# United States Patent Office.

EDMUND TROWBRIDGE AND JAMES M. JONES, OF DETROIT, MICHIGAN.

Letters Patent No. 107,982, dated October 4, 1870.

## IMPROVEMENT IN DRIERS.

The Schedule referred to in these Letters Patent and making part of the same.

*To whom it may concern:*

Be it known that we, EDMUND TROWBRIDGE and JAMES M. JONES, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Drying-Kilns; and we do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon, and being a part of this specification, in which—

Figure 1 is a perspective view of our apparatus.

Figure 2 is a vertical section across the rear end of the boilers.

Figure 3 is a vertical section, longitudinally, between the boilers.

Like letters indicate like parts in each figure.

The nature of this invention relates to the employment of steam and hot air in a kiln of peculiar construction for drying purposes; and consists in a peculiar arrangement of the various parts, by means of which steam is injected into the kiln, and in the arrangement for heating and injecting hot air, as more fully hereinafter described.

In the accompanying drawing—

A represents a kiln, constructed with close-fitting doors B at each end, through which cars loaded with lumber or other articles to be dried may be run into and out of the kiln upon a suitable railway-track laid therein.

A series of these kilns may be built side by side, and their roofs should be tight, and without any openings therein for the escape of the hot air or steam.

C is a rotary fan, driven by the engine D, which forces cold air through the pipe E, which is extended under the boilers, in coils or otherwise, in such a manner as to be presented to the fire in order to heat the air.

The pipe is then carried through the side of the kiln, as shown in fig. 2, or, where a series of kilns is built, it is extended through each one, and is provided with short branches, F, which are, in turn, provided with shut-off valves G, which are opened and closed, as occasion may require, from the outside of the kilns, by suitable rods H, connecting with the valves and extending through the wall of the kiln.

I is a steam-pipe, which takes steam from the boilers J, and carries it into the kilns, as shown in fig. 2, the end of the pipe being turned upward to give direction to the discharged steam. Wherever a series of kilns is employed the pipe should be extended through it, and provided with short branches, open at their ends, like those above described as attached to the air-pipe.

Outside the kiln the pipe should be provided with cut-off valve K, and between each of the kilns where there are more than one.

Near the floor of the kiln, and in the side wall thereof, is a door or opening, L, through which the air escapes. The object of placing the door in this place rather than in the top of the kiln is to compel the heated air, after injection, and rising to the top of the kiln, to descend again to the outlet, thereby utilizing it more thoroughly than when allowed to escape at the top.

For drying lumber, this kiln is peculiarly well adapted, and its operation is as follows:

The lumber, upon a suitable car, is run into the kiln through the doors, which are then closed. Steam and hot air are then injected into the kiln through the steam and air-pipes, for the purpose of reopening the pores or sap-tubes of the lumber, which may have been partially closed by exposure to the air. After this is done, the steam should be cut off and the superheated air admitted through the pipe heretofore described for that purpose. Should it be found that the hot air dries the surface of the lumber too rapidly, so that it has a tendency to check, then more steam should be injected until this tendency is stopped. A very short time is required by this process to turn out thoroughly-seasoned lumber.

We are aware that kilns are in use wherein the drying process is performed by hot air alone, and by steam alone; therefore, we utterly disclaim them and either of them.

What we claim as our invention, and desire to secure by Letters Patent, is—

The dry-kiln described, wherein the chamber A, the boilers J, the engine D, the blower C, the hot-air pipes E, and steam-pipe I, are constructed and arranged as described and shown, and as and for the purposes set forth.

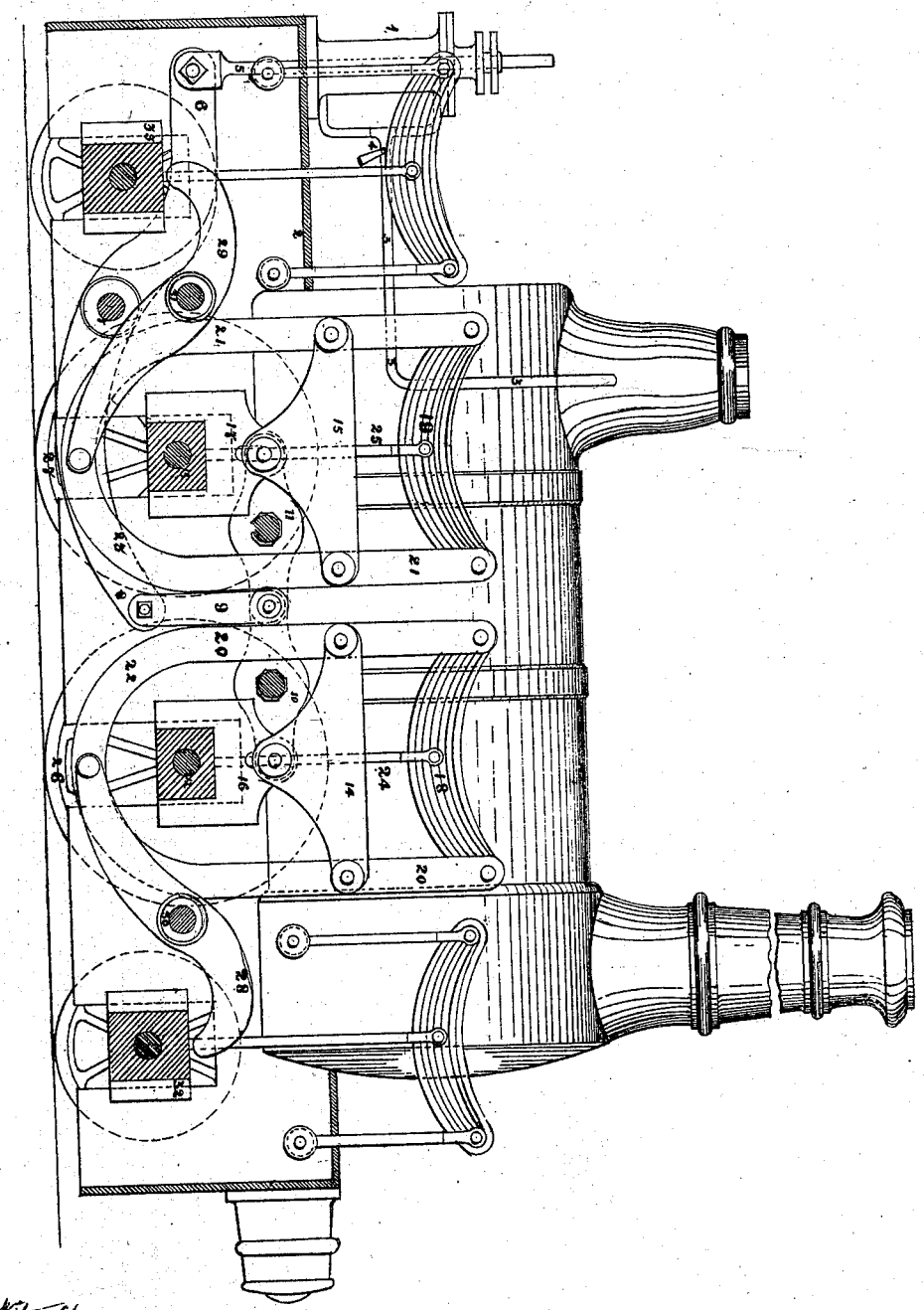
EDMUND TROWBRIDGE.
JAMES M. JONES.

Witnesses:
FREDERICK EBERTS,
SAM. J. SPRAY.

J. M. Ure,

Locomotive.

No. 107,983. Patented Oct. 4. 1870



Witnesses
J. M. Fowler,
P. E. Wilson

J. M. Ure
By Chas. D. Smith
Atty

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.