

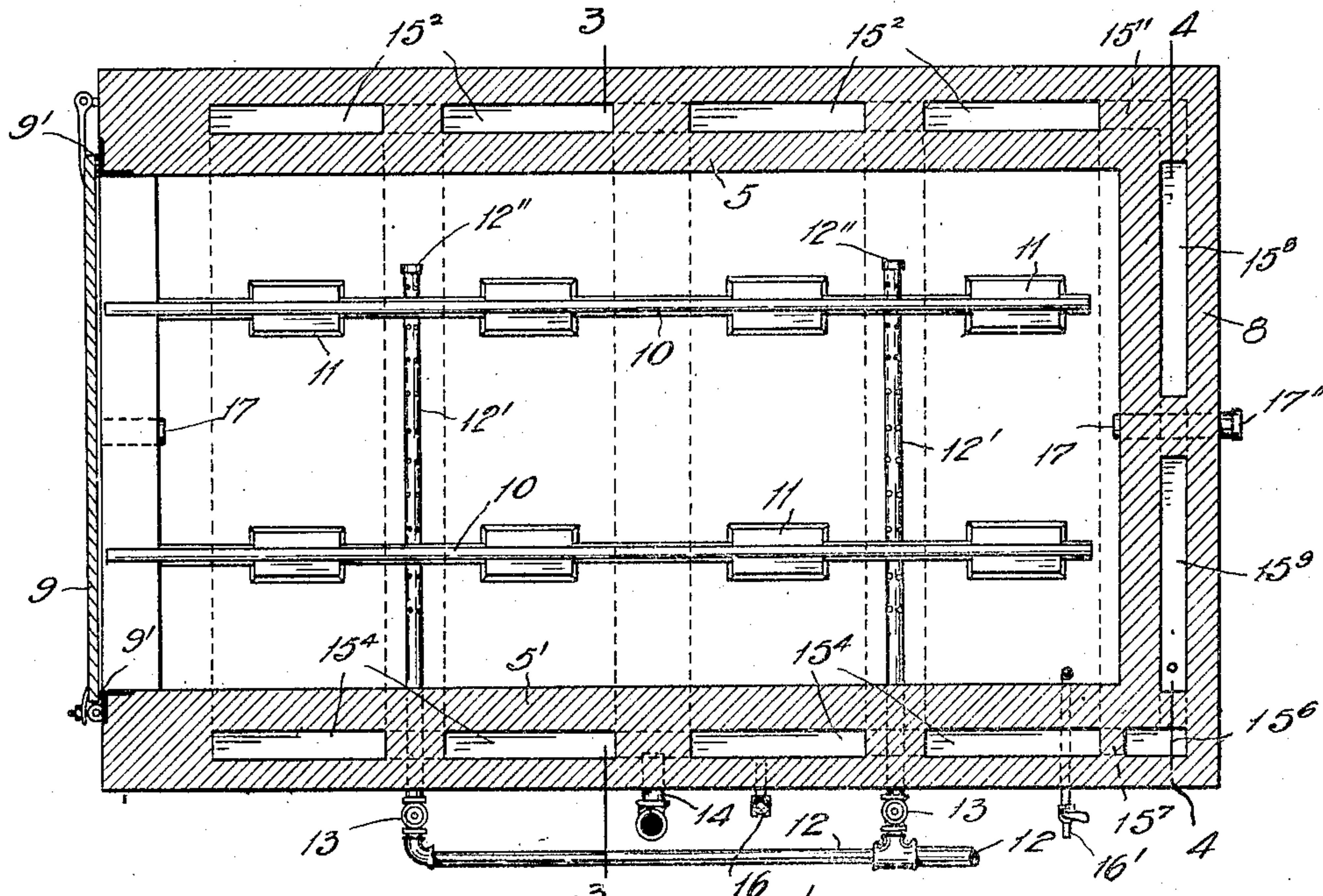
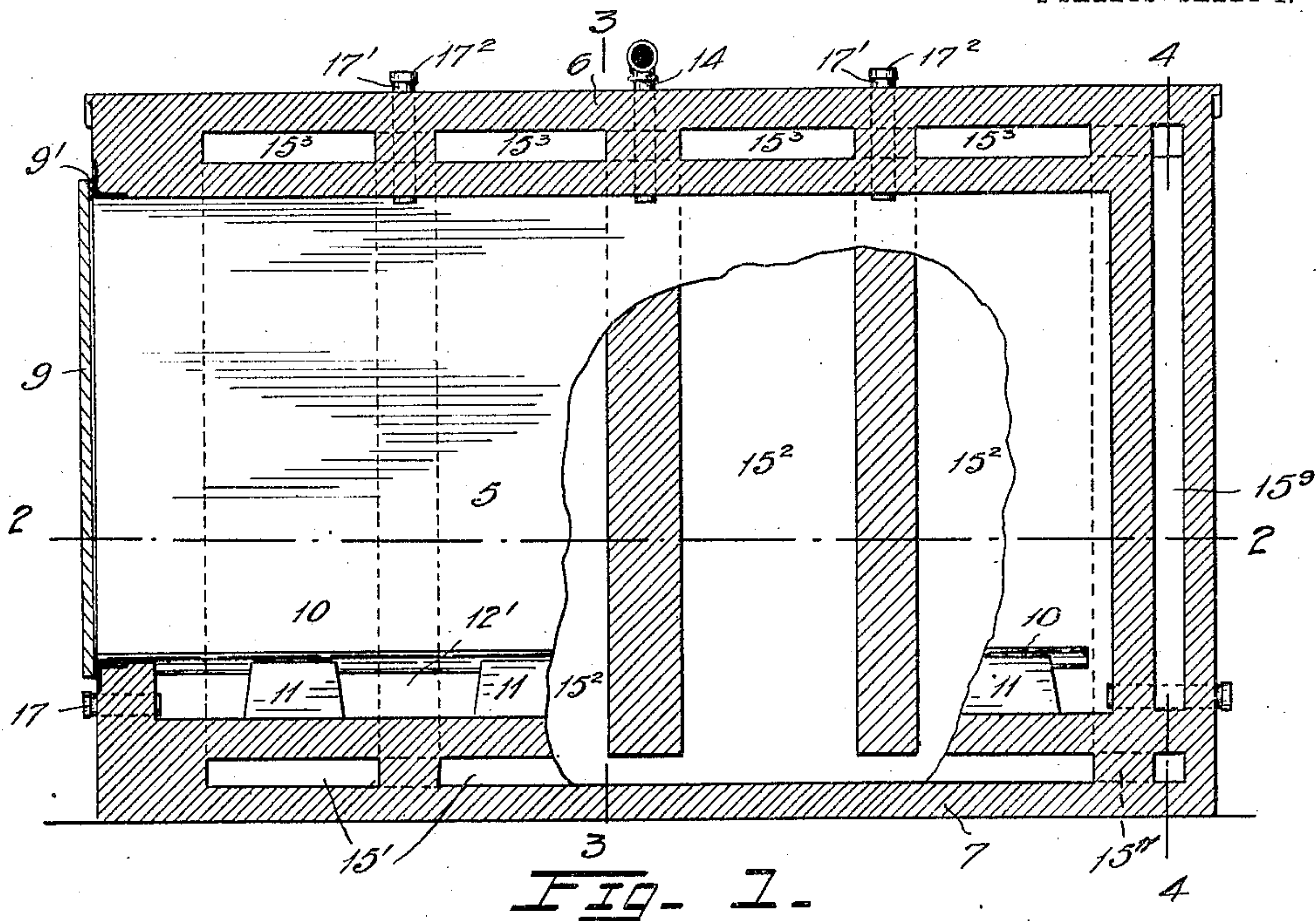
No. 890,944.

PATENTED JUNE 16, 1908.

A. J. UPHUS.
DRY KILN.

APPLICATION FILED DEC. 9, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

Horace Barnes
Q B Smith.

INVENTOR:

A. J. Uphus

BY

Pierre Barnes
ATTORNEY.

No. 890,944.

PATENTED JUNE 16, 1908.

A. J. UPHUS.
DRY KILN.

APPLICATION FILED DEC. 9, 1907.

2 SHEETS—SHEET 2.

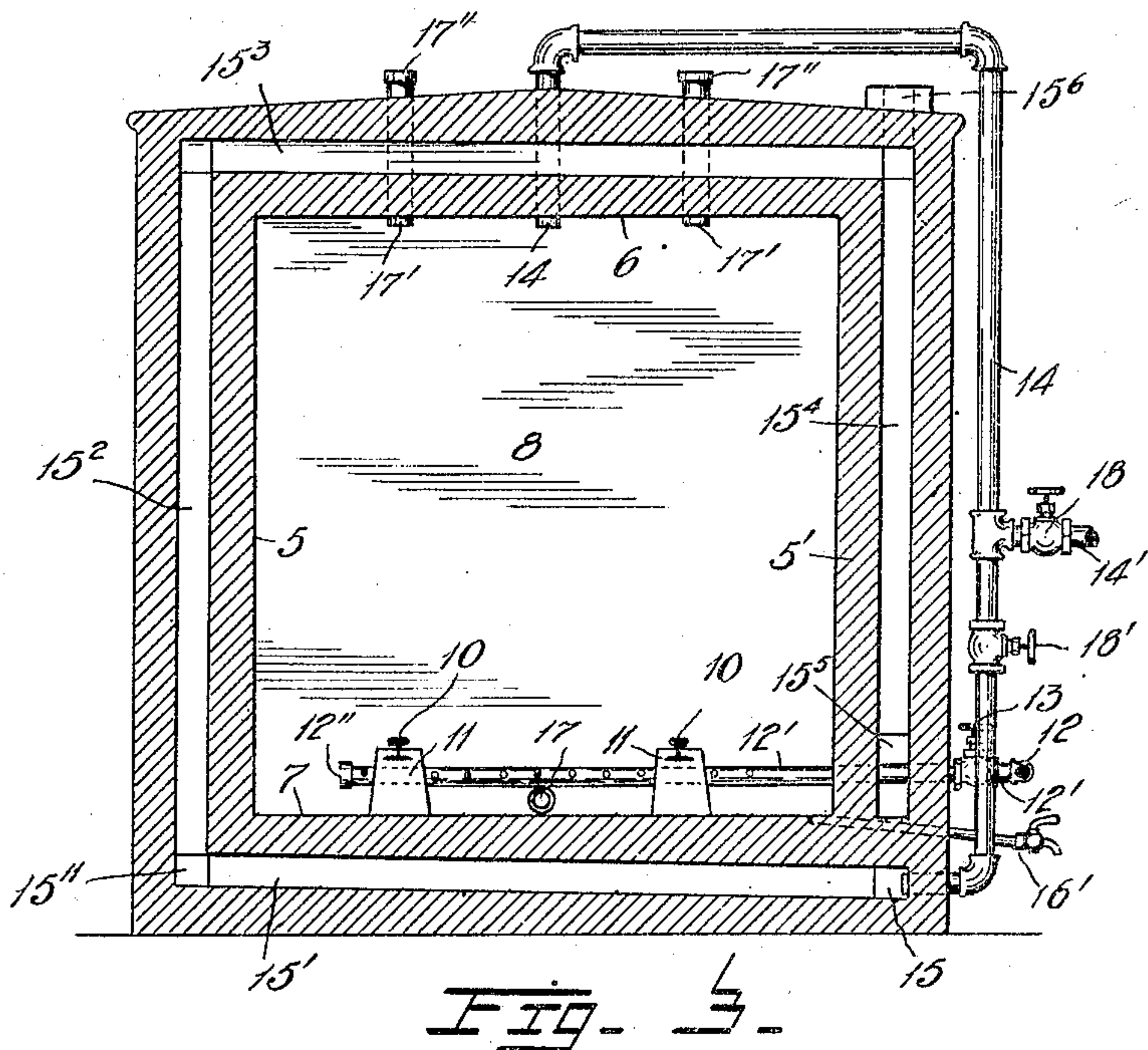


Fig. 3.

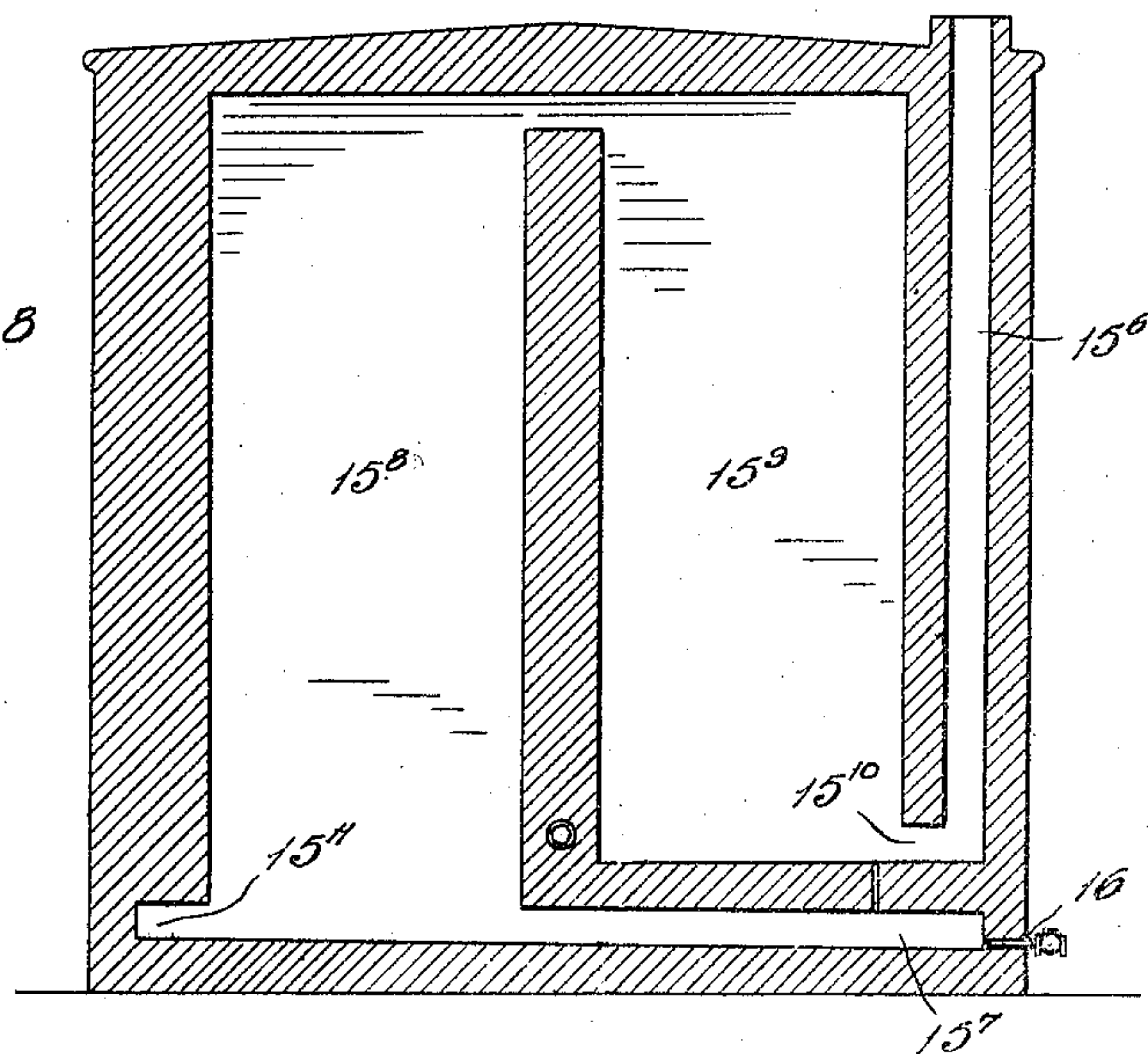


Fig. 4.

WITNESSES:

Horace Barnes
G. B. Smith

INVENTOR.

A. J. Uphus

BY

Pierre Barnes
ATTORNEY.

UNITED STATES PATENT OFFICE.

ANTON J. UPHUS, OF SEATTLE, WASHINGTON, ASSIGNOR TO THE AMERICAN WOOD EXTRACT COMPANY, OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

DRY-KILN.

No. 890,944.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed December 9, 1907. Serial No. 405,810.

To all whom it may concern:

Be it known that I, ANTON J. UPHUS, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Dry-Kilns, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to dry-kilns; and while it may advantageously be employed in various services, it is especially intended for use in the drying of lumber and other wood products.

15 The object of the invention is the improvement in the efficiency of apparatus of this type through the utilization of a readily controlled drying agent to its maximum extent and of so applying such agent that it will act directly upon the material being treated as well as serving to maintain the dry-house at a uniformly high temperature; and whereby the drying is effected with a minimum of deterioration such as from 20 warping, checking or splitting, and at a relatively low cost.

With these and other ends in view, the invention consists in the novel construction, adaptation and combination of parts, as will 30 be hereinafter described and claimed.

In the drawings, Figure 1 is a central longitudinal vertical section of a dry-kiln embodying my invention and with the inner part of the disclosed side wall partly broken 35 away. Fig. 2 is a plan view taken through 2—2 of Fig. 1. Figs. 3 and 4 are transverse sectional views taken respectively through 3—3 and 4—4 of Figs. 1 and 2.

The kiln structure is comprised of side 40 walls 5 and 5', a top 6, a floor 7, a rear wall 8, and, at the front, a hinged door 9. Each of these walls as well as the roof and floor are chambered to provide communicating flues, or conduits, which will be hereinafter de- 45 scribed.

Interiorly of the kiln are longitudinally disposed track-rails 10 which are supported at some distance above the floor by pedestals 11 and are arranged to be connected by a 50 removable section of track-rails with permanent ones outside of the kiln after the door 9 is opened to allow of a car being

brought into or removed from the kiln with a charge of lumber.

12 is a pipe line leading from a source of 55 steam supply and is provided with one or more branches 12' which extend into the kiln-chamber. These branches are closed at their extremities, as by caps 12'', but are foraminated interiorly of the kiln so that 60 the steam is emitted by multitudinous jets into the kiln chamber. 13 represents valves for regulating the admission of steam to said branch pipes. Opening into the kiln chamber is a discharge pipe 14 for conducting the 65 exhaust steam from this chamber, after the steam has acted upon a charge, to the after-said flues in the kiln structure. These flues comprise a longitudinal one 15 at or near the bottom of the wall 5', into which the 70 exhaust steam first enters from the pipe 14 thence it flows by cross-flues 15' extending through the floor 7 to vertically arranged flues 15² in the other side wall 5, wherefrom it is led by return flues 15³ in the kiln top 6 75 to down-flow flues 15⁴ in the wall 5', whence it escapes through a passage 15⁵ to an uptake flue 15⁶ discharging ordinarily into the atmosphere. Under certain conditions, however, as for recovering the more volatile 80 products from resinous woods, the flue 15⁶ would be connected with a suitable condenser or with a gasometer.

The end of pipe 14 entering the flue 15 is desirably located about centrally of the 85 length of the kiln and intermediate the flues 15' in order that the steam discharge from the pipe may be baffled in its course sufficiently to distribute the same among several flues 15' and to furthermore retard its flow to 90 enable a portion of the steam entering through a passage 15⁷ into communicating flues 15⁸ and 15⁹ in the kiln wall 8 which, in turn, connect by a duct 15¹⁰ with the uptake flue 15⁶. 95

At the junction of the flues 15' with 15² is a longitudinal passage 15¹¹ connecting them together and likewise with the flue 15⁸ to establish a flow therebetween to equalize pressures in each. The transverse flues are de- 100 sirably formed with their bottoms sloping so that the condensation which may occur can be collected and drawn off by pipes such as 16.

Ventilating pipes such as 17 and 17' are respectively provided at the lower and upper parts of the kiln chamber for the intake and egress of air which is oftentimes employed in the drying processes and are severally provided with removable caps 17² or equivalent obturating devices, such as valves.

14' is an outlet to the pipe 14 whereby connection is made to a condenser instead of utilizing, as before explained, the steam within the kiln walls, and to such ends valves 18 and 18' are provided to control the direction of the flow. Where it is determined to divert the exhaust steam from the kiln-flues, it is obvious that the flue-spaces of the wall will serve to render the latter poor conductors of heat, and the loss thereof by radiation would be less than if solid.

The door 9 is arranged with a packing strip, or gasket, 9' about its edges, while the door itself should be lined with asbestos or an equivalent heat non-conducting material.

The charge of lumber, shingles, lath or other mill products which is to be dried, is loaded upon a car in such a manner that there will be as many interstices as possible between the component parts thereof. The door is then opened and the car wheeled into the kiln while the beforementioned removable section of track is temporarily in place to span the gap between the track outside with that inside of the kiln, and is thereafter removed to allow of the closing of the door. The door is then secured by suitable clamping devices to make a joint thereabout which is impervious to air. Superheated steam is now admitted into the drying chamber of the kiln to immediately act upon the charge which, in being subjected to a high temperature, affects the same to cause the exudation of its contained liquids by a sweating process, as it were, and also such of the solid components thereof as would be rendered into fluids by the action of the prevailing heat. Such exuded substances are to an extent taken up by the steam and conveyed therewith, in the earliest portion of the drying, through the outlet 14' to a condenser for separating the foreign volatilized substances from the steam. The residue of the exuded substances, that is, the less volatile, gravitates to the floor of the chamber whence it can be drawn off by the pipes 16'. After thus continuing the process for a time dependent upon the character of the wood being treated, or until the more volatile of the exudations have been removed, the current of the discharge steam is caused to flow into and through the flues of the kiln structure and thus continued until the drying of the charge is completed, or nearly so, when the steam may be entirely cut off.

The ventilating pipes 17 and 17' are respectively employed to admit dry air into the kiln and liberate the same without the kiln

in a moist condition and when the drying of the charge has been nearly completed through the direct action of the steam upon the charge. The air in being allowed to flow through the previously heated kiln is capable of completing the drying operations through its capacity to absorb heat and moisture.

Among the advantages inherent to the present invention is the rapidity with which the drying of lumber may be attained, thus accomplishing by a relatively small kiln, by a repetition of drying processes upon successive charges, the work which has hitherto been subjected for longer periods in other and larger types of kilns.

Mill products which are dried in the described manner emerge from the kiln in good condition, without being warped and with a minimum amount of checking or other deterioration.

Having described my invention, what I claim, is—

1. The combination with a dry-kiln provided with communicating flues in its walls, a pipe leading from a source of steam supply and extending into the chamber, air inlet and outlet pipes making communication with the interior of the chamber and the atmosphere exteriorly of the kiln, and means to regulate the flow of air through such last named pipes, of a pipe conduit for discharging the steam from the kiln chamber into said flues.

2. The combination with a dry-kiln provided with communicating flues in its top, bottom and vertical walls, a pipe leading from a source of steam supply and extending into the chamber, air inlet and outlet pipes making communication between the interior of the chamber and the atmosphere exteriorly of the kiln, and means to regulate the flow of air through such last named pipes, of a pipe conduit for discharging the steam from the kiln chamber into said flues.

3. The combination with a dry-kiln provided with communicating flues in its walls, and a pipe leading from a source of steam supply and extending into the chamber and provided with perforations within such chamber, of a pipe conduit for discharging the steam from the kiln-chamber into said flues.

4. The combination with a dry-kiln provided with communicating flues in its walls, and a pipe leading from a source of steam supply and extending into the chamber and provided with perforations within such chamber, of a pipe conduit for discharging the steam from the kiln-chamber into said flues, and means whereby such flow of steam may be discharged without entering said flues.

5. The combination with a dry-kiln provided with communicating flues in its top, bottom and vertical walls, and a pipe leading from a source of steam supply and extending

into the chamber, of a pipe conduit for discharging the steam from the kiln chamber into said flues, and means whereby such flow of steam may be discharged without entering
5 said flues.

6. The combination with a dry-kiln provided with communicating flues in its walls, a pipe leading from a source of steam supply and extending into the chamber, air inlet and
10 outlet pipes making communication between the interior of the chamber and the atmosphere exteriorly of the kiln, and means to regulate the flow of air through such last named pipes, of a pipe conduit for discharging the steam from the kiln chamber into said
15 flues, and means whereby such flow of steam may be discharged without entering said flues.

7. The combination with a dry-kiln provided with communicating flues in its top, bottom and vertical walls, a pipe leading from a source of steam supply and extending into the chamber and provided with perforations within such chamber, air inlet and outlet pipes making communication between the
20 interior of the chamber and the atmosphere exteriorly of the kiln, and means to regulate

the flow of air through such last named pipes, of a pipe conduit for discharging the steam from the kiln chamber into said flues, and a
30 valve for regulating the flow of steam through said conduit pipe.

8. The combination with a dry-kiln provided with communicating flues in its top, bottom and vertical walls, a pipe leading
35 from a source of steam supply and extending into the chamber and provided with perforations within such chamber, air inlet and outlet pipes making communication between the interior of the chamber and the atmosphere
40 exteriorly of the kiln, and means to regulate the flow of air through such last named pipes, of a pipe conduit for discharging the steam from the kiln chamber into said flues, a valve for regulating the flow of the steam through
45 said conduit pipe, and means whereby the flow of steam may be discharged without entering said flues.

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

ANTON J. UPHIUS.

Witnesses:

N. TALLENTIRE,
HORACE BARNES.