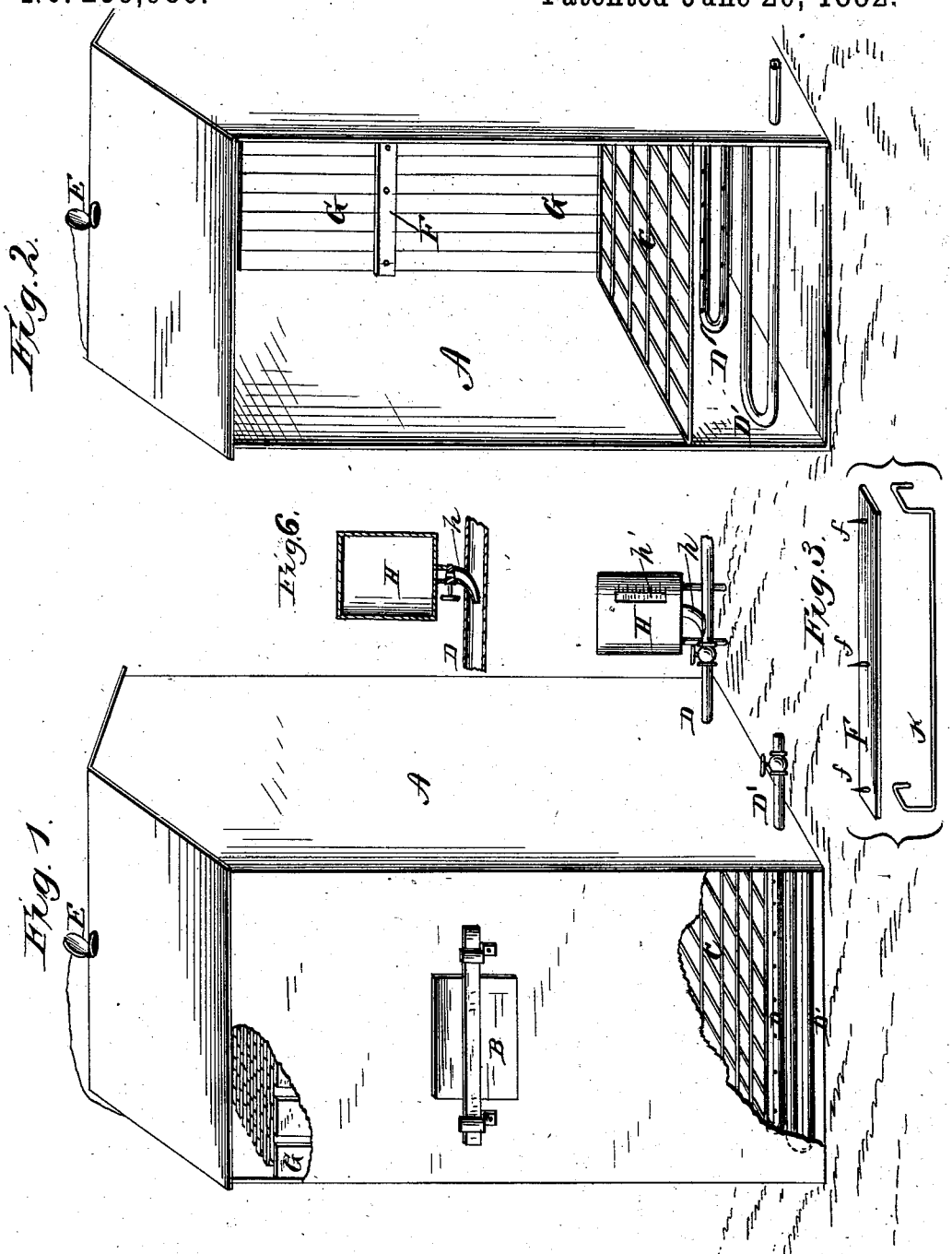
(No Model.) 2 Sheets—Sheet 1.

J. LYNCH.

PROCESS OF AND APPARATUS FOR DRYING LUMBER.

No. 259,986. Patented June 20, 1882.



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(No Model.) 2 Sheets—Sheet 2.

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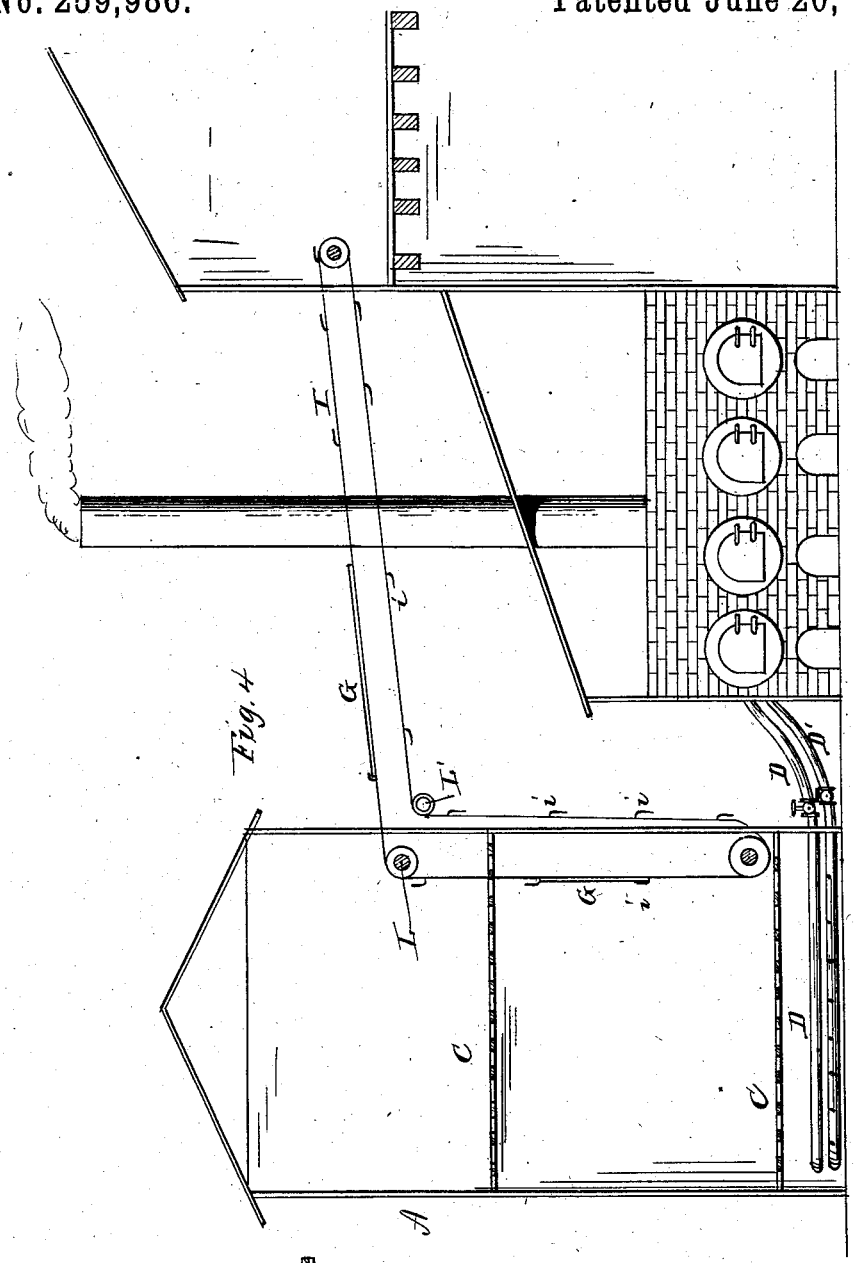

Fig. 4

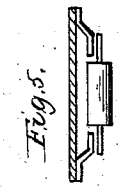

Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN LYNCH, OF PORTLAND, MAINE.

PROCESS OF AND APPARATUS FOR DRYING LUMBER.

SPECIFICATION forming part of Letters Patent No. 259,986, dated June 20, 1882.

Application filed November 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN LYNCH, a citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Process of and Apparatus for Drying Lumber; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a perspective view of a device embodying this invention, with a portion of the casing broken away to show the lumber stacked inside. Fig. 2 is a vertical central section of Fig. 1, showing the interior in perspective; Fig. 3, detail showing devices for sticking and separating the lumber; Fig. 4, sectional elevation, showing chiefly the means for carrying the lumber from the mill into the drier, the mechanism being used to take it out. Fig. 5 is a detail of the short roller or pulley over which the endless belt moves. Fig. 6 is a detail showing the connection of the naphtha-tank with the steam-pipe.

This invention belongs to that class of devices known as "lumber-driers," wherein artificial heat is used, and the novelty consists in general details of the construction and combination of the parts, as will hereinafter be more fully and clearly set out and explained.

Heretofore in lumber-driers where artificial heat is used it has been customary to place the lumber in a horizontal position in the drying-chamber, and then admit the heating agent—hot air, or steam and hot air, or superheated steam and hot air; but the method of introducing the drying agent or the position of the lumber in the drying-chamber, or both causes combined, have rendered it almost impossible to treat the lumber by any of these methods, excepting by expensive outlay of money and time, in such a way that when it came from the drier it would not be warped, cracked, or blackened, and thus be badly damaged; but the demands of the trade have called for such a method and apparatus as would enable the lumber to be dried very rapidly, and also, when dried, leave it in a handsome condition, both as to cracks and warping and as to external appearance. It has been the aim in the present invention to meet these conditions, and to give a process and an apparatus that will dry rapidly, smoothly, and soundly, and at a very small expense.

I am well aware, as above stated, that the general agents or means by which I carry out my invention are not new with me; but with these well-known means I have succeeded in producing in an entirely novel way the important ends desired.

The main points of my invention are stacking the lumber endwise in the drying-chamber, and then treating it by live steam or by live steam and dry heat. I may also add to the live steam, when it is desired, any suitable pitch solvent. The advantage in treating in this way the pitch pine lumber which is produced in warm climates is that by standing the lumber on end a large quantity can be stacked in a small space, and the steam and heat so applied as to get the full effect of the same, not only upon every part of the surface, but through the pores of the lumber. This pitch pine lumber, if not dried day by day as it is sawed, blackens and becomes of little value. By using a drier which will dry the lumber rapidly the product of each day can be dried bright and soft. The use of live steam on lumber piled horizontally is not effective, as the steam comes in contact with only one side of the lumber, and not effectively, as it naturally rises to the top, and, being against the grain, does not saturate the lumber or expel the sap. The steam by my process forced directly under the ends of the lumber naturally passes up between and through the same. The dry heat which follows flows through the sap-channels, which have been expanded by the live steam, and thus by reaching every part of the lumber dries rapidly without splitting. While live steam has heretofore been introduced into dry-houses for the purpose of expelling the sap and preparing the lumber for rapid drying, by dry steam it has not accomplished the object for the reason that it did not act upon all parts of the lumber, and there is no way in which the use of steam can be made effective except in the manner described in my invention.

I do not claim to have discovered the advantage of using steam for drying, or that I have

first applied it by perforated and imperforated pipes to the drying of lumber; but I have first applied it in a way to effectually accomplish the cheap, rapid, and successful drying of lumber.

In carrying out my said invention I have found that a structure, as now shown at A in the accompanying drawings, of about the following dimensions will answer very well—say six feet deep by nine feet wide, and from twenty to sixty feet high—by which I mean a structure that is very high in proportion to depth and width. This is made of any suitable materials, and steam-tight, as near as possible.

At suitable places are provided man-holes B, to allow the lumber to be put in or taken out; but any convenient arrangement—as by doors or by endless apron, as will be hereinafter described—may be adopted for this purpose, the aim being to allow an easy way to fill the drier and also to remove the lumber from it. At the same time this aperture or opening will be securely closed, so as to retain the steam or heat inside the drier during the process of treating the lumber.

In the lower part of the drier, beneath the grated or open floor C, are the steam-coils D D′. The one, D, is perforated, and designed to be used in steaming the lumber. The other, D′, is not perforated, and is to be used in drying the lumber after it has been steamed. These pipes are properly controlled by cut-off cocks, so that one or the other may be used, as desired. These pipes may be arranged in any desirable manner.

At any suitable place in the upper part of the structure A is provided a blow-off or safety valve, E.

To retain the boards G, when placed on their ends on the floor C, I may use a device like that shown in Fig. 3, which is a long and slender piece, F, of wood or metal, having on its face points *f*. These pieces can be applied as shown in Fig. 2; or pieces of wire, as shown at K, Fig. 3, or any like retaining device, may be used for this purpose. Thus when a row of boards has been stacked across the back of A, one or more of these bars F, wires K, or the like can be stuck or placed upon them, and so the row will be kept in place, and at the same time sufficiently apart from the next to allow the free circulation of steam or heat. It is not, however, absolutely essential that such a sticking and dividing strip should be used, for the boards may—as by breaking the joints or by some mere mechanical skill—be so placed in the structure A as to leave amply sufficient spaces for the circulation of steam and heat. Where economy of space is a requisite the latter method may probably be preferred.

It may also be desirable to use naphtha or some pitch solvent in connection with the live steam during the process of the treatment, and this may be accomplished by placing a tank, H, at any convenient position relative to the outer part of the perforated steam-pipe D, so that the pipe *h* from the lower part of said tank can enter into the said steam-pipe. This pipe *h* has a suitable cut-off. The inflowing of the steam will bear with it, when the cock is open, a quantity of the naphtha vaporized and mingled with it, and thus will, in circulating through the interior of A and in and through the pores of the lumber, act directly on the pitch in it. The glass tube or register *h′* on H will indicate the quantity of naphtha inside the tank.

To fill the structure A with lumber I can use an endless belt, I, which passes over pulleys L, and is situated in close proximity to the saw-carriage, &c., to allow the boards to be run upon it. This can be easily done by placing along the belt, at proper spaces each side, catches *i*, which will afford a suitable holding for the end of a board. The board is thus carried down into the drier, and will here be removed by the man who is attending to the stacking. The reverse movement of the carrier I will enable the boards to be removed from A after they are dried.

It may be found necessary to have one of the pulleys over which I passes short, as at L′, Fig. 5, so that the belt may smoothly go over it, and the catches *i* on the sides of the belt may readily pass by it. When this method of filling A is used it will be possible to build said structure without any opening, except that in the top and the small ones needed to accommodate the carrying-belt. When the process of steaming, &c., is going on the openings for the belt are properly closed.

The drier, when sufficiently high, may have two or more lengths of boards stacked inside at the same time. This will be easily accomplished by providing a proper number of grated floors. It may also be desirable to have the steam-coils run under each of said floors. I may sometimes find it well to use a fan-blower in connection with this drier.

In the ordinary use I prefer to let in on the lumber steam by the perforated pipes, and when the sap and resinous matter have been expelled the close pipes are then employed to dry the lumber.

The advantages in this mode of drying lumber are, first, that the dry house or box is so constructed that all the steam and heat is utilized and brought into direct contact with the lumber, not only on the surface, but through the grain or natural sap-channels of the wood; second, that by introducing, first, steam through the perforated pipes, the pores of the wood are opened and the sap and resinous matter expelled, which leaves only the moisture of the steam to be dried out by the imperforated steam-pipes; third, the lumber being set on end and a little open at the bottom, the steam and heat, being directly beneath and confined in a small space, must be forced rapidly through to the top.

I am aware that heretofore lumber has been sometimes stacked endwise to dry in the open air; also, that pitch solvents have been used in processes for saturating lumber; also, that

chemicals have been used in connection with live steam in feather-renovators to destroy vermin, and that it is not new in steam-drying apparatus to have close and perforated steam-pipes.

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

1. The herein-described process of drying lumber, namely: first, stacking it endwise in a suitable chamber or holder, and then treating it with live steam, or with live steam and finally with hot air, applied or admitted at the lower end of the lumber, all substantially in the manner set forth.

2. The herein-described process of treating lumber for purposes of drying, &c., namely: first, stacking or packing it endwise in a suitable receptacle, and then admitting therein to the lower end of the lumber live steam which has been duly saturated with some sap or pitch solvent, and afterward drying by hot air, all substantially as set forth.

3. In combination with a steaming and drying structure, A, operated as set forth, a separating and holding piece, F, substantially as set forth.

4. In combination with the receptacle A, adapted to hold the lumber when stacked, as described, the endless belt or carrier I, having catches *i*, whereby in a forward movement the lumber can be carried into the drier and in the reverse movement taken out, all substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN LYNCH.

Witnesses:
G. W. BALLOCH,
GEO. W. STICKNEY.