E. A. HALLAM.

DRYING KILN.

APPLICATION FILED FEB. 10, 1913.

1,067,110.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

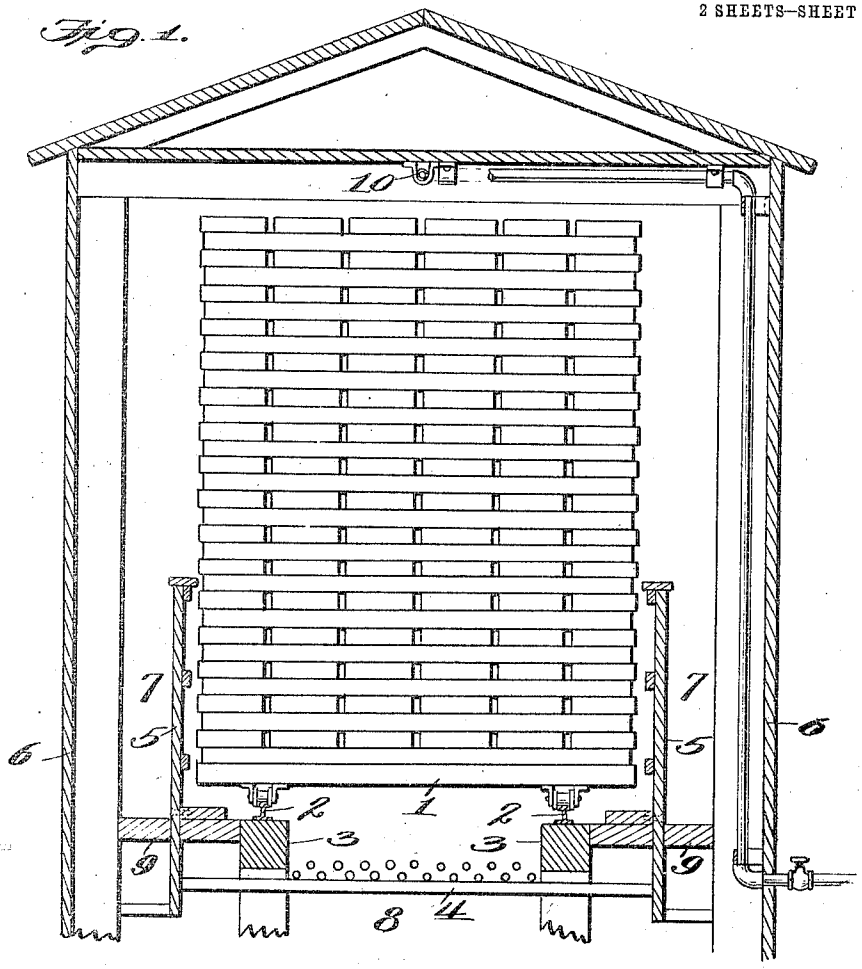
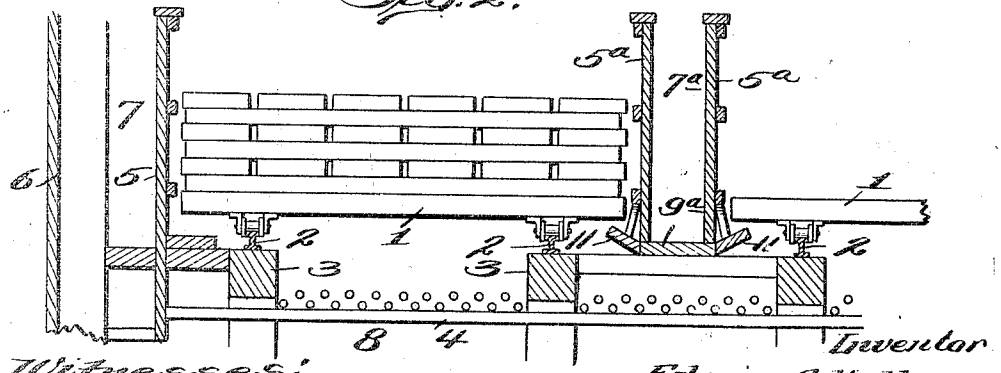


Fig. 2.



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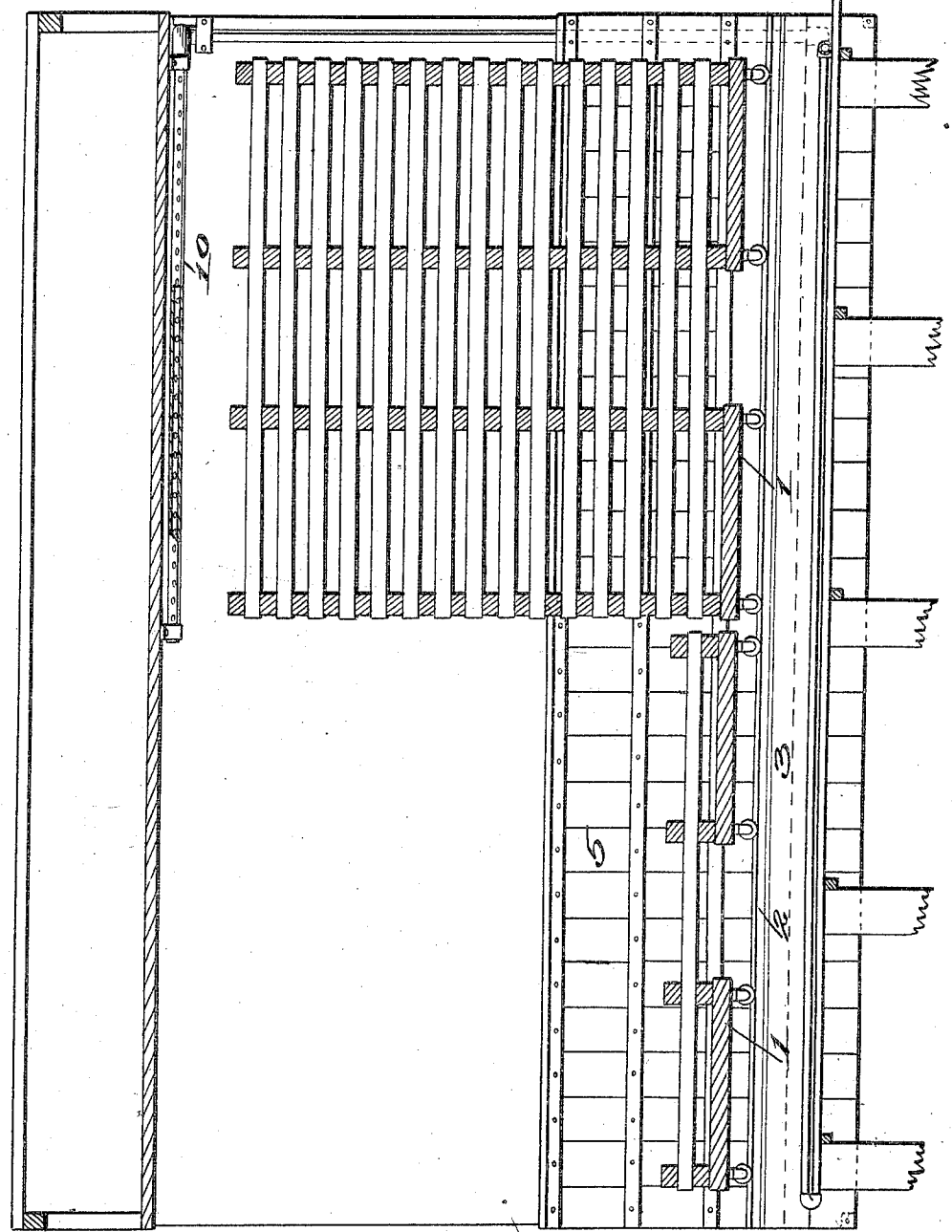
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2 SHEETS—SHEET 2.



Witnesses

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Fig. 3.

UNITED STATES PATENT OFFICE.

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DRYING-KILN.

1,067,110. Specification of Letters Patent. Patented July 8, 1913.

Application filed February 10, 1913. Serial No. 747,467.

To all whom it may concern:

Be it known that I, EDWIN A. HALLAM, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented new and useful Improvements in Drying-Kilns, of which the following is a specification.

This invention relates to improvements in drying kilns, and proposes a construction which is more especially applicable to the drying of lumber.

The objects of the invention are to reduce the time required for lumber drying operations, and to make these operations more effective and without any accompanying detrimental effects on the lumber.

I have found, by observation, that when a stack of lumber is confined in a kiln room, the portion of the stack which requires the greatest time to become thoroughly dried is located at the center, and somewhat near the bottom, and does not become effectively dried until after the operation is practically complete as to the rest of the stack. This is for the reason that there are relatively wide spaces between the sides of the stack at the lower portion thereof, and the side walls of the inclosure, or the walls of the down draft ducts, adjacent said side walls, and the air which rises from the heaters passes in large part through these wide spaces, acting on the outer side portions of the stack with greater drying effect than on the central portions thereof.

According to the present invention, shields are arranged adjacent the sides of the stack in such positions that they do not interfere with the effective width of the passageways along which the workmen walk in moving the stack into and out of the kiln, and air circulates downwardly on the outer sides of these shields and is positively directed by the shields under the heaters, rising from the latter uniformly throughout the width of the stack, and effecting as thorough a drying of the central lower portion of the stack as of the sides thereof.

Lumber drying operations in kiln rooms are frequently accompanied by detrimental effects, due to the fact that the air used to effect the drying of the lumber does not contain sufficient moisture, and causes the lumber to become "case hardened", as well as otherwise detrimentally affecting its quality. These detrimental effects can be overcome, in a measure, by checking the drying operations, but this causes serious delay, especially in the case of heavy or thick lumber. To obviate the defect noted, it has been proposed to introduce moisture into the air adjacent the heaters. But in this case, the air takes up too much moisture, a substantial percentage of the moisture condenses on the lumber, and thus the drying operation is retarded.

According to the present invention, moisture is introduced into the air, not adjacent the heaters, but at a point above the stack, and in the event that any excess of moisture is taken up by the air, the excess is condensed in the relatively cool spaces under the heaters, and the air passes through the heaters with an amount of moisture requisite to prevent detrimental effects on the lumber, but not sufficient to perceptibly retard the drying operation.

A drying kiln in which the features of the invention are incorporated is illustrated in the accompanying drawings, wherein:

Figure 1 is a transverse vertical sectional view of a single track kiln; Fig. 2 is a view showing the features of the invention as applied to a double track kiln; and Fig. 3 is a vertical longitudinal sectional view of the kiln shown in Fig. 1.

Similar characters of reference designate corresponding parts throughout the several views.

The kiln room may be of any desired or approved construction. The drying trucks 1 move on rails 2 supported by stringers 3, and in the space between the rails, at a suitable distance below the trucks, there are arranged the usual radiators or heating coils 4. The lumber is stacked in any suitable manner on the trucks, and closely adjacent the sides of the stack, at the lower portion thereof, there are arranged shields 5 of suitable construction. These shields may extend throughout the length of the kiln room, and are of a depth or height suitable for the purposes in view, ordinarily approximately a third of the height of the stack of lumber. Said shields extend downwardly below the radiators or coils 4, and in connection with the adjoining side walls 6 of the kiln room, define circulation passages 7 through which the air, from the up-

per portion of the room, passes downwardly for reheating. The shields 5 positively cause the air to pass into the space 8 beneath the radiators or coils 4, the air rising through the radiators or coils and being heated thereby previous to its circulation through the stack of lumber. The shields 5 are arranged so closely adjacent to the sides of the stack as to leave no intervening spaces of substantial proportions, and to confine the air for the most part within the stack throughout the lower portion thereof. In this way there are no wide spaces at the sides of the lower portion of the stack into which a large percentage of the heated air can escape and the stack is dried uniformly throughout its width and to the same degree throughout its central portion as at its sides.

Most kiln drying rooms, and especially those which are constructed according to modern standards, have passageways at the sides of the stack through which the workmen walk in pushing the stacks into or out of the kiln room. In the present case, the passages 7, through which the air passes downwardly for reheating, serve also as the passageways or "walkways" in which the workmen move when handling the stack, the necessary width for this purpose being secured by the arrangement of the shields 5 in close relation to the sides of the stack. The floors 9 of these walkways may be of any suitable construction, except, of course, that openings or spaces must be provided through which the air may pass in its downward circulation. For example, these floors may be made up of transverse beams arranged in spaced relation, either without any covering of flooring boards, or with a partial covering of flooring boards.

For the purpose of supplying moisture to the air, a steam pipe 10 is employed. The essential and important feature of this pipe is that it is arranged in the upper portion of the room, preferably adjacent the ceiling. The pipe 10 is provided with laterally directed openings at the sides thereof, through which small jets of steam issue to mingle with the air rising from the stack. Any excess of moisture thus taken up by the air is condensed in the space 8 beneath the radiators or heating coils 4, and the condensed moisture is disposed of in any suitable way. The discharge leg of the pipe 10 need not extend the length of the kiln room. It is sufficient to arrange said discharge leg adjacent the entrance end of the room, so that it will be located above the stacks of "green" lumber in the positions which they first occupy in the room, (Fig. 3.)

Fig. 2 shows a double track kiln room. The outer shields are arranged as shown in Fig. 1 and above described. The inner shields 5^a adjoin one another and define a central passage 7^a which serves the same purpose as the passages 7. Where heating coils are arranged between the tracks, the shields 5^a terminate adjacent the floor 9^a, and this floor should be imperforate. The lower portions of the shields in such a case are provided with openings through which the air passes, the air being directed toward the stack by the deflectors 11, arranged at the sides of the floor 9^a.

The features of improvement herein described do not interfere with the use of any approved arrangement of down draft ducts or passages adjacent the walls 6 to promote the circulation of the air.

Having fully described my invention, I claim:

1. In a drying kiln, a kiln room, rails arranged therein, heaters located under the rails, and shields extending parallel to the rails and having their lower ends below the heaters, the shields being so located as to be closely associated with the sides of the stack and coacting with the adjacent walls of the kiln room to define passages through which the air circulates downwardly, passing under the heaters, the shields serving, by virtue of their location, to cause the air which rises from the heaters to pass uniformly through the stack and to effect a uniform drying of the lower portion of the stack throughout the width thereof.

2. In a drying kiln, a kiln room, rails arranged therein, heaters located under the rails, shields extending parallel to the rails and having their lower ends below the heaters, the shields being so located as to be closely associated with the sides of the stack and coacting with the adjacent walls of the kiln room to define passages through which the air circulates downwardly, passing under the heaters, the shields serving, by virtue of their location, to cause the air which rises from the heaters to pass uniformly through the stack and to effect a uniform drying of the lower portion of the stack throughout the width thereof, and flooring for the said passages whereby they serve also as walkways.

3. In a drying kiln, a kiln room, rails arranged therein, heaters for the air, means for causing the air as it leaves the stack to circulate downwardly in relation to the heaters for reheating, and means located in the upper portion of the room and arranged to be above the stack to introduce moisture in the air which rises from the stack previous to its downward circulation.

4. In a drying kiln, a kiln room, rails arranged therein, heaters for the air arranged between and below the rails, means for causing the air as it leaves the stack to circulate downwardly in relation to the heaters for reheating, and means located in the upper portion of the room, and ar-

ranged to be above the stack, to introduce moisture in the air which rises from the stack previous to its downward circulation.

5. In a drying kiln, a kiln room, rails arranged therein, heaters located under the rails, shields extending parallel to the rails and having their lower ends below the heaters, the shields being so located as to be closely associated with the sides of the stack and coacting with the adjacent walls of the kiln room to define passages through which the air circulates downwardly, passing under the heaters, the shields serving, by virtue of their location, to cause the air which rises from the heaters to pass uniformly through the stack and to effect a uniform drying of the lower portion of the stack throughout the width thereof, and means located in the upper portion of the room and arranged to be above the stack to introduce moisture in the air which rises from the stack previous to its downward circulation.

6. In a drying kiln, a kiln room, heaters for the air, means for causing the air, as it leaves the stack, to circulate downwardly in relation to the heaters for reheating, and means located in the upper portion of the room and arranged adjacent the upper end of the stack to introduce moisture in the air which rises from the stack previous to its downward circulation.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWIN A. HALLAM.

Witnesses:
FRANCIS S. BURT,
THEODORE B. BROWN.