

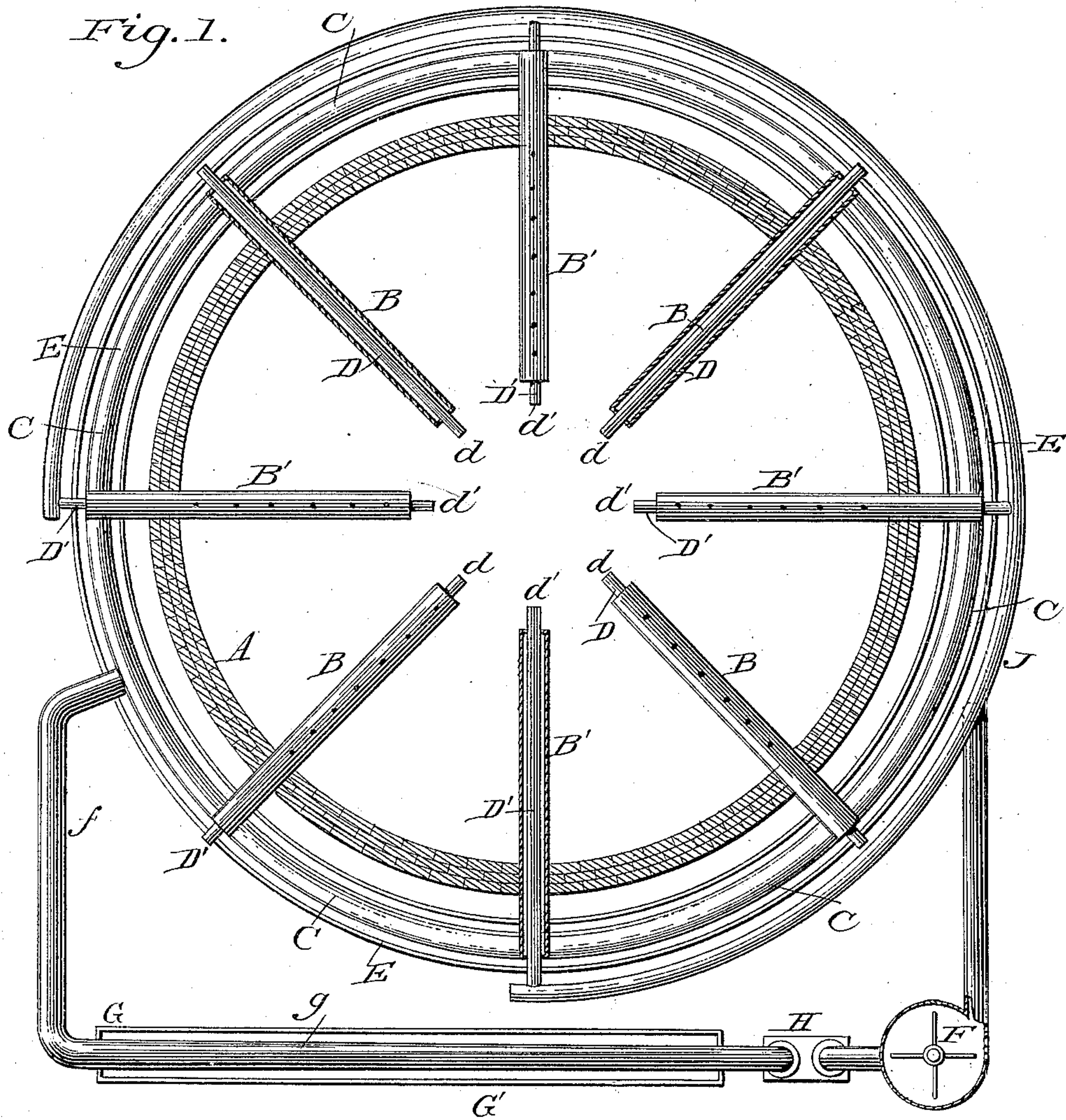
(Model.)

2 Sheets—Sheet 1.

J. A. MATHIEU.
APPARATUS FOR DISTILLING WOOD.

No. 344,917.

Patented July 6, 1886.



Witnesses:

J. S. Hollingworth
Forrest H. West

Inventor:

Jean A. Mathieu,
By J. C. Haley,
Attorney.

(Model.)

2 Sheets—Sheet 2.

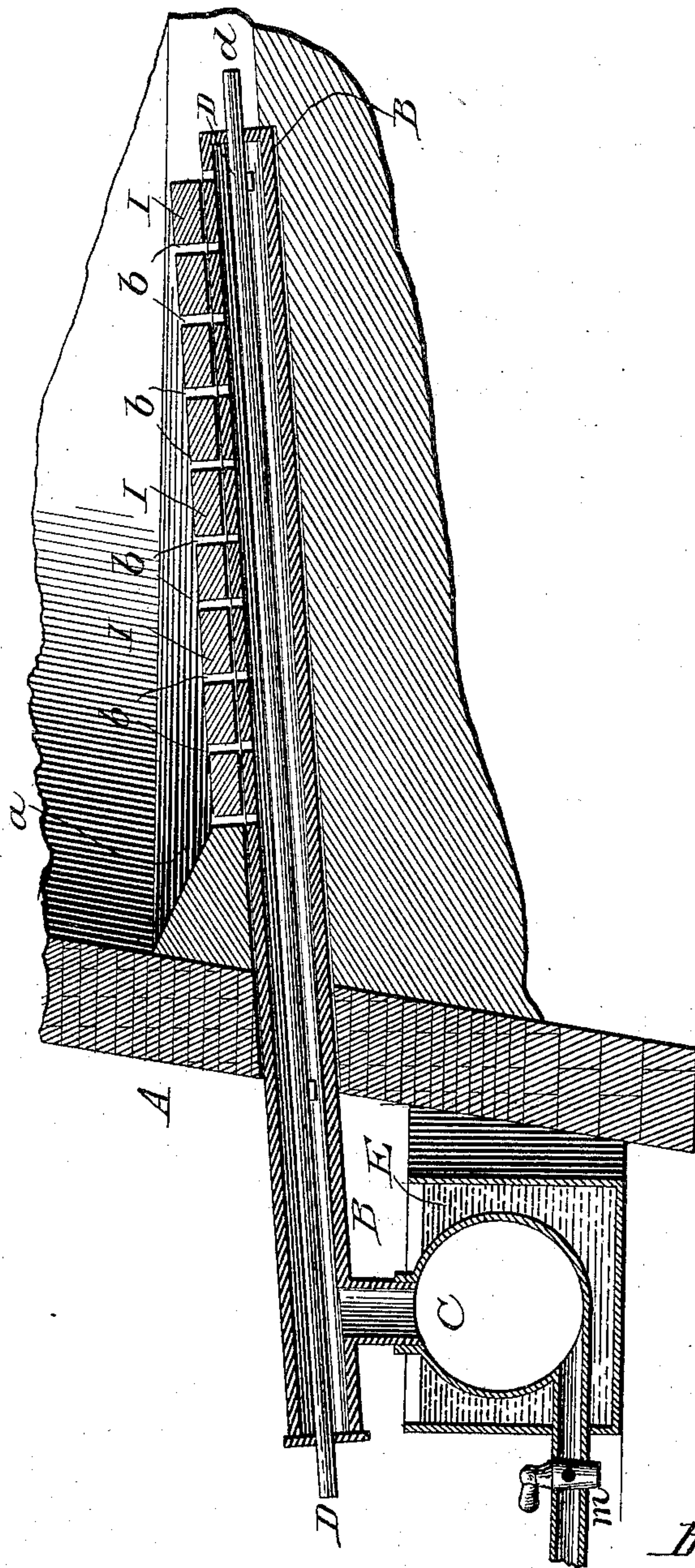
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Fig. 2.



Witnesses:

J. S. Hollingsworth
Forrest H. West

Inventor:

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UNITED STATES PATENT OFFICE.

JEAN A. MATHIEU, OF DETROIT, MICHIGAN.

APPARATUS FOR DISTILLING WOOD.

SPECIFICATION forming part of Letters Patent No. 344,917, dated July 6, 1886.

Application filed October 30, 1882. Serial No. 75,435. (Model.)

To all whom it may concern:

Be it known that I, JEAN ANTOINE MATHIEU, now residing at Detroit, in the State of Michigan, have invented certain new and useful
5 Improvements in Apparatus for Carbonizing Wood and Separating the Products of Distillation.

The following is a specification of my improvements, reference being had to the accompanying drawings, wherein—

Figure 1 represents a plan view of the entire system of apparatus, and Fig. 2 a vertical section through a portion of the kiln and one of the condensers placed therein, the scale being
15 somewhat enlarged to show the details more accurately.

The primary objects of my invention are to economize space in construction and to avoid waste of heat.

20 In the accompanying drawings, the system is shown as applied to a kiln of "bee-hive" form; but I do not desire to limit its use to that connection, as it may be employed advantageously with the ordinary Swedish kiln or with the "meiler" of earth, &c.,

30 In Fig. 1, A represents the wall of the kiln, constructed, preferably, of brick, and having the usual doors for charging and discharging. The bottom should be slightly inclined, as indicated at *a*, so as to facilitate the collection of any products of distillation that may condense within the kiln. A series of conduits, B, of any desired number, which may be constructed of iron or wood protected by brick-
35 work I, lead from the interior of the kiln to an annular pipe, C, which preferably surrounds the kiln, as shown. The conduits B are provided with ducts or openings *b*, communicating with the interior of the kiln, and each conduit is traversed by a metallic pipe, D, whose
40 open end terminates near the center of the kiln in a nozzle or spout, *d*. The pipe C should be immersed in a water-trough, E, or otherwise cooled.

45 To insure greater efficiency and rapidity of operation, I employ a blast-fan, F, of any of the well-known forms, whose exhaust communicates with the pipe C, and whose blast-pipe *f* leads to a secondary condenser, G *g'*, and
50 thence through a safety apparatus, H, to an annular pipe, J. The pipe J communicates with pipes D', leading back into the kiln

through conduits B', arranged similarly to the conduits B.

The details of the safety apparatus H need 55 not be more particularly adverted to, as a convenient form is fully shown and specified in Letters Patent No. 208,835, granted to me under date of October 8, 1878, and I do not desire to limit myself in the present instance 60 to any one form as essential.

The condenser G may be of any of the well-known forms; or, as shown in the drawings, may be merely a long pipe, *g*, immersed in a cold-water trough, G'. 65

The pipe C is provided with proper faucets, *m*, to drain its liquid contents.

The operation of the apparatus is as follows: The kiln having been charged with wood the fires are lighted in the usual manner, and the 70 process of distillation commences. The volatilized products descend to the bottom of the kiln, and such of them as are condensed by the cold wood near the bottom drain down the inclined sides *a* and through the nearest ducts 75 *b* into the pipes B, whence they run into the pipe C. The uncondensed vapors pass out by the ducts *b* also, and are then more or less condensed (according to their character) by contact with the metallic pipe D, through 80 which the cold outside air is being drawn into the kiln by the draft of the fire. The double effect of cooling the vapors of distillation and heating up the air admitted to the fire is thus produced, and the loss of heat is reduced to a 85 minimum. This indraft of air is aided, if desired, by the use of fan F, and since in this case the vapors of distillation are drawn out with considerable rapidity, it is desirable to employ the condenser G to effect complete con- 90 densation. In such case the gases remaining after the complete condensation of the vapors may be advantageously used for aiding the combustion, and hence after passing them through a safety apparatus to avoid explosion 95 they are driven back into the kiln through the pipes D', and in their passage are reheated and aid in condensing the vapors in the conduits B' in a manner similarly to the action which takes place in the conduits B. The products 100 condensed in the pipes B and B' drain down into the pipe C, whence they may be drawn off by suitable cocks, *m*.

It is obvious that the number of the con-

duits leading from the kiln may be varied greatly, as may also be the construction of the interior condensing apparatus without effecting the principle of operation. I do not, therefore, limit my claim to the precise form shown, nor to the number of conduits, nor to their arrangement in reference to the exterior receptacle for condensed products; but

I claim—

10 1. The combination, with a kiln, of a condenser placed within the same, and serving also as a conduit for the exit of products of distillation, substantially in the manner specified.

15 2. The combination, with a kiln, of the conduit having ducts communicating therewith, and provided with an interior pipe communicating with the outside air and with the interior of the kiln, whereby condensation is effected by the entrance of air into the kiln, and

the admitted air is heated, substantially as specified.

3. The combination of a kiln, a condenser-conduit located within the same, a fan communicating with said condenser, a secondary condenser outside of the kiln, and a conduit leading from such secondary condenser into the interior of the kiln, and provided with a safety apparatus intermediate between the secondary condenser and the point of discharge into the kiln, the whole operating substantially in the manner specified. 25 30

4. The combination of a kiln provided with a series of radiating condenser-conduits, and an annular collecting-pipe communicating with said conduits, substantially as specified. 35

JEAN A. MATHIEU.

Witnesses:

J. WALTER DOUGLASS,
L. H. POOLE.