July 1, 1924. 1,499,627

R. THELEN

REVERSIBLE CIRCULATION INTERNAL FAN KILN

Filed July 21, 1921 2 Sheets-Sheet 1

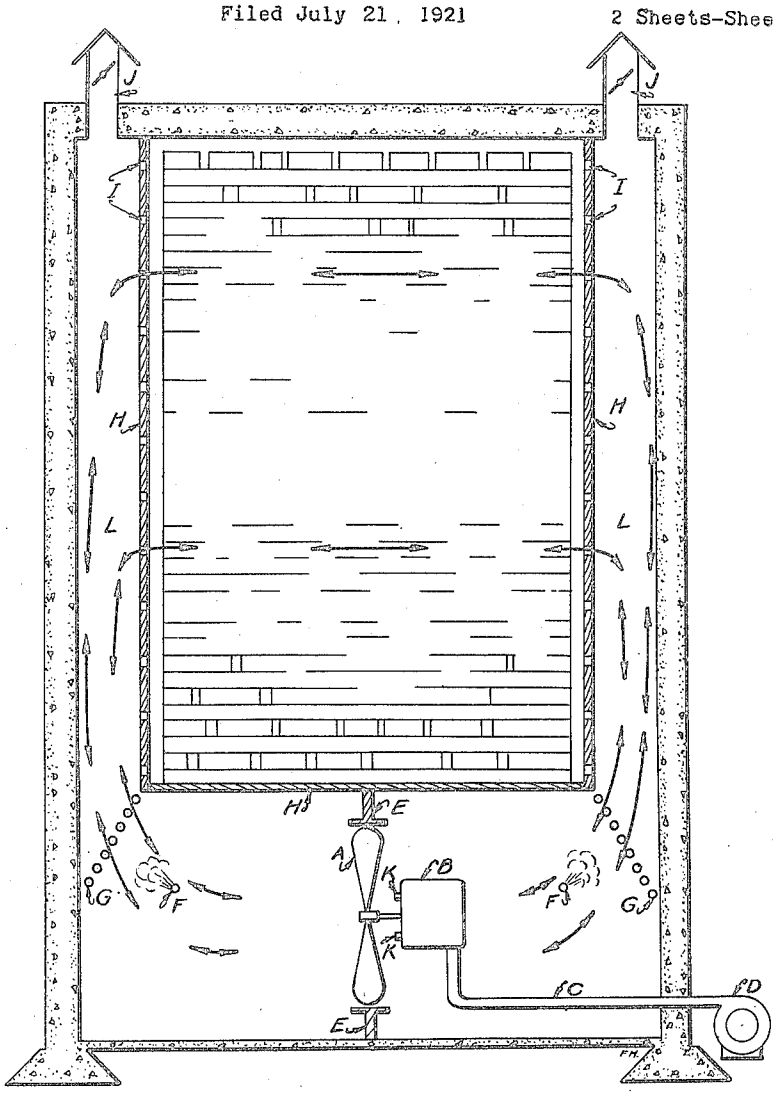


Fig. 1.

Rolf Thelen
INVENTOR.

BY R. W. Williams

ATTORNEYS.

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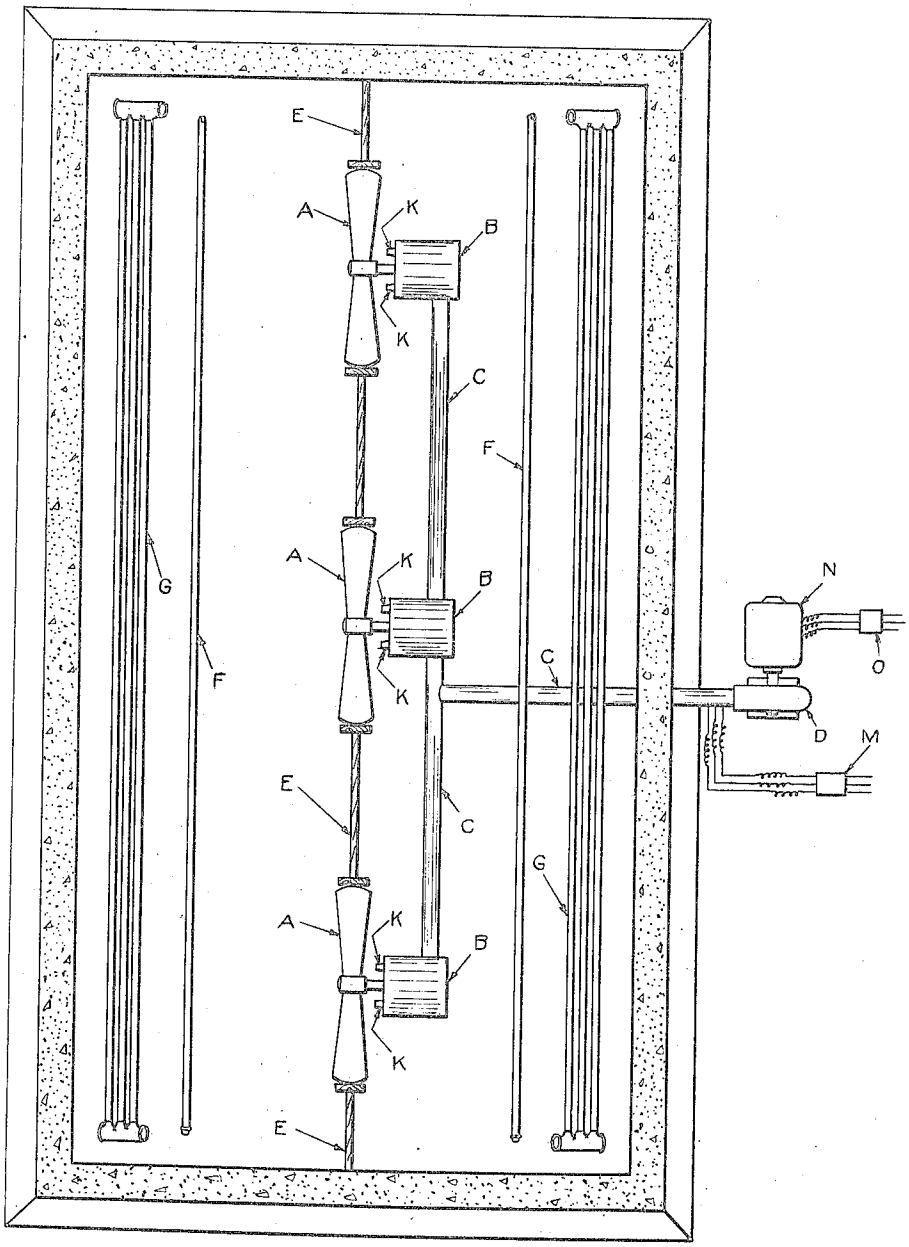


Fig. 2.

Rolf Thelen INVENTOR.

BY R.W. Williams

ATTORNEY.

Patented July 1, 1924. 1,499,627

UNITED STATES PATENT OFFICE.

ROLF THELEN, OF MADISON, WISCONSIN.

REVERSIBLE-CIRCULATION INTERNAL-FAN KILN.

Application filed July 21, 1921. Serial No. 486,564.

(FILED UNDER THE ACT OF MARCH 3, 1883, 22 STAT. L., 625.)

To all whom it may concern:

Be it known that I, ROLF THELEN, a citizen of the United States of America, and an employee of the Department of Agriculture, residing in Madison, Wisconsin (whose post-office address is Department of Agriculture, Madison, Wisconsin), have invented a new and useful Reversible-Circulation Internal-Fan Kiln.

This application is made under the act of March 3, 1883, chapter 143 (22 Stat., 625), and the invention herein described and claimed may be used by the Government of the United States, its officers and employees, and by any person in the United States without payment to me of any royalty thereon. I hereby dedicate the same to the free use of the Government and the people of the United States.

My invention relates to a compartment kiln in which the main circulation is internal and is produced by means of a row of internal fans. It is an improvement in the art of drying in that it combines three very advantageous features; namely, (1) a reversible circulation by means of which the drying is made more uniform and the drying time cut down appreciably, (2) an unusually uniform distribution of the air currents, (3) a mechanical means of producing the circulation which is very simple and very efficient, it being generally recognized among those skilled in the art that disk fans are the most economical means for the movement of large quantities of air at relatively low pressures.

The operation of the kiln will be evident from an inspection of the accompanying drawing, which shows in Fig. 1 a sectional side view of the kiln, and in Fig. 2 a longitudinal cross section taken directly under the horizontal portion of partition H in Fig. 1. Referring to the drawing, a row of disk fans A is mounted in a partition wall E, running the full length of the kiln. These disk fans are novel in the method employed for cooling the direct connected motors driving them. Each motor N is surrounded by a suitable casing B. Each one of these casings is reasonably air-tight with the exception of outlet ducts K suitably arranged, and an inlet pipe C through which fresh outside air is supplied from the blower D. This fresh air after passing around the motor passes into the kiln through the outlets K and can be made to serve a dual purpose, not only keeping the motors cool and dry but also serving to reduce the humidity in the kiln as needed. The quantity of air passing through each duct C can be controlled by any suitable means.

The motors are provided with the necessary wiring so that they may be reversed at will without entering the kiln. The motor wiring may be carried through the ducts C and thus protect it from the atmosphere of the kiln. A switch O is provided for operating motor N. Another switch M is provided for starting, stopping and reversing the disk fans A. By supplying air under a slight pressure to the casings B any leakage through the casings takes place outward whereas in self-cooled motors, in which a slight suction is established in the casing, the leakage is inward, which is especially deleterious during the periods when the kiln is filled with steam at high temperature. The pressure system is in this regard superior.

The partition H extends the full length of the kiln on both sides and below the lumber pile and shuts off the fan chambers from the lumber entirely except through the openings I of which there are a comparatively large number. The dampered vents J J are to be used to assist in reducing the humidity at times when this cannot be accomplished with sufficient speed by means of the air blown in through the ducts C. The heating pipes G G and the steam spray lines F F can be located wherever convenient. The particular location chosen for the heating coils has the specific advantage of serving to baffle and distribute the air entering or leaving the vertical chambers L L which act respectively as plenum chambers or vacuum chambers, depending upon the direction of the air flow in the kiln.

The steam jet lines F F serve to increase the humidity of the atmosphere in the kiln, both during normal operation and during steaming treatments. The chambers L are intended to be of sufficient width to reduce the velocity head and friction of the moving air to a point at which it will not interfere with the uniform, horizontal movement of the air through the lumber pile from one side to the other. The reversing feature permits

the air to be moved either to the right or to the left in the pile. It is the intention that in operation the direction of air movement will be reversed several times for each kiln run. This reversing will eliminate the lag in drying rate between the entering and leaving air sides of the pile which is present in all kilns in which the air circulation is continuously in the same direction.

I claim:

In a drying apparatus the combination with a receptacle containing the material to be dried of a series of motor-driven reversible fans mounted in a row lengthwise of the interior of said receptacle and a common means for supplying cold air to cool all of the motors.

ROLF THELEN.

Witnesses:
RAY C. TUTTLE,
E. C. SHERRARD.