

(No Model.)

G. E. HOAG.  
LUMBER DRIER.

No. 554,271.

Patented Feb. 11, 1896.

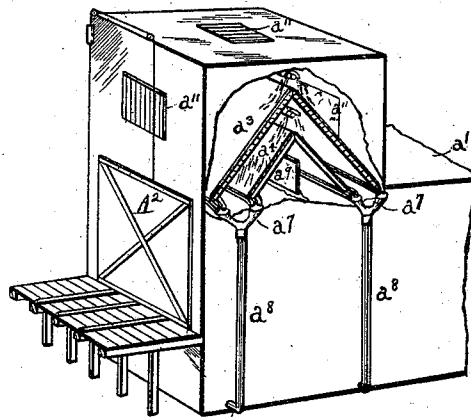
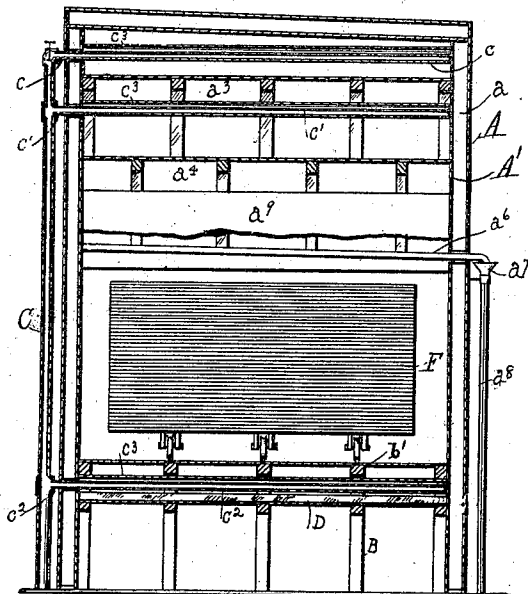
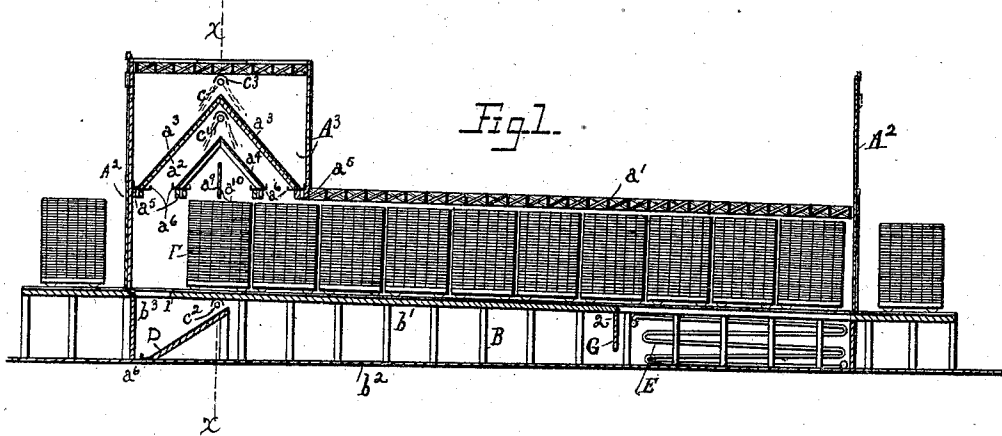


Fig. 2.

Fig. 3.

Witnesses.

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# UNITED STATES PATENT OFFICE.

GEORGE E. HOAG, OF TELL CITY, INDIANA, ASSIGNOR OF TWO-THIRDS TO  
ALBERT P. FENN AND ANTON PAALZ, OF SAME PLACE.

## LUMBER-DRIER.

SPECIFICATION forming part of Letters Patent No. 554,271, dated February 11, 1896.

Application filed September 21, 1892. Serial No. 446,486. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE E. HOAG, a citizen of the United States, and a resident of Tell City, in the county of Perry and State of Indiana, have invented certain new and useful Improvements in Lumber-Driers, of which the following is a specification.

The object of my invention is to provide a lumber-drying kiln in which the gum, resinous matter and moisture are expelled from the lumber and carried outside of the kiln without permitting the heat generated within the kiln to escape.

It is well known that lumber which is first subjected to a steaming or sweating process is more rapidly dried, less liable to check while undergoing the drying process, and less liable to warp, shrink or swell after drying.

By means of my invention the steaming and drying process is continuously and progressively and economically carried on.

The invention will be first fully described in connection with the accompanying drawings, and will then be particularly referred to and pointed out in the claim.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views, Figure 1 is a vertical longitudinal central sectional view of a drying-kiln embodying my invention. Fig. 2 is a vertical transverse sectional view of the same, taken through line *xx* of Fig. 1. Fig. 3 is a detail view, in perspective, of the front part of the kiln, part of the side wall being broken away to more clearly show the internal arrangement of the vapor-condensing chamber.

The walls of the kiln are preferably formed of a framework of timbers of suitable strength, covered by jointed siding-boards *A* on the outside and tongue-and-groove ceiling-boards *A'* on the inside. A non-conducting material of tar-paper is placed over the framing-work before the siding and ceiling boards are secured to it, thus forming an air-chamber *a* between the inner and outer walls to prevent the radiation of heat generated within the kiln. The supporting-timbers *B*, upon which the track-timbers *b* are supported, are shorter at the rear than at the front of the kiln, so that the tracks incline from front to rear, as does also

the roof *a'* of the main kiln. The lower portion of the kiln is floored with tongue-and-groove boards from the point 1 to the point 2, forming a chamber between the floor *b'* and the bottom of the kiln *b*<sup>2</sup>. The front and rear of the kiln are provided with vertically-sliding doors *A*<sup>2</sup> in the usual manner.

Above the front of the kiln is a condensing-chamber *A*<sup>3</sup>, the roof of which inclines from one side to the other. Within this condensing-chamber are arranged transversely roof-timbers *a*<sup>2</sup>, which support metal condensing-plates *a*<sup>3</sup>, forming a transverse roof across the condensing-chamber, and below this roof is a similar roof *a*<sup>4</sup>. These roofs are supported upon transverse timbers *a*<sup>5</sup>, and have gutters *a*<sup>6</sup> upon each side of the roofs to carry the cooling-water and water of condensation from the roofs to the outside of the building, where they are discharged into funnels *a*<sup>7</sup> at the top of branch pipes which conduct them to the discharge-pipes *a*<sup>8</sup>.

*C* is a cold-water pipe, which has branches *c c' c*<sup>2</sup> leading from it transversely across the front end of the kiln. Each of these branches is perforated on the top and covered by semi-circular deflectors *c*<sup>3</sup>. The spray from the pipes *c c'* is deflected upon the condensing-plates *a*<sup>3</sup> *a*<sup>4</sup>, and the spray from the branch pipe *c*<sup>2</sup> is deflected upon an inclined metal plate *D*, arranged below the floor *b'*, at the front end of the kiln.

Underneath the track-plates at the rear end of the kiln is arranged the steam heating-coil *E*, which may be of any approved construction; and underneath the roof *a*<sup>4</sup> is a transverse baffle-plate *a*<sup>9</sup>, from the lower edge of which depends a curtain *a*<sup>10</sup>, which rests upon the pile of lumber *F*.

In the process of drying, the heat generated in the kiln subjects the lumber in the kiln in advance of the deflecting-plate *G* to the steaming or sweating process, which opens the pores of the wood and softens the gum or resinous matter in the wood, which is carried off with the vapors to the upper part of the kiln and to the front of the kiln, which is the condensing-chamber. The heated vapors striking the under side of the metal plate *a*<sup>2</sup> are condensed by the cold water passing upon the outside, and also by striking the outside of the roof

$a^4$  and passing through the spray from the branch pipe  $c'$ . That portion of the vapor which passes underneath the roof  $a^4$  is deflected up against the roof by the deflecting-plate  $a^5$ , and passing over it descends through the opening  $b^3$  in the floor  $b'$ , and any moisture in the air which passes through this opening is condensed upon the inclined plate D, so that the air passing through the chamber between the floor  $b'$  and the floor of the kiln  $b^2$  is comparatively free from moisture and is carried to the heating-pipes and the lower portion thereof by the deflecting-plate G and from them up through the piles of lumber in the rear end of the kiln, driving from the said piles of lumber whatever moisture remains in them after they have passed through the steaming process and reached the rear of the kiln.

It will thus be seen that the steaming and drying process is continuous, and that when the last pile in the kiln is thoroughly dried the rear door of the kiln is opened, one pile of lumber withdrawn, and then the front door is opened, another pile of lumber pushed into the kiln, and the piles advanced to the positions shown in the drawings. I have found by experience that lumber thus dried is free from cracks and checks, and that it is thoroughly dried and seasoned in less time and at less expenditure of fuel than by the old process.

The top, front, and rear side of the condensing-chamber are provided with doors  $a''$ , which in cold weather may be thrown open to cool the condensing-plate  $a^3$ , in which case

the water may be turned off from the branch pipe  $c$ .

The deflectors  $c^3$  may be omitted and the perforations made in the lower sides of the pipes to spray upon the deflecting-plates  $a^3$ ,  $a^4$ , and D; but in this case the pipes would require to be kept clean, as the resinous or gummy substance carried by the vapors passing them would have a tendency to clog the openings, while the spray thrown down from the deflectors prevents the vapors from passing over the perforated portions of the pipes and closing them.

What I claim as new, and desire to secure by Letters Patent, is—

In a lumber-drying kiln, the combination of the lumber-chamber, the condensing-chamber above its receiving end and having within it the condensing-roofs one above the other, the spray-pipes perforated upon their top sides and arranged above the apex of said roofs, the semicircular deflectors arranged above the pipes to deflect the spray upon the roofs, the gutters underneath the lower edges of said roofs to convey the water to the outside of the condensing-chamber, the heating-chamber open on top at front and rear, the condensing-plate D in the front of said chamber, and the heating-pipes in the rear thereof, and the spray-pipe above the said condensing-plate, substantially as shown and described.

GEORGE E. HOAG.

Witnesses:

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 M. L. MURRAY.