3 Sheets--Sheet 1.

J. J. CURRAN.

Lumber-Drier.

No. 161,490. Patented March 30, 1875.

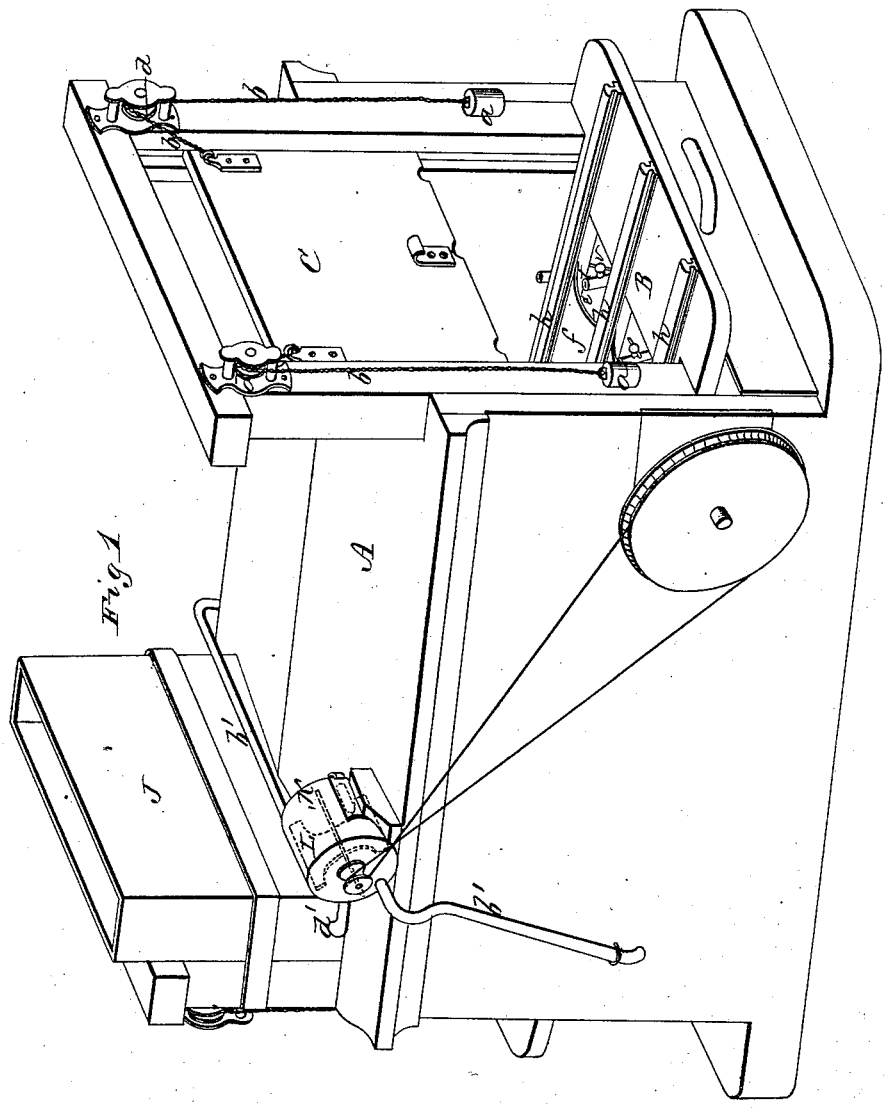

Fig 1

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3 Sheets--Sheet 2.

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Fig 2

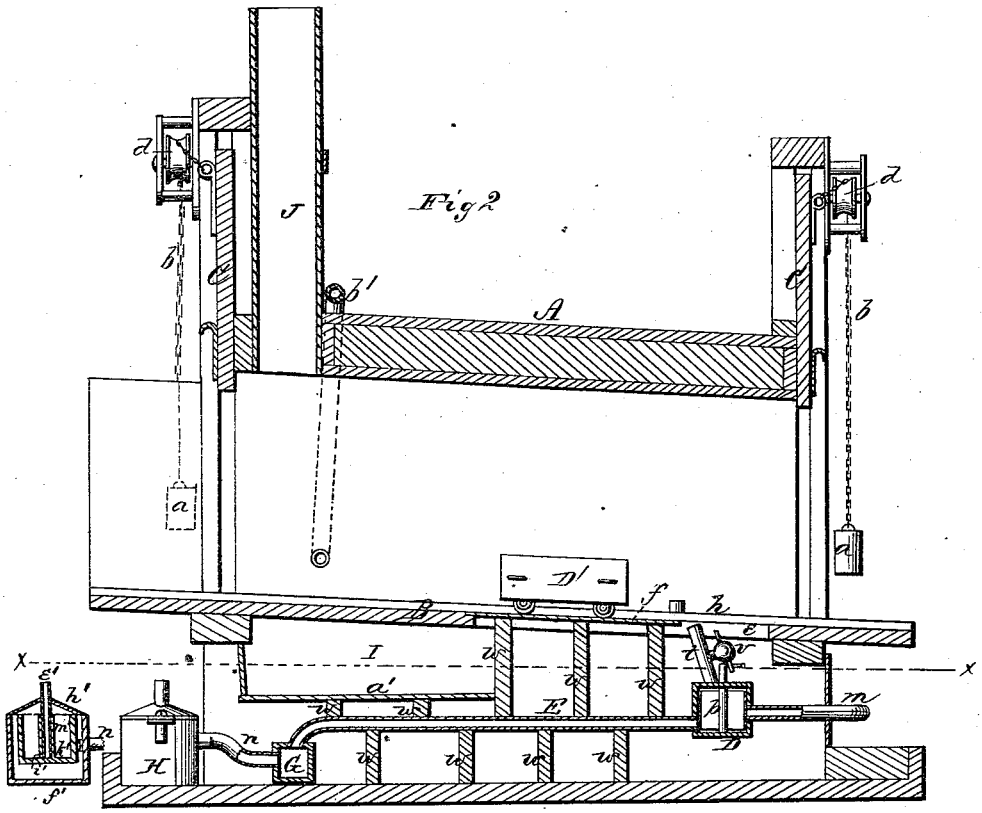
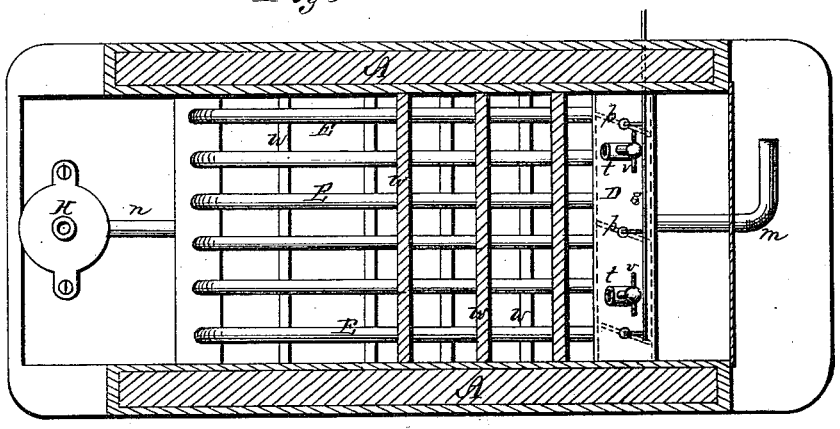


Fig 3



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3 Sheets--Sheet 3.

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Fig 4

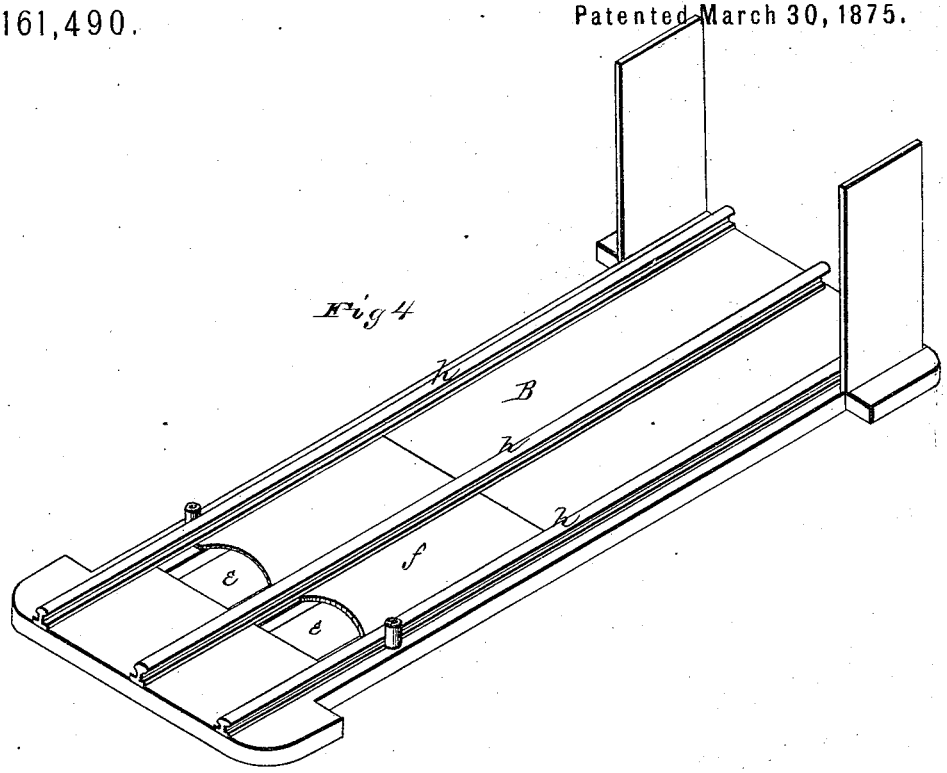


Fig 5

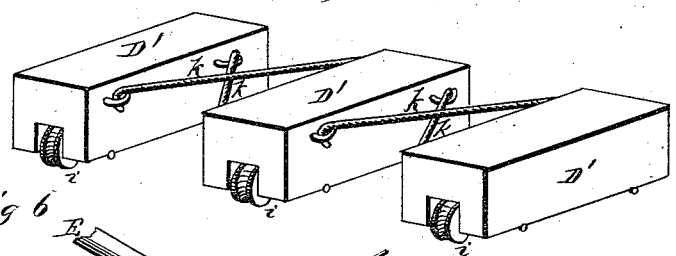
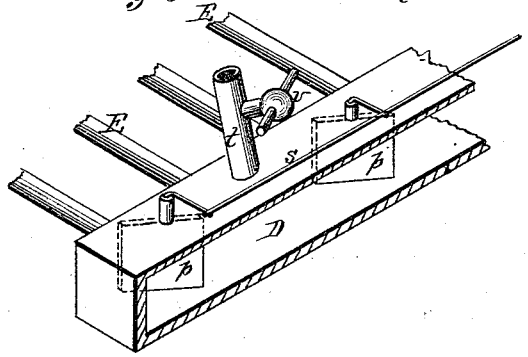


Fig 6



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UNITED STATES PATENT OFFICE.

JOHN J. CURRAN, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN LUMBER-DRIERS.

Specification forming part of Letters Patent No. **161,490**, dated March 30, 1875; application filed February 15, 1875.

To all whom it may concern:

Be it known that I, JOHN J. CURRAN, of Chicago, in the county of Cook and in the State of Illinois, have invented certain new and useful Improvements in Lumber-Driers; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a kiln for drying lumber, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a perspective view of my improved lumber-drier. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a horizontal section through the line *x x*, Fig. 2. Fig. 4 is a perspective view of the bottom of the kilns. Fig. 5 is a perspective view of one of the cars used therein. Fig. 6 is a perspective view of the steam-chamber used in the kiln.

A represents the shell of the kiln constructed in any suitable manner, and divided, by means of an inclined floor, B, into the drying-chamber above and the heating-chamber below. The drying-chamber above the inclined floor B is closed at both ends by means of vertically-sliding doors C C, balanced by means of weights *a a*, connected by chains *b b* to the doors, and said chains passing over elevated pulleys *d d*, as shown. The inclined floor B extends beyond both ends of the kiln, and forms platforms, upon which the cars are loaded and unloaded. In the lower portion of the floor B, near the front end of the kiln, are apertures *e* for the passage of the heated air from the heating-chamber below to the drying-chamber above the floor. Back of these openings the floor is made of sheet-iron *f* for a suitable distance, against the under side of which the heated air strikes, so as to heat above the same by radiation, also. Longitudinally on top of the floor B are secured three parallel rails, *h*, forming the track upon which the cars run. Each car is composed of three beams, D′, made entirely independent of each other, and each provided near each end with a flanged wheel, *i*, to run on the rails. The beams D′ D′ are then connected together by means of hooks *k k* crossing each other, as shown in Fig. 5, forming a flexible self-adjusting car, which can easily be taken apart, so that one man can carry it from one end of the kiln to the other, whereas, with the cars now generally in use, it takes three or four men to convey the car back to the entrance. Below the openings *e* in the heating-chamber is placed a steam-chamber, D, into which the steam is admitted from a boiler or engine through the pipe *m*. The exhaust steam from the engine used in the mill may be employed, if so desired. From the steam-chamber D a series of pipes, E, lead into another steam-chamber, G, at the rear end of the kiln, and from this latter chamber a pipe, *n*, conveys the steam into a steam-trap, H. The chambers D and G may be of any suitable form, but I prefer to make them rectangular, as shown. In the chamber D are valves or dampers *p p* operated by means of a rod, *s*, for the purpose of deflecting the steam, and causing it to pass as near equally as possible through the pipes E. From the chamber D extend one or more short pipes, *t*, into the openings *e* in the inclined bottom B, each pipe being provided with a stop-cock, *v*. By means of these pipes *t* one or more jets of steam may be injected into the drying-chamber above the floor B, which is of great importance in the proper drying of the lumber. Where hot air only is used the lumber will become case-hardened, but by the application of steam the lumber becomes sufficiently softened to allow the hot air to penetrate the same, and thoroughly dry it. Above and below the pipes E are arranged joists or partitions *w w* alternately, in the manner shown in Fig. 2, so as to cause the air to pass alternately up and down, around and between the pipes E, and become thoroughly heated before it passes through openings *e* up into the drying chamber.

Above the rear ends of the pipes is a horizontal partition, *a′*, to confine the air as it passes in close to the pipes, and the space above said partition *a′* to the bottom B is in-

closed to form a dead-air chamber, I, as shown. At the rear end of the kiln is a flue or chimney, J, extending entirely across the kiln. K is a fan-case, containing a suction-fan, L, driven by belt or otherwise from the engine in the mill, and said fan-case is by pipes *b' b'* connected with the interior of the drying-chamber, near the bottom of the rear end, and also by a pipe, *d'*, with the chimney J.

A number of cars having been loaded with lumber and placed in the kiln, the doors C C are closed. The steam is injected through the pipes *t*, and the hot air passes up through the openings *e*. The moisture settles at the bottom of the drying-chamber, and is drawn out by the action of the fan L through the pipes *b'*, thus creating a steady and continuous current through the drying-chamber. The moisture not taken out by the action of the fan is carried off with the vapor through the wide chimney J. As soon as the lumber on the front car has been sufficiently dried, this car is taken out at the front end of the kiln, the rest of the cars moved down and another car inserted at the rear end, and so on.

The steam-trap H is composed of an exterior cylinder, *f'*, with cover *h'*, and through the center of the cover passes an exhaust-tube, *e'*. Inside of the cylinder *f'* is a cup or bucket, *k'*, with central tube *m'*, having holes *i'* at the sides, near the bottom. As the steam passes into the trap it raises the bucket *k'*, closing the exhaust-pipe *e'*. As the steam condenses in the trap it flows over the top of the bucket and fills the same, when the bucket sinks, opening the exhaust-pipe, so that the steam will force the water out of said pipe. As soon as the weight of bucket is sufficiently reduced the steam again raises it, and closes the exhaust-pipe. By this means the pressure in the pipes E is kept uniform, and there is no liability of their bursting from any excess of pressure.

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

1. In a kiln for drying lumber, the inclined floor B, extending beyond the ends of the kiln to form the loading and unloading platforms, and provided with openings *e*, and sheet-metal part *f*, substantially as and for the purposes herein set forth.

2. The flexible self-adjusting car for lumber-driers, herein described, consisting of the independent beams D', provided with wheels *i*, and connected by means of hooks *k*, substantially as and for the purposes herein set forth.

3. In combination with the inlet and exit pipes, the steam-chamber D, provided with the valves *p*, operated by means of the rod *s*, substantially as and for the purposes herein set forth.

4. In a hot-air lumber-drier, the combination, with the inclined bottom B and steam-pipes E E, of the horizontal partition *a'* and the vertical partitions *w*, arranged alternately above and below the pipes, substantially as and for the purposes herein set forth.

5. The combination, in a hot-air lumber-drier, of the steam-chamber D, with valves *p* and pipes *t*, pipes E, steam-chamber G, and steam-trap H, all constructed substantially as and for the purposes herein set forth.

6. The combination of the kiln A, inclined bottom B, doors C C, steam-chambers D G, pipes E, trap H, wide chimney J, and suction-fan L, all constructed and arranged to operate substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of February, 1875.

JOHN J. CURRAN.

Witnesses:

J. TYLER POWELL,

C. L. EVERT.