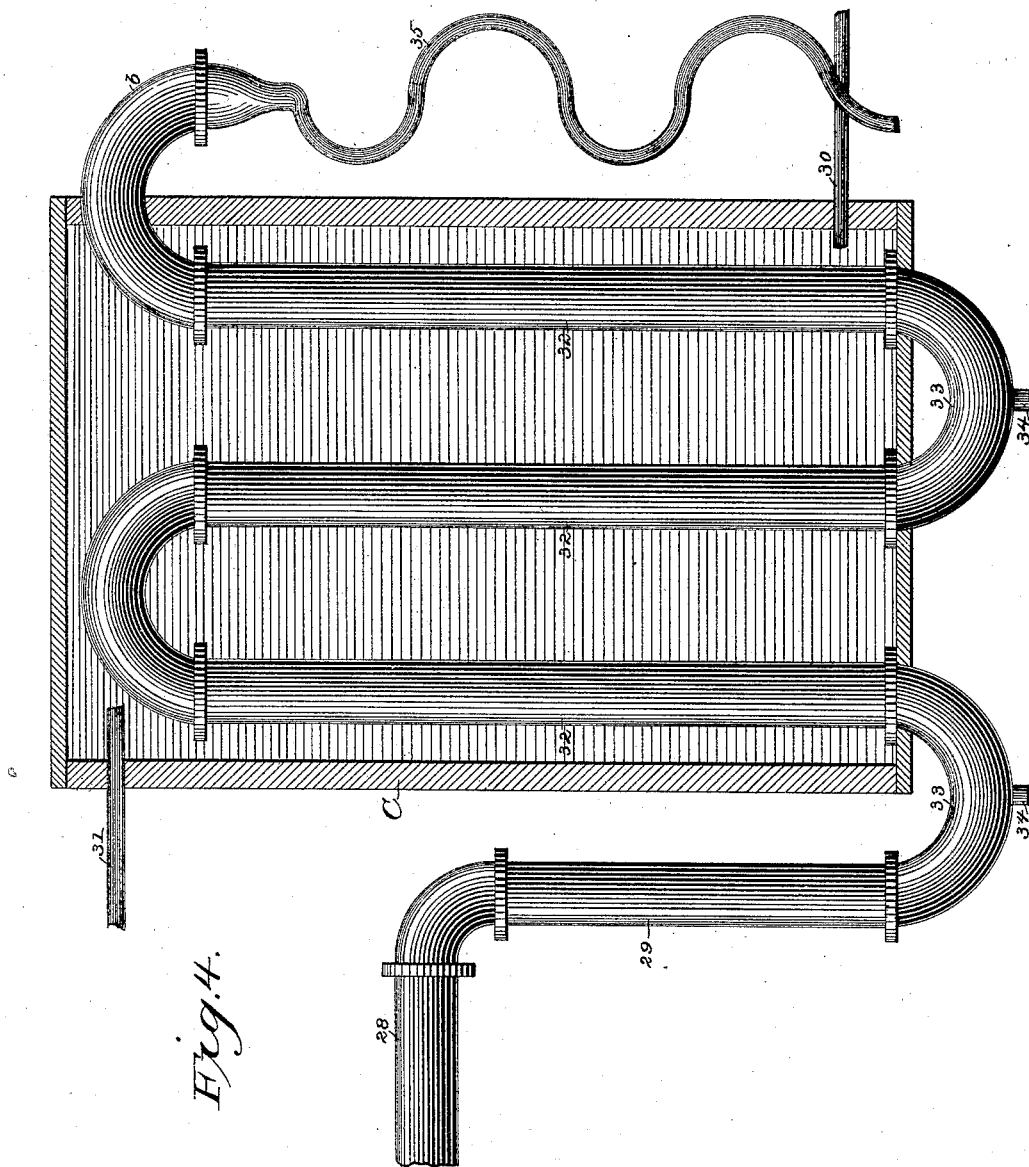


Fig. 4.

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# UNITED STATES PATENT OFFICE.

SAMUEL H. SPANGLER, OF PALESTINE, TEXAS, ASSIGNOR OF ONE-HALF TO  
L. LEWENTHAL, OF SAME PLACE.

## APPARATUS FOR DISTILLING WOOD.

SPECIFICATION forming part of Letters Patent No. 417,752, dated December 24, 1889.

Application filed June 20, 1889. Serial No. 314,948. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL H. SPANGLER, a citizen of the United States, residing at Palestine, in the county of Anderson and State of Texas, have invented certain new and useful Improvements in Furnaces and Apparatus for Distilling Wood; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention has relation to improvements in furnaces and apparatus for distilling wood of that class wherein the liquids of the wood are extracted by subjection in a closed heated chamber or retort and carried by vaporization through the process of distillation to condensation.

The improvements involved in my invention are fully illustrated in the accompanying drawings, and hereinafter I have specifically described the same, so as to distinguish my invention from other inventions.

In the drawings, Figure 1 is a front view, in elevation, of the furnace. Fig. 2 is a rear view, in elevation, of the furnace, a portion being shown removed to illustrate the retort-pipe. In this figure are also shown the receiver, the dome with the deflector, and the exhaust-pipe. Fig. 3 is a longitudinal central section of the furnace and retort and vertical section of the retort-pipe, the receiver, and dome, a car being shown in position in the retort. Fig. 4 is a view of the water-box and condensing-pipes with the discharge-pipe.

A designates the brick-work of the furnace having end walls and side walls to properly inclose, surround, and support the retort.

In the front of the furnace are openings 1 and 2, the former leading into the fire-chamber of the furnace, and are closed by doors 3, properly mounted and closing tight, and the latter openings 2 leading into the ash-pit and provided with doors 4 to close them. The fire-chamber is provided with grate-bars 5, arranged over the ash-pit 6, with one end rest-

ing in the front wall of the furnace and the other or rear end resting on the bridge 7, the lower part of which forms the back wall of the ash-pit, and the bridge being built to a proper height in the furnace to throw the flames upward and into the combustion-chamber 8 at the rear. Transversely arranged across the furnace are a sufficient number of supporting-bars 9, having their ends fixed in the masonry of the furnace, and these support the retort.

B designates the retort. This consists of a chilled-iron-plate bottom 10, resting on the supporting-bars 9, and a fire-clay body 11, having vertical sides and arched top or roof, substantially as shown. This clay body 11 may be molded and built of plastic material or composed of fire-clay bricks laid up to suit the construction, with iron end facings 12 13 at front and rear bracing the masonry of the retort and furnace and having the ends closed by doors 14 15, fitting gas-tight over the openings of the retort. The retort is arranged in the masonry with a draft-space about its sides and top, to which the draft of the furnace communicates through flues 16, located at the rear of the furnace. At the front is the stack 17. The stack or flues are provided with suitable dampers to control the draft of the furnace. At the front of the furnace is arranged a pyrometer 18, from which the condition of the heat in the retort may be ascertained. In the center of the retort is fixed the vertically-arranged escape-pipe 19, through which the escaping gases are carried into a cylindrical receiver 20, located on the top of the escape-pipe. The escape-pipe extends up in the reservoir, as shown, with its open end arranged directly under an inverted cone-shaped deflector 21, which deflects and distributes the rising fumes or gases about in the reservoir, causing precipitation of any solid or tarry matter which may be carried forward by the gases. At each end of the reservoir is a hand-hole 22, through which access to the reservoir may be had for the purpose of removing the deposits. These hand-holes are covered by caps or doors 23. In the bottom of the reservoir is a spigot 24, through which the liquid deposits may be

discharged when desired. Over the deflector on the receiver is secured a dome 25, which has an exhaust-pipe 26, connected to its top. This exhaust-pipe is curved above its connection to the dome, substantially as shown, and has in it an exhaust-fan 27, operated by any suitable mechanism. From the exhaust-fan leads the conveying-pipe 28, having a connection with the exterior vertical pipe 29 of the condensing-pipes in the water-box.

C designates the water-box. This is made of suitable dimensions to receive the condensing-pipes, and is provided at the bottom with a feed-pipe 30 and at the top with a discharge-pipe 31, whereby the contents of the water-box may be constantly supplied and kept fresh through the discharge-pipe. In the water-box are the condensing-pipes 32, being composed of vertically-arranged pipes connected at their top and bottom, the connections 33 at the bottom being disposed on the outside of the box and provided with spigots or cocks 34, by which the precipitated and condensed deposits remaining in the pipes may be discharged as desired. The upper end of the last arm of the condensing-pipes projects from the water-box, as at *b*, and has connected thereto a small worm-pipe 35, through which the volatile gases escape or are conducted to such reservoir (not shown) as may be supplied for their retention or distribution.

At the rear of the retort is a tramway 36, on which the cars 37, containing the materials to be treated, are conveyed. The trucks or cars are provided with metal boxes to retain the materials to be treated, and are run into and out of the retort through the openings covered by the doors.

Having thus described my invention, so as to distinguish it from other and prior inventions, I proceed to particularly point out the parts and combinations I claim as my invention, as follows:

1. In an apparatus for distilling woods, the combination, with the heating-furnace, of a fire-clay retort provided with a metal bottom

arranged directly over the fire and combustion chambers of the furnace, a vertically-arranged escape-pipe in the roof of the retort, a receiver on the upper end of the escape-pipe provided with a deflector arranged over the end of the escape-pipe, a dome on the receiver arranged over the deflector, and an exhaust-pipe attached to the dome, substantially as described.

2. In an apparatus for distilling woods, the combination, with a furnace containing a closed retort, of an escape-pipe leading from the retort, a receiver mounted on the escape-pipe with the end of the escape-pipe projecting into the receiver, a deflector in the receiver arranged over and above the open end of the escape-pipe, a dome over the deflector, an exhaust-pipe provided with an exhaust-fan, a conveying-pipe leading from the exhaust-fan, a water-box, a series of condensing-pipes arranged in the water-box with the upper end of the last pipe thereof projected from the box, and a small coil-pipe attached to the end of the condensing-pipe, substantially as described, and for the purpose specified.

3. In an apparatus for distilling woods, the combination, with the conveying-pipe leading from the retort, of a tight water-box provided with an inlet-pipe at its bottom and an outlet-pipe at its top, a series of condensing-pipes arranged in the water-box with their lower ends connected by elbows projected below the bottom of the water-box and provided with drain-cocks, and a coil-pipe arranged outside of the water-box, having its upper end connected to the upper end of the condensing-pipe, substantially as described, and for the purpose specified.

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

SAMUEL H. SPANGLER.

Witnesses:

LOUIS LEWENTHAL,

his  
ALBERT X WILLIAMS.  
mark