

(No Model.)

S. W. PEREGRINE.  
DRYING KILN.

No. 435,258.

Patented Aug. 26, 1890.

Fig. 1.

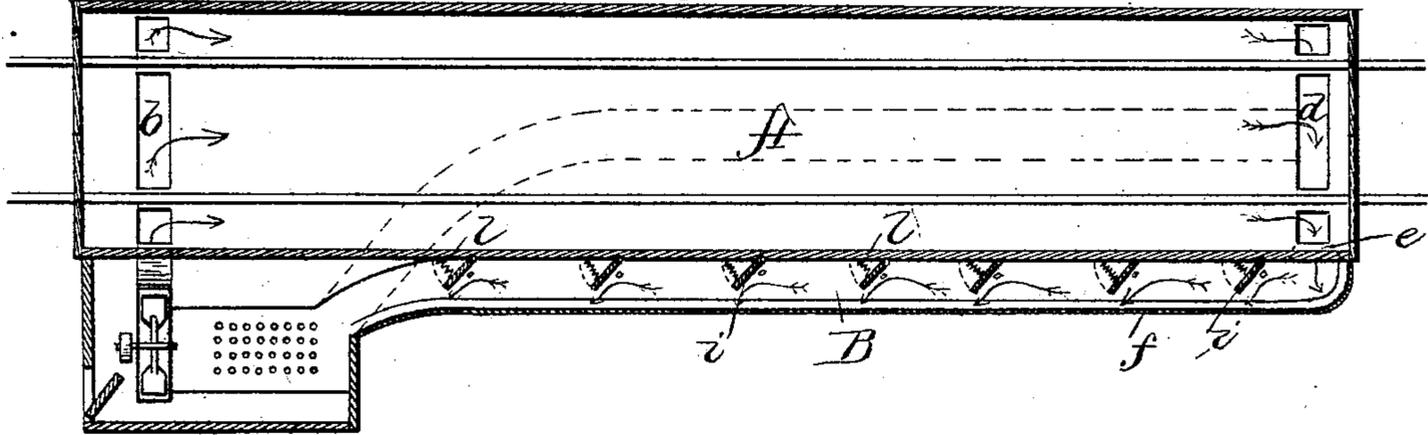


Fig. 2.

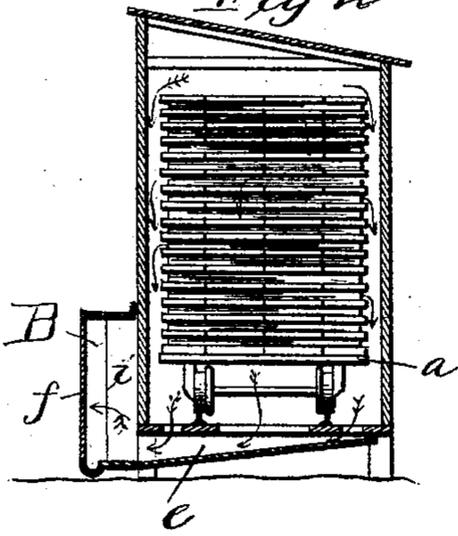


Fig. 3.

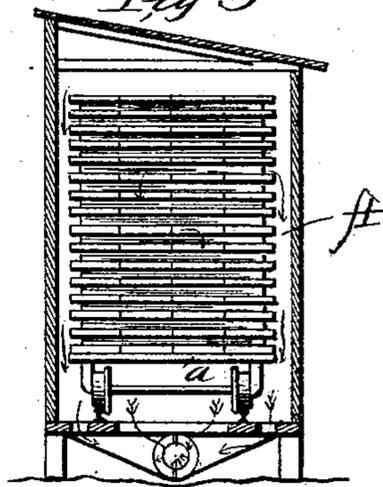


Fig. 4.

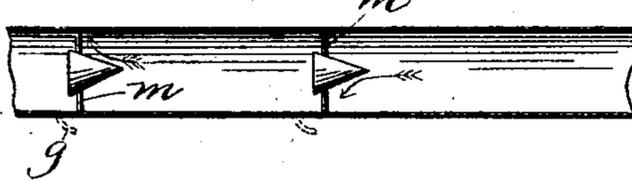


Fig. 4<sup>a</sup>.



Fig. 5.

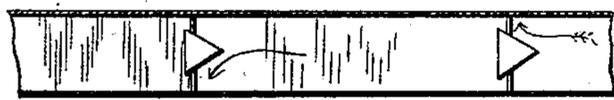
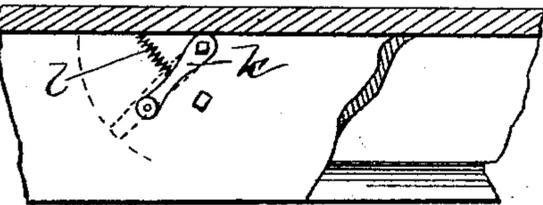


Fig. 5<sup>a</sup>.



Fig. 6.



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# UNITED STATES PATENT OFFICE.

SEYMOUR W. PEREGRINE, OF GRAND RAPIDS, MICHIGAN.

## DRYING-KILN.

SPECIFICATION forming part of Letters Patent No. 435,258, dated August 26, 1890.

Application filed April 4, 1889. Serial No. 305,939. (No model.)

*To all whom it may concern:*

Be it known that I, SEYMOUR W. PEREGRINE, of Grand Rapids, in the county of Kent and State of Michigan, have invented a new and useful Improvement in Drying-Kilns; and I do hereby declare that the following is a full, clear, and exact description of the same.

It is the object of my invention to provide a simple construction of return-flue in a drying-kiln, such as that used for the drying of lumber, for the purpose of utilizing the same air over and over again and rendering it unnecessary to draw in continuously the cold outer air, and at the same time in the return of the air from the rear of the kiln to the heating-chamber to deprive it of the moisture which it has taken up from the green lumber.

Prior to my invention many ways have been suggested of condensing the moisture carried by the air, and return-flues have been proposed between the rear of the kiln and the heating-chamber; but these contrivances have been more or less complex and consequently expensive, and I aim in the present invention to provide a very simple arrangement, effective in operation, and which may be cheaply applied.

In carrying out my invention the kiln may be of ordinary construction, consisting of a drying-chamber through which the material to be dried is to be passed, ordinarily laid on trucks, with a heating-chamber either beneath or to one side of the main chamber, with passages leading from the heating-chamber to the main chamber, by means of which the material within the main chamber may be subjected to the drying action of the heated air. This heated air as it passes through the drying-chamber takes up the moisture from the green lumber, and when it reaches the other end of the kiln is very heavily laden with the moisture.

In my invention I arrange a condensing-flue between the end of the drying-chamber and the heating-chamber at the opposite end, so as to dry the moisture-laden air, making this either wholly or partly of metal and providing it with permanent or adjustable deflectors, so as to deflect the moist air against the metal wall.

In the accompanying drawings, Figure 1 is a plan view in section of a heating-chamber, showing in full lines a return-flue arranged at one side of the chamber and in dotted lines a return-flue arranged beneath the chamber. Fig. 2 is a vertical section of the drying-chamber, showing the flue arranged to one side thereof. Fig. 3 is a like view showing the flue arranged beneath the heating-chamber. Fig. 4 is a detail sectional view of a portion of the return-flue, representing the deflectors in elevation. Fig. 5 is a modified view of a portion of a square return-flue. Figs. 4<sup>a</sup> and 5<sup>a</sup> are end views of Figs. 4 and 5, respectively. Fig. 6 is a detail view showing the side walls of the drying-chamber in section and the top of the return-flue in plan partly broken away.

In the drawings the drying-chamber of the kiln is shown at A, and may be of any ordinary or desired construction. It is preferably provided with tracks upon which run trucks *a* laden with the lumber or other material to be dried. To one side or beneath the drying-chamber I arrange a heating-chamber, which may consist of a series of heating-coils in connection with a suitable source of heat, and this chamber is preferably provided with a blower or fan for driving the heated air into the drying-chamber through suitable passages *b*.

I wish it to be understood that I do not limit myself in regard to the means of heating the kiln, as I may accomplish this by the means shown, or any suitable device.

At the opposite end of the heating-chamber openings are provided in the floor, as shown in Fig. 1 at *d*, which lead through a passage *e* to the return-flue B, which in Figs. 1 and 2 is shown as located along one side of the heating-chamber, the wall of the heating-chamber constituting the inner wall of the said flue. This flue is of rectangular form, as shown in Fig. 2, and is preferably made with its bottom slightly sloping toward the heating-chamber. The outer wall *f* of the flue is composed of metal, so as to give a better effect in the condensing of the moisture carried by the heated air, and this outer wall is curved on its lower edge and bent inwardly and upwardly where it is connected to the bottom of the flue, so as to form a

trough or gutter to carry off the water of condensation. This water may be discharged by openings formed in the gutter at intervals, as shown at *g* in Fig. 4, or it may be directed 5 into a trap with an overflow to a sewer, as in Fig. 5 at *h*. In order to retard the movement of the air and direct it against the metal wall of the flue, I provide a series of deflectors *i*, as shown in Figs. 1 and 2, these deflectors 10 being pivoted to the main wall of the flue and set at an angle, thus compelling the air to pass through a contracted space, which retards its movement and keeps it longer in contact with the condensing-surface. Each 15 of these deflectors may have a spindle extending to the outside, where they may be provided with handles, so as to increase or lessen the amount of deflection, one of these handles being shown at *k* in Fig. 6, and a 20 suitable spring may be provided for each deflector for returning it to normal position, as at *l*. This puts a tension on the deflector, so that while being set to leave a certain opening for the passage of the return-current any 25 excess of pressure in this current will enlarge the opening, if this pressure exceeds the power of the spring, and as soon as this pressure gets below that of the spring the deflector will be forced back to its normal po- 30 sition.

Instead of the pivoted deflector described, I may provide permanent deflectors, as shown

in Figs. 3 and 4, in which I show a tubular flue arranged beneath the floor of the kiln to give greater amount of condensing-sur- 35 face, the deflectors being cone-shaped and supported in the center of the tubular flue by arms *m*. Fig. 5 shows substantially the same idea as Fig. 4 applied to a square return- 40 flue.

I claim—

1. In combination with a drying-chamber, a heating-chamber at one end thereof and a condensing-flue extending between the oppo- 45 site end of the drying-chamber and the said heating-chamber, and a series of deflectors located at intervals in the said flue and arranged, as described, so as to direct the moist air against the condensing-surface of said 50 flue, substantially as described.

2. In combination with a drying-chamber, a heating-chamber and a return-flue having a metal wall *f*, having its area contracted by spring-seated deflectors arranged within the 55 same adapted to act automatically and to deflect the moisture-laden air against the metal wall, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SEYMOUR W. PEREGRINE.

Witnesses:

CHARLES A. RENWICK,  
CHAS. N. ROOD.