

(No Model.)

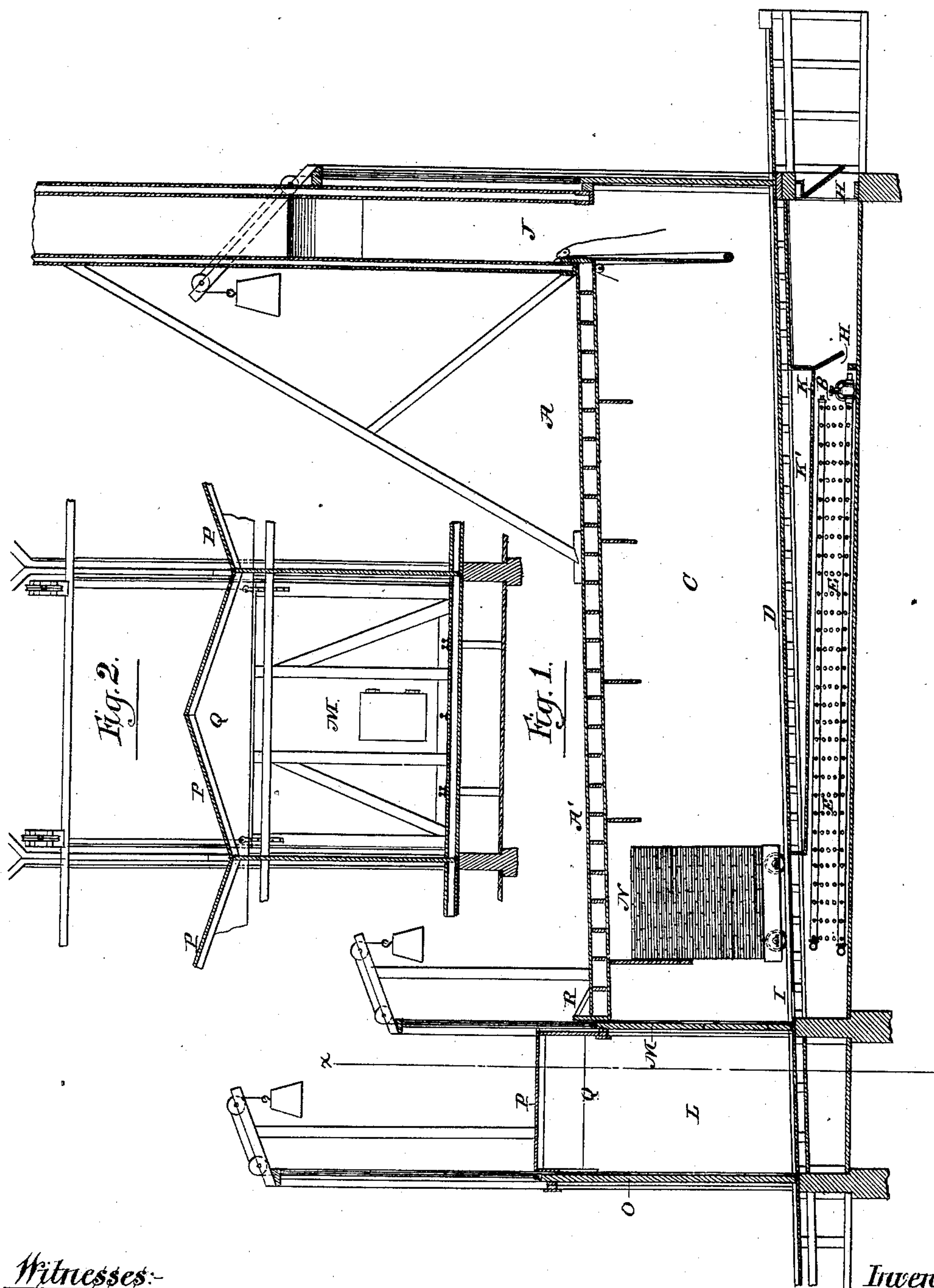
2 Sheets—Sheet 1.

J. J. CURRAN.

LUMBER DRIER.

No. 336,511.

Patented Feb. 16, 1886.



Witnesses:
Louis M. Whitehead.
C. C. Poole

Inventor:
John J. Curran
by
M. E. Dayton
Attorney:

(No Model.)

2 Sheets—Sheet 2.

J. J. CURRAN.

LUMBER DRIER.

No. 336,511.

Patented Feb. 16, 1886.

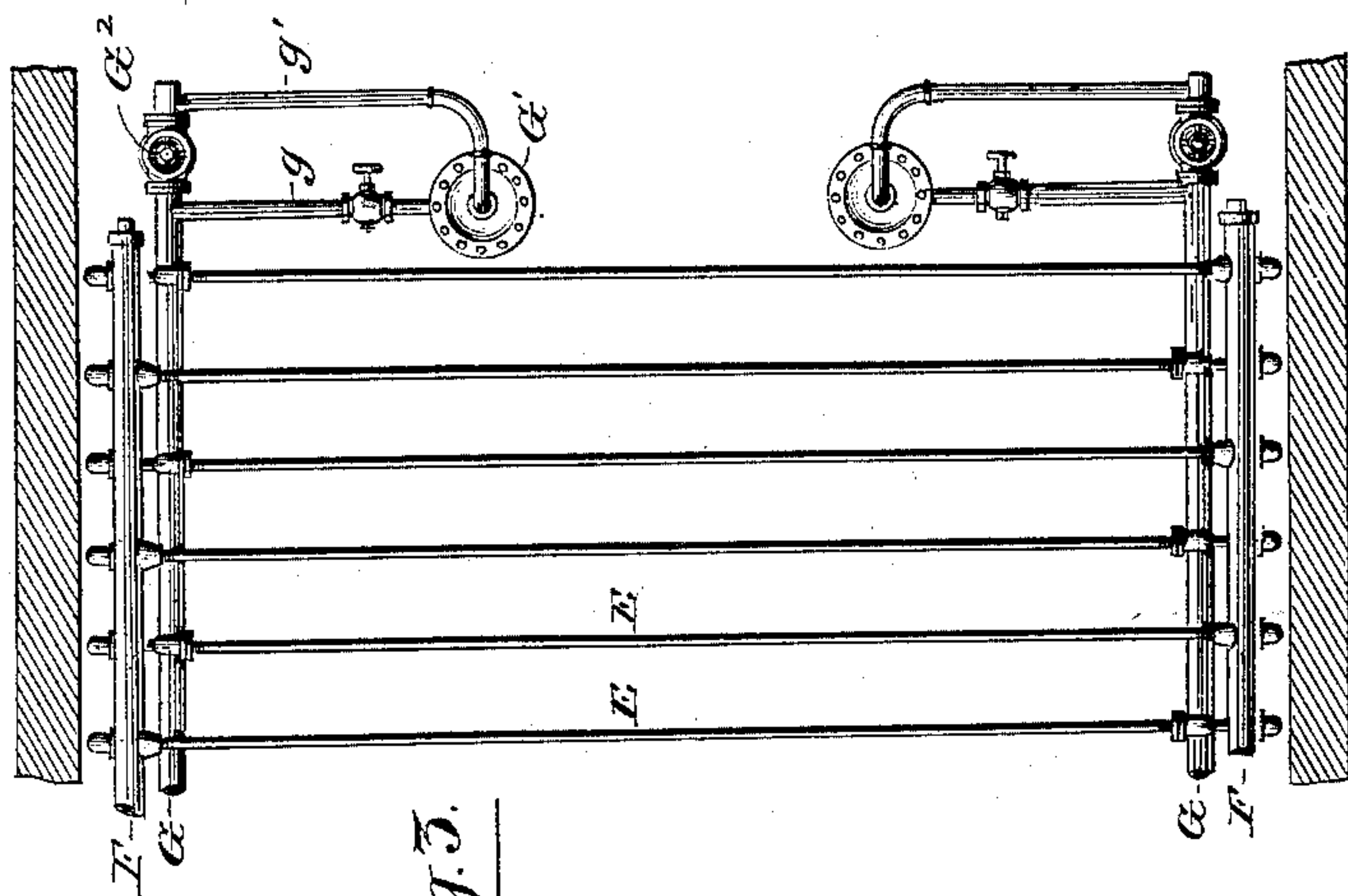


Fig. 3.

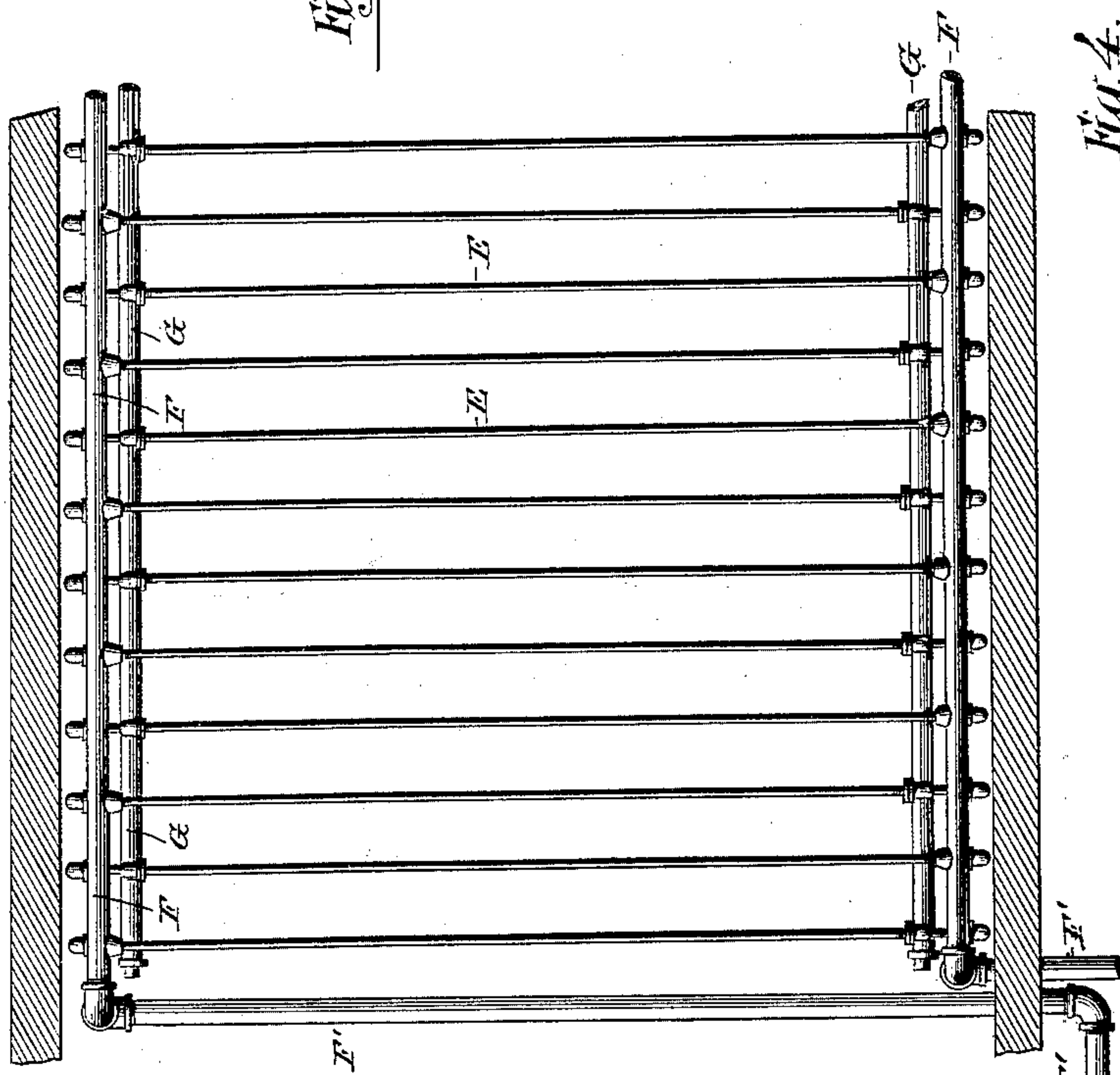
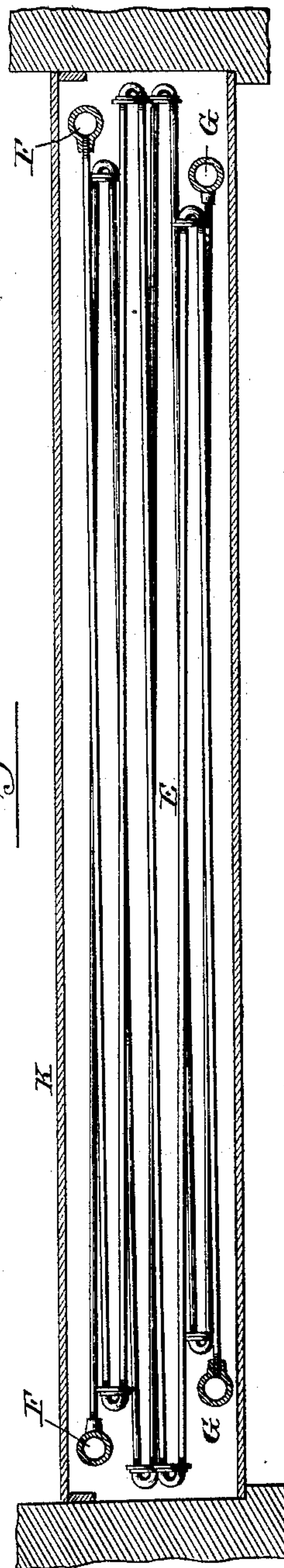


Fig. 4.



Witnesses:

Louis M. V. Whitehead

C. C. Poole

Inventors:

John J. Curran

by M. E. Davenport

Attorneys:

UNITED STATES PATENT OFFICE.

JOHN J. CURRAN, OF CHICAGO, ILLINOIS.

LUMBER-DRIER.

SPECIFICATION forming part of Letters Patent No. 336,511, dated February 16, 1886.

Application filed March 13, 1885. Serial No. 158,657. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. CURRAN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lumber-Driers; and I 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, which form a part of this specification.

This invention relates to the arrangement and connections of the steam-pipes used for heating the air in driers for lumber and other purposes, and also to provision in such driers for allowing the lumber or other articles to cool gradually after being dried, with a view to prevent injury thereto from too sudden change of temperature.

The several features of the invention are intended more especially for use in lumber-driers, and they are therefore illustrated in a drier constructed throughout for the particular purpose of drying lumber.

That branch of the invention which concerns the steam-heating pipes has for its object to shorten the steam circulation in the heating-pipes, with the advantage of lessening the vertical height of the heating-chamber and of the structure as a whole, making the loading and unloading of lumber in supplying and discharging the kiln more convenient, securing a more effective action of the steam, and preventing the lower steam-pipes from freezing.

To these and other desired ends this branch of the invention is illustrated in the provision of two supply and two discharge steam-headers, which will preferably be located on opposite sides of the heating-chamber, and of vertical gates or groups of pipes which lead back and forth from each of the several supply to the several discharge-headers, and which contain a less number of pipes than the old construction, whereby the distance traveled by the steam from the supply to the exhaust header is correspondingly lessened, the space or vertical height of the heating-chamber is also correspondingly diminished, and the entire length of each connecting-pipe is more uniformly and highly heated.

That branch of the invention which relates to the gradual cooling of the articles after be-

ing dried has for its object, particularly as employed in connection with lumber, to prevent the lumber from checking when first withdrawn from the highly-heated drying-chamber and exposed to the cooler air outside.

To this end this branch of the invention consists in a separate chamber located at the exit end of the drying-chamber and communicating with said drying-chamber by a passage that may be closed after a load has been withdrawn from the latter, and which has an outer door through which the load may be finally discharged after it has been sufficiently "tempered" for safe exposure to the outer air.

Referring to the accompanying drawings for a fuller understanding of my invention and of a particular form in which the same may be practically embodied, Figure 1 is a longitudinal vertical section of a lumber-drier containing my said improvements. Fig. 2 is a transverse vertical section through *xx* of the tempering-chamber. Fig. 3 is a fragmentary plan view of the heating-pipe arranged in accordance with my invention. Fig. 4 is a transverse vertical section of the heating-chamber, showing the steam-heating pipes in elevation.

A represents a drier divided into a lower heating-chamber, B, and an upper drying-chamber, C, by a floor or platform, D, which is usually and preferably downwardly inclined from the receiving to the discharge end of the drying-chamber, in order to facilitate the movement of heavy loads of lumber thereon in the process of drying the same.

Within the heating-chamber B are located the steam-pipes in the form of vertical transverse "gates" or groups E, connected with suitable longitudinally-arranged "supply-headers" F, and discharge-headers G. Heretofore a single supply and a single discharge header have been employed, which have usually been placed on opposite sides of the heating-chamber, and the steam-pipes connecting these headers have been placed in gates numbering, say, nine pipes in height, joined by return-bend couplings, as here also shown, or by vertical headers. In the present invention two each of said headers are employed, and the gates are or may be thereby reduced to, say, five pipes in height, which permit the platform D to be located and the entire building

to be made correspondingly lower, and which insure a more active and uniform heating of said pipes and prevent the lowermost pipes of the circulation from freezing. Preferably, the supply-headers are located one on each side of the heating-chamber or building, and the discharge-headers are similarly placed in order that as both supply-headers receive steam from the same source the heat of the chamber B may be made substantially the same at one side as at the other. I also prefer to place the supply and discharge headers that are connected with each other on opposite sides of the heating-chamber, though this is not essential. The pipes forming the gates E, connected with one pair of headers, are desirably alternated in position with those connected with the other pair, as shown in Figs. 3 and 4, with the purpose of securing a uniformly-progressive increase of temperature from one end to the other of the heating-chamber. The discharge-headers G will usually connect with a steam-trap or steam-traps, G', such connection in the present instance being provided by the valved branch pipe g and a return-pipe, g', coupled with the said pipe G at a suitable distance apart to admit the valve G² in the latter between said trap branches. This construction, by the opening of the valve G², allows the steam to be directly discharged through the pipe G, as will be desirable in starting up the apparatus, or, by the closing of said valve G², to direct the condense-water through the trap, which is of course the more economical and desirable method after the apparatus has once got into running order. The inlet-steam pipes F' F', as shown in Fig. 3 of the drawings, are admitted to the heating-chamber at one side of the latter; but this is not a material matter, and said pipes may be brought into said chamber at any other desired point.

The provisions for admitting and conducting the air through the heating-chamber form no part of the present invention, and may be of any desired or suitable construction and arrangement. The devices herein shown for the purpose are of a familiar and approved form, consisting of registered openings H H, for the admission of air to the heating-chamber at the end of the building at which the lumber is admitted, a passage at I through the floor D, at the rear end thereof, and a chimney, J, leading from the drying-chamber at the opposite or front end thereof. The steam has its ingress to the heating-pipes at the end of the system of piping most remote from the point at which the air is admitted to the heating-chamber, this being the ordinary and preferred construction, for the purpose of giving the lowest heat in said pipes where they meet the incoming air and higher heat as the air advances between the pipes in its progress toward the floor-opening I. The drawings also show a suspended floor, K, located parallel with the line of the upper surfaces of the pipes and adjacent thereto for the primary purpose of compelling the air to

pass through the interstices or spaces between the heating-pipes in its advance through the heating-chamber, and to thereby become thoroughly and certainly heated. A secondary and useful purpose of such suspended floor K, particularly when the space between the same is inclosed at its ends, as shown, is to form a "dead-air chamber," as it is called, which prevents the floor or platform D from becoming cool by the contact of cold air therewith. This matter is, however, no part of the present invention, being covered in other and prior patents.

L is the tempering-chamber, which forms the second branch of my present improvement, and which is located at the rear or discharge end of the drying-chamber C. Said tempering-chamber is separated from the drying-chamber by a vertical sliding door, M, of familiar construction, being of the full width and height of the drying-chamber, or of sufficient dimensions to allow the loads N of lumber or other material to pass unbroken from the drying to the tempering chamber. Said tempering-chamber is also provided with an outer door, O, which will desirably be of the same vertically-sliding character, and which may, if preferred, be constructed to open otherwise.

In the drawings, Fig. 1, the floor or platform D is shown as being continued beyond the tempering-chamber to enable the load to be run out from said tempering-chamber upon said platform, to be thence distributed or carried off. In many situations, however, the addition of such exterior extension of platform will be objectionable on account of lack of space, and the said platform may therefore reach only through the tempering-chamber. In this case it will be desirable to provide vertical room within said tempering-chamber to allow the lumber to be unloaded directly from said tempering-chamber upon wagons or cars, and for this purpose said tempering-chamber will need to be made of greater interior height than the drying-chamber, which latter is commonly of only sufficient height to fairly accommodate the loads which are passed through the same for the purpose of being dried.

To give space for a man to stand upon the full load within the tempering-chamber, and to remove and pass out the boards therefrom one by one, the said chamber is herein shown as being provided with a roof, P, higher than the roof A' of the drying-chamber, said roof P being illustrated in the ordinary gable form, though it may be of shed or other form, as may be considered desirable for particular locations. This elevated roof affords a space, Q, within which a man or boy may stand upon a load of lumber, N, for the purpose of delivering the boards or planks of which said load is composed, one by one through the doorway O, to a car or wagon located outside to receive them. The greater elevation of the roof of the tempering-chamber of course prevents the free discharge of water from the roof

A', and the latter is therefore provided with a sort of dam, R, forming a transverse trough along the lower end of the roof A', which deflects the water sidewise. In a group of driers located side by side, as is frequently the case, said roof A' may find discharge through the lower points of the roofs P, provided the latter are made low enough for the purpose, or the water may be conducted in two ways entirely across the series of driers by the foot-board R, and delivered in any convenient manner.

The purpose of the tempering-chamber L, as above stated, is to shelter and confine each load of lumber for a time after it leaves the drying-chamber C, in order to permit the same to cool down gradually, and thus prevent checking of the lumber from too sudden exposure to the outer air. In cold weather, particularly, this is of very great importance, as it has been observed that the sudden exposure of lumber to cold air upon leaving the highly-heated drying-chamber C has resulted in cracking or checking the lumber to such an extent as to materially lessen its value.

By providing the inclosed chamber L in communication with the drying-chamber C, said chamber L may and naturally will be heated to a rather high temperature by the raising of the door M to allow the passage of the lumber-load from the drying to the tempering-chamber. The load admitted to the tempering-chamber will, therefore, on the closing of the door M, be subject to a temperature nearly as high as that of the drying-chamber, and to a temperature at least so high as to prevent checking of the lumber, and the temperature of the said chamber L will be gradually lowered after being cut off from the drying-chamber and by reason of its exposure; or, if desired, the door O may be slightly opened to allow said chamber L to cool as rapidly as may be necessary, while guarding against the effect of too rapid cooling, for the purpose indicated.

It is understood that in the use of driers of the class indicated in the drawings, the lumber is admitted in loads at the higher end of the drying-chamber, and that said loads are advanced gradually, as one is removed and another admitted at intervals from the higher to the lower end of said drying chamber. The heated air being admitted at I, or at the lower end of the drying-chamber, said lower end of that chamber is hotter than the upper end in proportion as the heat is abstracted from the air and communicated to the lumber, and in proportion as the moisture taken from the lumber serves to cool the said air in its passage toward the chimney. The principle of the drier in its drying operation is therefore to gradually advance the lumber from its cold or cool condition, at which it is admitted, through a gradually-increasing temperature until it reaches the lower end of the drying-chamber. This has been found useful and advantageous for the purpose of preventing the

checking of the lumber in the operation of drying; but prior to my present invention no provision has been made for the gradual cooling of the lumber and the prevention of its checking by sudden change from a high to a low temperature. The addition of the tempering-chamber L in communication with the more highly heated and delivery end of the drying-chamber perfectly serves this purpose, and the lumber may therefore be taken out from the tempering-chamber in the same unchecked or perfect condition in which it is originally admitted to the drying-chamber, and in condition to stand subsequent exposure without injury.

As will be seen from the drawings, Fig. 1, the door O is made to open and close the tempering-chamber throughout its entire height, so that when lifted said door will open the space above the lumber, and thus allow the latter to be passed out from the top of the load.

I claim as my invention—

1. The combination, with the heating-chamber of a lumber-drier, of two longitudinally-arranged steam-supply headers and transverse gates of steam-pipes leading therefrom, substantially as and for the purposes set forth.

2. The combination, with the heating-chamber of a lumber-drier, of two steam-supply headers arranged longitudinally on opposite sides of the heating-chamber, two correspondingly-arranged discharge-headers, and transverse pipes connected with each other and with said headers in vertical groups or gates, substantially as and for the purposes set forth.

3. The combination, with the heating-chamber of a lumber-drier, of two longitudinally-arranged steam-supply headers placed at the sides of the heating-chamber, and two similarly-arranged discharge-headers, and a series of vertical groups or gates of pipes alternately connected with said headers, substantially as and for the purposes set forth.

4. The combination, with the drying-chamber, of a tempering-chamber located at the exit end of the drying-chamber and communicating therewith by a passage having a door, substantially as described.

5. The combination, with the drying-chamber having its roof inclined toward the exit end thereof, of a tempering-chamber having a roof more elevated than that of the drying-chamber, a vertically-sliding door between the said chambers and rising above the roof of the drying-chamber, and a foot-board at the lower extremity of said latter roof, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN J. CURRAN.

Witnesses:

M. E. DAYTON,
OLIVER E. PAGIN.