

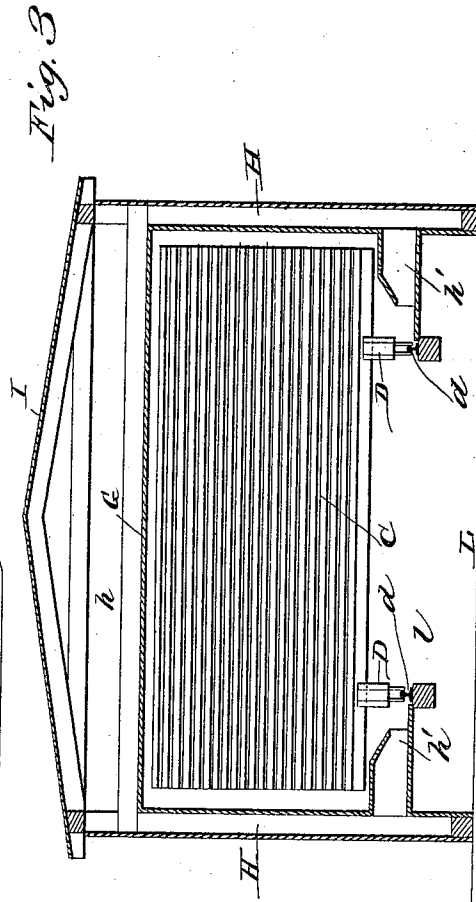
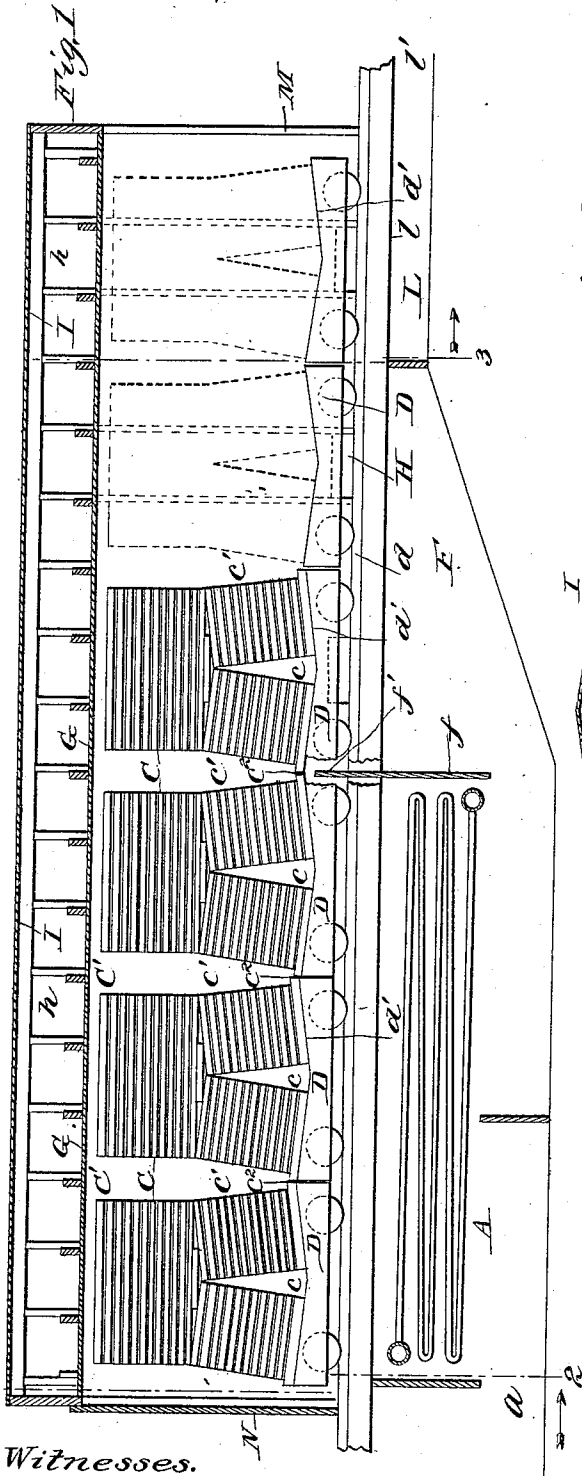
(No Model.)

2 Sheets—Sheet 1.

J. C. LINNELL.
DRY KILN.

No. 552,380.

Patented Dec. 31, 1895.



Witnesses.

J. P. Coleman
A. Gibson

Inventor
J. C. Linnell
by A. C. Fitzgerald
Att'y.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2

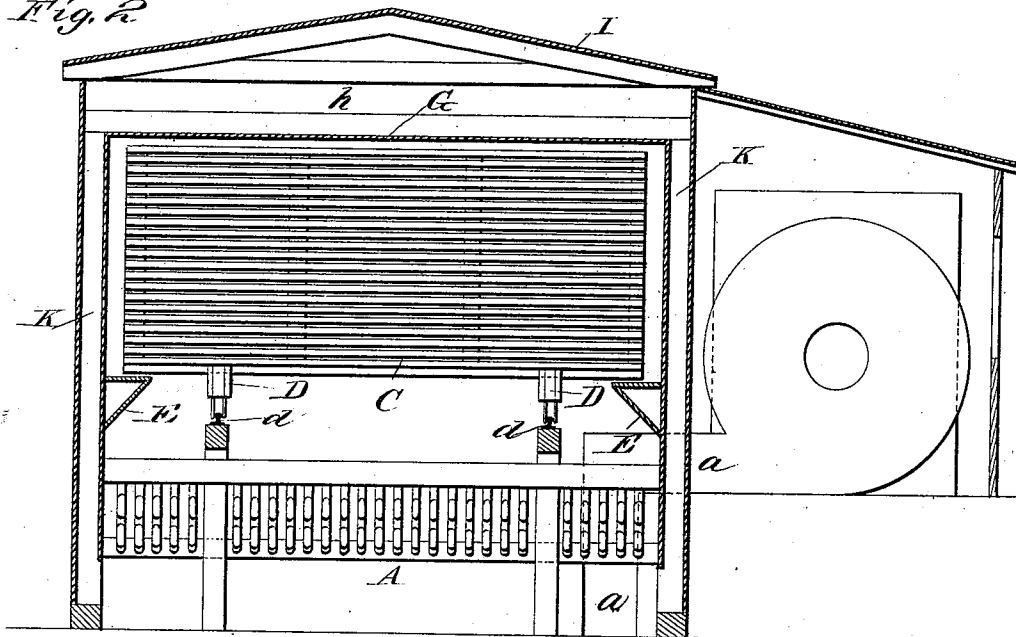
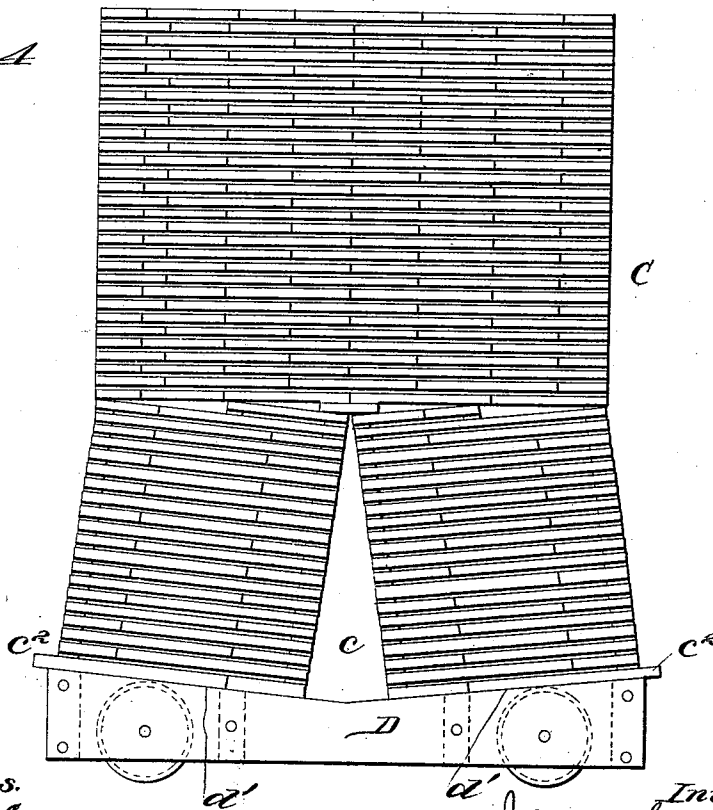


Fig. 4



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UNITED STATES PATENT OFFICE.

JAMES C. LINNELL, OF ADRIAN, MICHIGAN.

DRY-KILN.

SPECIFICATION forming part of Letters Patent No. 552,380, dated December 31, 1895.

Application filed June 10, 1895. Serial No. 552,323. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. LINNELL, a citizen of the United States, residing at Adrian, in the county of Lenawee, State of Michigan, have invented certain new and useful Improvements in Dry-Kilns; and I do hereby 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.

My invention relates to improvements in dry-kilns for drying lumber and other material.

The invention will first be described in connection with the accompanying drawings, and then particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal central section of a kiln embodying my invention. Fig. 2 is a transverse section of the front portion of the kiln on line 2 2, Fig. 1. Fig. 3 is a similar view of the rear portion of the kiln on the line 3 3, Fig. 1. Fig. 4 is an elevation of a car-bunk constructed in accordance with my invention.

Referring to the drawings, A is a heater device of any suitable kind arranged to receive air from any desired inlet, as at *a*, which is shown as connected with a blower arranged at the side of the kiln, and heating the said air, which then enters the kiln and enters openings *c* in the stacks of material. On each car is placed one or more stacks of material C, which are each so piled on the car D as to have one or more transverse V-shaped openings, as shown at *c*, the car-bunks D being arranged to rest on track-rails *d*, along which they may be moved when charging or emptying the kiln. These car-bunks D are preferably provided with a downward and inward extending incline *d'* at each end, whereby the material may be readily piled in the desired manner, as shown in Fig. 4, during certain stages of the drying operation.

The front portion of the kiln hot-air space is provided at each side with wings E, which extend inward beneath the ends of the lumber and are preferably inclined upward on the lower sides to deflect the current of hot air toward the central openings *c* in the lumber piles.

The lumber or other material is so placed on the car-bunks that it leaves not only a cen-

tral space *c*, but also a space between the contiguous ends of the lumber piles, as shown at *c'*, while, at the same time, the communication between the said spaces *c'* and the space beneath the material are closed by the lower tiers of the material, which project to meet, as shown at *c*². Hence the hot air which enters the central opening in the lumber piles is compelled to pass through and around the ends of the piles to reach said spaces *c'*, ascending at the same time until it reaches the top of the kiln.

At the rear portion of the kiln is a main return-duct F, partitioned off from the hot-air space by a downward-extending wall *f*. The track-rails *d* extend over this main duct F, and on the part of the said rails above the return-duct are placed the car-bunks of green lumber or other material, as it first enters the kiln. Above the partition *f*, and extending upward to meet but not quite touch the bottom boards of the piles of lumber, and between the tracks, is a transverse wing *f'*, which prevents the heated air arising at the front of the kiln from moving along under those cars of lumber which are at the rear end of the kiln. Hence the heated air which strikes the wing *f'* is compelled to rise. When it reaches the ceiling G of the kiln, it travels along said ceiling and through the piles of lumber, (indicated at C,) which absorb the heat rapidly and commence to cool the air, which descends and as it travels continues to cool until it reaches the opening *c*, at which point it may drop down into the main return-duct F or will enter the side ducts H, which are formed in the walls of the kiln opposite the end of the central opening *c* in each pile of material and connect at the top with the upper main duct *h*, formed between the ceiling G and roof I of the kiln. This main duct *h* is connected by down-flues K to the heater-room, so that the air in said main duct, which has been cooled at the roof, is allowed to drop down and join the air returning by way of the main return-duct F, this air being again heated, together with the limited amount of fresh air admitted through the inlet *a*, and arising into the kiln again to go through a similar cycle of operation.

In order to prevent the descending air in the rear portion of the room from passing readily

around the lumber or other material and entering the side flues II, the latter are each provided with pipes *h'* which extend inward beneath the lumber and opposite the central opening of its respective stack of material.

The ducts I beneath the rear end of the kiln and the floor-openings *l* at the extreme rear end of the kiln do not connect with the roof-space, but instead connect with the open air at *l'*, so that the air which has been cooled the most by traveling the farthest, and which is also heaviest on account of containing the greatest amount of moisture, is allowed to escape, and fresh air entering direct to the heater at inlet *a* is used to replace it, since the said fresh air contains less moisture and is, of course, of more use in drying the lumber or other material, since it will, when heated, absorb more moisture.

From the description given it will be understood that the operation of my kiln is continuous—that is to say, the loaded bunks of green lumber or other material are pushed into the kiln in the first place through the rear door M, and when the one at the far end (which being nearer the heater will dry first) is dried, it is removed through the front door N, the bunks are all pushed farther toward the front and a new car of green lumber inserted through the rear door, and so on, as fast as the lumber is dried at the front end.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A dry kiln comprising a heater device, a main return duct arranged to return part of the air to said heater device, a drying room adjacent to the heater device and return duct, a series of side flues opening into the rear portion of the kiln at the bottom, an upper return duct connecting with all the said flues, and a downward extending flue connecting the said upper return flue to the heater device, substantially as described.

2. A dry kiln comprising a heater device,

a main return duct, a drying room adjacent to the heater device and return duct and in communication therewith, a series of side ducts opening into the rear portion of the drying room near the bottom, a series of inward extending pipes at the lower ends of the side ducts and projecting into the room, and means for returning the air from the top ends of the side ducts to the heater device, substantially as described and for the purpose set forth.

3. A dry kiln comprising a heater device, a main return duct arranged to return part of the air to the heater device, an escape duct communicating with the atmosphere, and a drying room over the said ducts, the front portion of the drying room communicating with the heater device, the intermediate portion with the main return duct and the extreme rear portion with the escape duct, substantially as described and for the purpose set forth.

4. A dry kiln comprising a heater device, a main return duct at the rear end of the same, and an escape duct, a drying room adjacent to the heater device and ducts, the front portion of said room communicating with the heater device, the intermediate portion with the main return duct and the rear portion with the escape duct, a plurality of inward extending wings at the sides of the front portion of the drying room, a series of side ducts opening into the rear and intermediate portions of the drying room near the bottom of the same, each side duct having an inward extending pipe, an upper return flue connected to the upper ends of the side ducts and means for connecting the said upper return duct to the heater device, substantially as described.

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

JAMES C. LINNELL.

Witnesses:

E. N. SMITH,
W. B. COLVIN.