

J. McLAUGHLIN.
LUMBER KILN.
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973,872.

Patented Oct. 25, 1910.

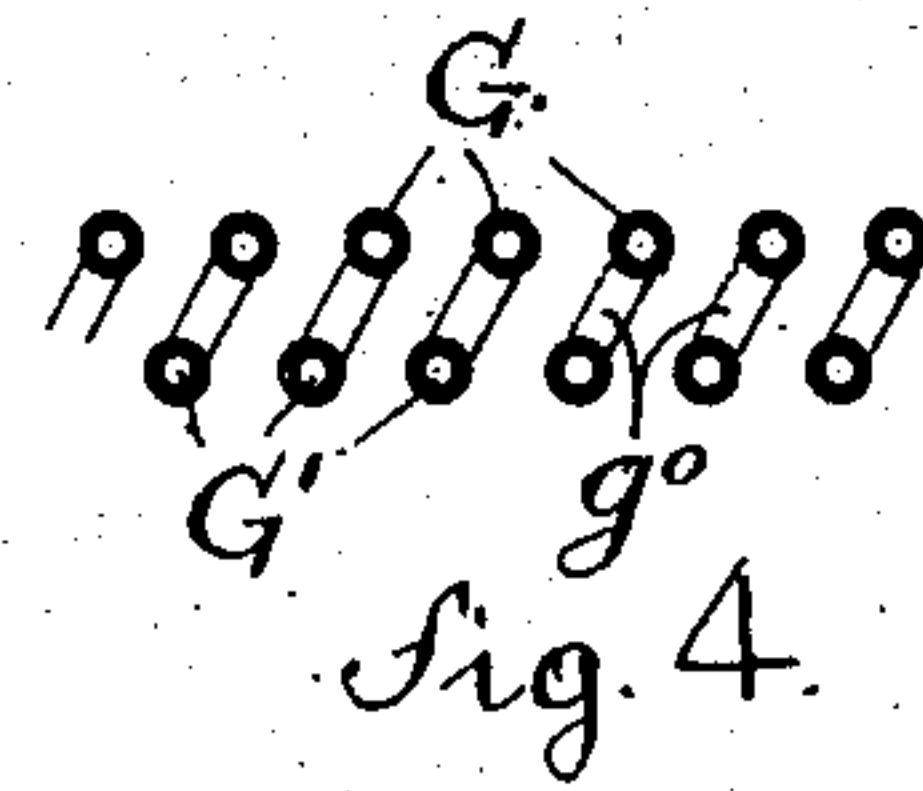
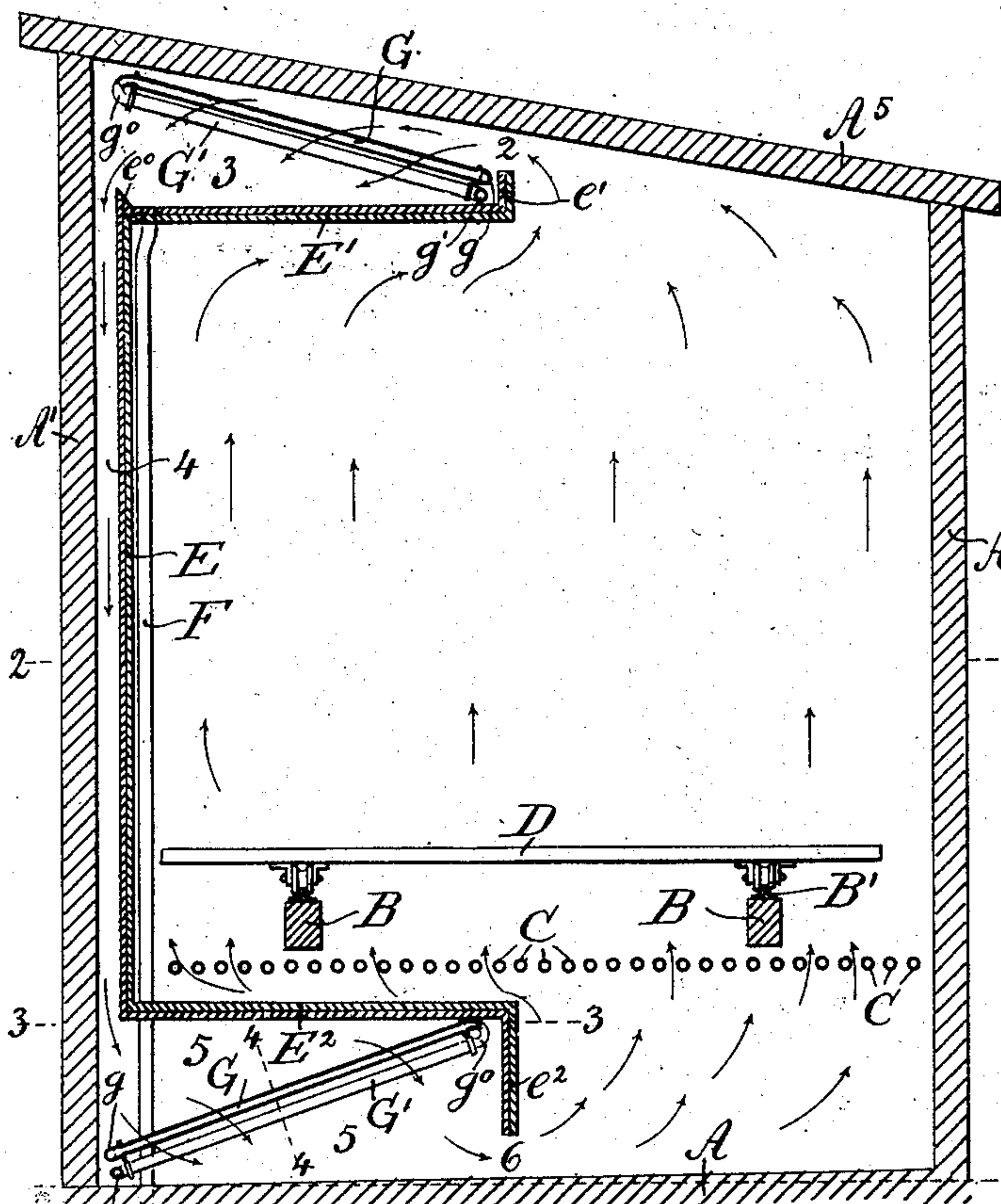


Fig. 1.

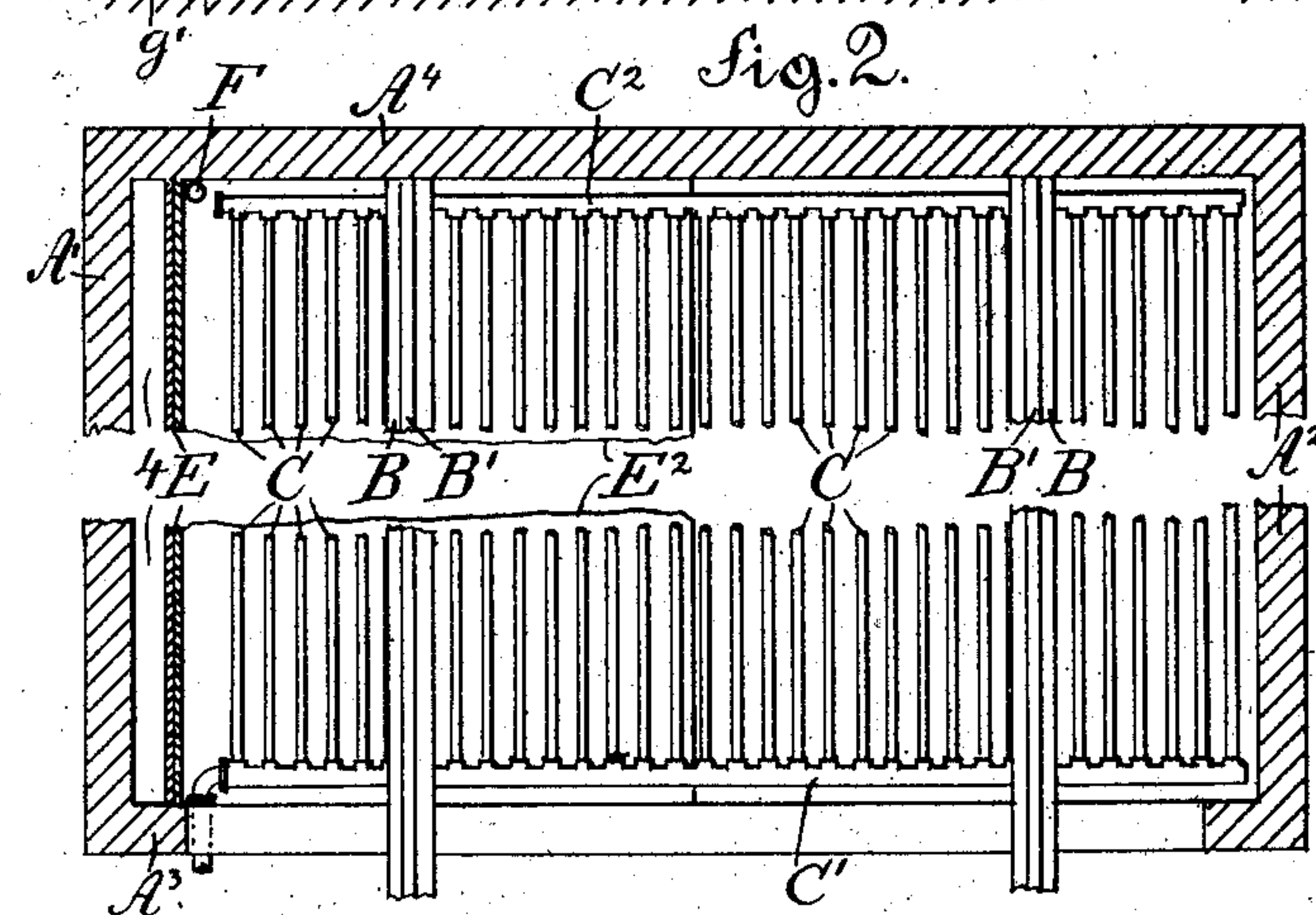


Fig. 2.

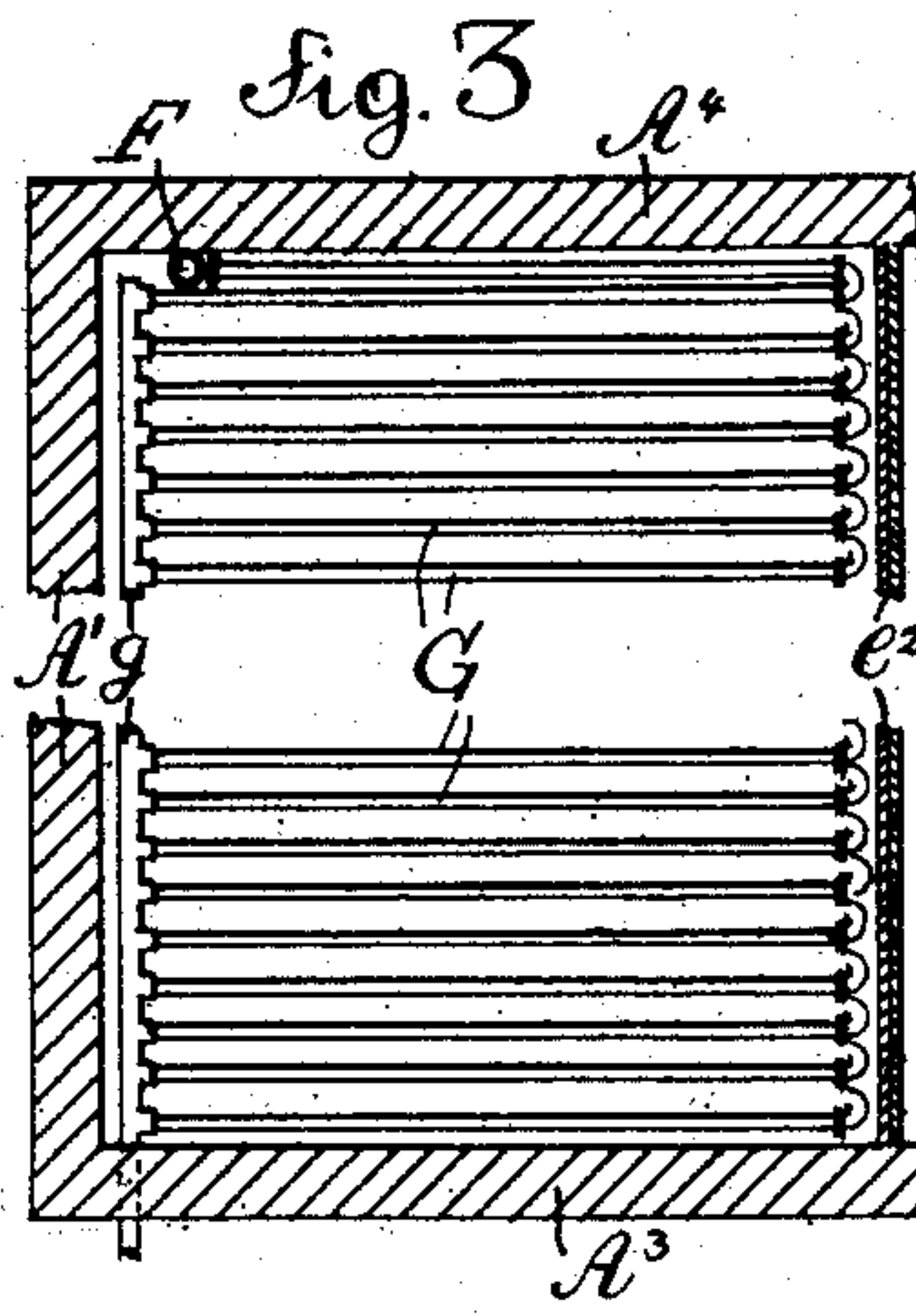


Fig. 3.

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LUMBER-KILN.

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To all whom it may concern:

Be it known that I, JOHN McLAUGHLIN, residing at Ottawa, in the county of Carleton, Province of Ontario, and Dominion of Canada, have invented new and useful Improvements in Lumber-Kilns, of which the following is a specification.

My invention which will be hereinafter fully set forth and claimed relates to kilns for seasoning and drying lumber.

The object of my invention is to improve the circulation of air in lumber kilns, to condense, intercept and collect the moisture in the circulating air and prevent splash and spray from drip, to equalize the temperature of the drying chamber, to economize the space of the same and to increase the rapidity of its working.

In the drawings which form a part of this specification: Figure 1 is a vertical transverse section of my improved kiln. Fig. 2 is a partial horizontal section, on line 2—2, Fig. 1. Fig. 3 is a partial horizontal section, on line 3—3, Fig. 1, and Fig. 4 is a cross section, on line 4—4, Fig. 1, showing the disposition of the pipes in the condensing coils.

The structure forming the drying chamber is composed of the floor A, the side-walls A¹ and A², the endwalls A³ and A⁴ and the roof A⁵; one of the endwalls, which may be called the front, being open and prepared to be closed with a large door or doors (not shown) to admit of the ingress and egress of the loaded wagons carrying the material to be operated upon in the kiln. The floor is given a slight slope for drainage and the roof is usually a flat lean-to, as shown, requiring one sidewall (A¹) to be higher than the other and leaving an angular space or spandrel on the side of the said wall, which is usually waste space.

The heating apparatus consists of coils or pipes, C, placed in an approximately horizontal tier, adapted for the circulation of steam, hot water or other medium and shown in Figs. 1 and 2 to be fed from a header, C¹, and draining or returning into another, C².

Beams, B, are placed above the heating apparatus; upon them the rails, B¹, are secured which carry the wagons, D.

The sidewall A¹ is faced the whole of its length, but not extending to the floor and roof, with a false wall or partition, E, standing a little distance therefrom, so as to form with it an airspace or flue, 4, which

merges at top and bottom into horizontal flues 3 and 5, both of which are made deeper and act as condensing chambers. These may be described as horizontal and deeper continuations of the flue 4 along the roof and floor respectively and having contracted mouths, *i. e.*, inlet, 2, at top and outlet, 6, near the floor, being formed by the approximately horizontal continuations, E¹, at top and, E², near the floor, of the false wall E, extending only partly across the chamber, approximately to the vertical center line of the same and having vertical lips or continuations, e¹ and e² respectively, the former ascending, the latter descending. The continuation E¹ forms the floor of the upper condensing chamber 3 and the bottom of a wide gutter, being for that purpose provided with an inner lip, e⁰, in continuation of the partition E, to prevent water running or splashing into the flue 4. The gutter is drained by a down-spout or pipe F. The continuation E² forms the top or ceiling of the lower condensing chamber 5 which is confined by the vertical lip e² descending nearly to the floor, but leaving an egress space, 6.

The condensing chambers are each provided with two tiers of pipes, G, G¹, adapted for the circulation of cold water or other refrigerating medium. These pipes are disposed transversely into the condensing chamber and at an incline, rising from the bottom at that side of the chamber on which the current enters to the top at the other side, thus compelling the current to pass through the coil, *i. e.*, between the pipes of the same, the latter being placed in staggered relation as shown in Fig. 4. Said coils are shown to be fed from headers, g, connected by bends, g⁰, and drained by headers, g¹, but this system of fitting is not essential, the essentials being the inclined position of the pipes, completely intercepting the space transversely, their staggered disposition and their being limited to only two tiers.

It may be remarked that the placing of the condensing chamber 3 utilizes the spandrel adjacent to the high wall and roof in a drying chamber already constructed and which is usually waste space. As the flue 4 absorbs but little space from the total width of the drying chamber—four inches being sufficient—it can generally be obtained even if originally not designed for

the purpose and with the condensing chamber 3 forms a kiln of admirable working capacity, even if the lower condensing chamber 5 is not obtainable but is reduced to a mere horizontal egress from the flue 4. Bringing the mouths of the condensing chambers (2 and 6) near the center line of the main chamber is also a feature of value; if they are too much on one side, the up-current is apt to be up the side walls, where there is usually more free space from the lumber piled in the chamber and the circulation is impaired by inequality. It may also be pointed out that the inclined position of the condensing pipes causes the condensate that forms on their surface to run down on them and avoids all kinds of drip. This drip, where it exists, is a considerable drawback to the efficient working of a kiln, as the drip causes splash and spray which is carried forward with the current and therefore fails to keep the air dry. For this reason more than two tiers of condensing pipes are also avoided, as in case of drip the pipes below the two upper tiers receive that drip and simply have to do the work of the upper pipes over again.

The operation may be briefly described thus: The air is heated by the heating pipes C, spreads laterally and rises in contact with the stuff that has been placed in the kiln and takes up moisture. Risen to the top, it passes by the opening 2 into the condensing chamber 3 where in its current it is compelled to pass between the cold pipes G and G¹ and come into contact with them. The vapors contained in the current are thus condensed on the surface of the pipes, formed into drops thereon and these run down the inclined pipe to the bottom E¹ and are carried off by the drain pipe F. The current of dry and cooled air having become heavier now sinks down the flue 4 and enters the condensing chamber 5 where any remaining moisture is intercepted in the same manner as in the upper condensing chamber. The current leaves the lower condensing chamber 5 by the exit 6 at or near the center line of the main chamber and spreads and passes through the heating apparatus again and the round is repeated. The air current is indicated by arrows.

I claim as my invention:—

1. In a lumber kiln, the combination with the walls forming a chamber, of a false wall facing one of the side walls and forming a narrow flue, approximately horizontal continuations of said false wall at top and bottom extending partly into and near the center line of the chamber and forming horizontal deeper continuations of said flue as condensing chambers, vertical lips at the inner edges of said horizontal continuations of false wall contracting the mouths of the condensing chambers, condensing coils with-

in said condensing chambers consisting of two tiers of pipes placed in staggered relation and sloping transversely across said chambers, means of drainage for said condensing chambers and heating apparatus in the lower part of the main chamber and above the lower condensing chamber, substantially as set forth.

2. In a lumber kiln, the combination with the walls forming a chamber of a false wall facing one of the side walls but short at top and bottom and forming a narrow flue, approximately horizontal continuations of said false wall at top and bottom extending partly into and near the center line of the chamber and forming horizontal continuations of said flue, the lower one deeper to form a condensing chamber, a vertical continuation or lip at the lower edge of said lower horizontal continuation descending near the floor but leaving a mouth or space forming the egress from and said descending lip forming the inner confine of the condensing chamber, two tiers of condensing pipes placed transversely in said chamber and sloping from the floor of the ingress side to the top of the egress side and disposed in staggered relation and heating apparatus placed in the lower part of the main chamber above the condensing chamber, substantially as set forth.

3. In a lumber kiln, the combination with the walls forming a chamber, of a false wall facing the highest side wall but short at top and bottom and forming a narrow flue, approximately horizontal continuations of said false wall at top and bottom extending partly into and near the center line of the chamber and forming horizontal continuations of said flue, the upper one deeper to form a condensing chamber, a vertical continuation or lip at the inner edge of said upper horizontal continuation ascending near the roof but leaving a mouth or ingress space forming the ingress to and said ascending lip forming the inner confine of the condensing chamber, two tiers of condensing pipes placed transversely in said chamber and sloping from the floor of the ingress side to the top of the egress side and disposed in staggered relation, an upward extension of the false wall above the floor of the condensing chamber to complete the trough shape, a down-spout draining said trough and a heating apparatus in the lower part of the main chamber, substantially as set forth.

4. In a lumber kiln, the combination with the walls forming a chamber, of a narrow flue facing the highest side wall in its whole length, a condensing chamber at a vertical end of said flue extending horizontally partly across and near the center line of the said main chamber and having a contracted mouth adjacent to said main chamber, con-

5 densing pipes placed transversely sloping across said condensing chamber and rising from the floor of the ingress side to the top of the egress side and consisting of two tiers placed in staggered relation, means of confining the precipitated water at the bottom of said condensing chamber, means of drainage of said condensing chamber and means of heating the air in

the lower part of the main chamber, substantially as set forth. 10

In testimony whereof I have affixed my signature, in presence of two subscribing witnesses.

JOHN McLAUGHLIN.

Witnesses:

A. HARVEY,
B. HARVEY.