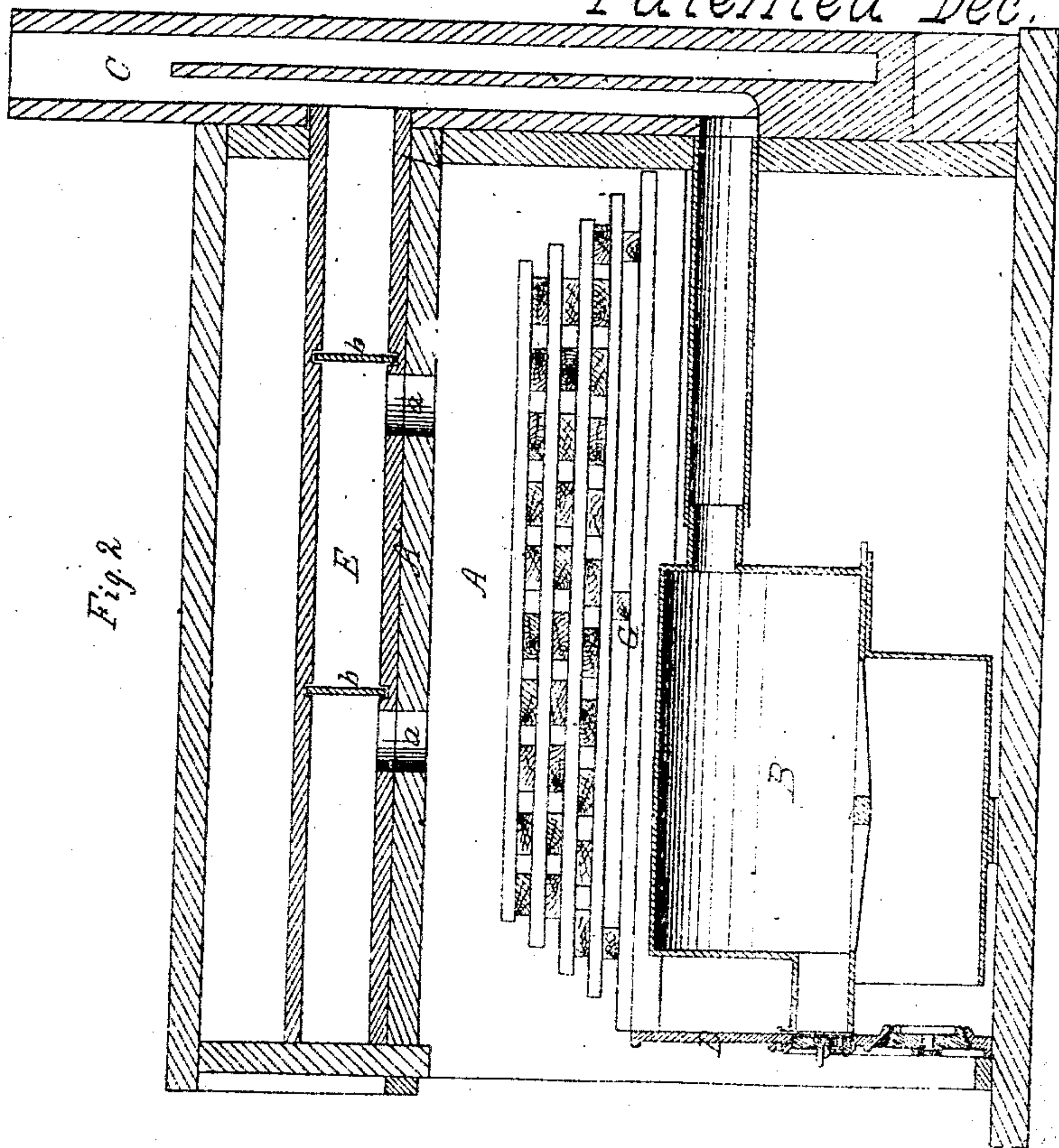


*Bender & Steffe.*

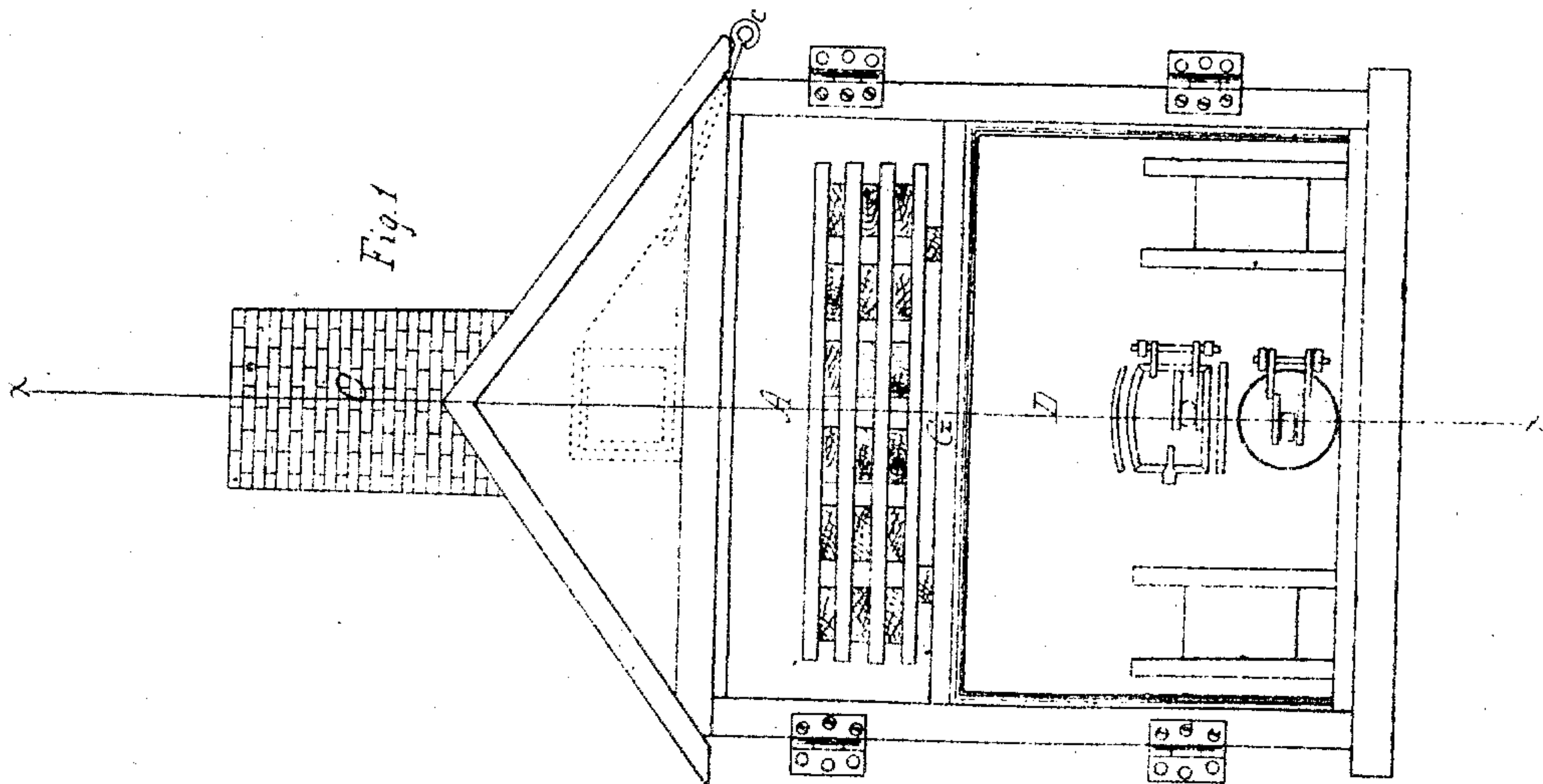
*Drying & Seasoning Lumber*

*Nº 72157*

*Patented Dec. 17, 1867.*



*Fig. 2*



*Fig. 1*

*Witnesses*  
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# United States Patent Office.

E. C. BENDER, OF YORK, AND WILLIAM STEFFE, OF PHILADELPHIA,  
PENNSYLVANIA.

*Letters Patent No. 72,157, dated December 17, 1867.*

## IMPROVEMENT IN DRYING AND SEASONING LUMBER.

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

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, E. C. BENDER, of York, in the county of York, and State of Pennsylvania, and WILLIAM STEFFE, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and improved Process of Seasoning Lumber; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of the front part of a building, in which the drying and seasoning process is conducted.

Figure 2 is a longitudinal section, taken in a vertical plane through the centre of the building.

Similar letters of reference indicate corresponding parts in the two figures.

This invention relates to a new and improved process of treating lumber, for the purpose of drying and seasoning it. The invention is designed to remedy a serious defect in processes of seasoning lumber which have been heretofore adopted, which defect arises from an improper application of heat to the lumber in the drying-kiln, causing the surfaces of the logs to shrink and become so dry, in a very short time, as to prevent the heat from penetrating to the interior of the logs and carrying off the moisture therefrom. We refer particularly to processes wherein the lumber to be seasoned is placed in a kiln or apartment, and subjected to the direct action of dry heated air, which is allowed to enter the seasoning-apartment at the lower part, and to escape through the roof, charged with moisture, which it absorbs from the lumber. The continual ingress and egress of highly heated air, greedy of moisture, absorb the moisture from the surfaces of the logs with such rapidity as to contract and close the pores or spiracles of the wood, and thereby form an impenetrable shell, through which the sap or moisture contained in the interior of the logs is prevented from escaping, or being acted upon to advantage by a further continuance of the heat.

Other processes have been attempted, wherein the lumber was subjected to the direct action of steam for a considerable length of time, for the purpose of expanding and enlarging the pores of the wood, and softening the gummy matters of the wood. The lumber was then subjected to the direct action of dry heated air in circulation, for the purpose of carrying off the moisture and drying the wood.

To obviate the above objections, and to provide for drying and seasoning large logs, as well as sawed lumber, from centre to surface, the nature of our invention consists in providing for keeping the pores of the wood open for a sufficient length of time to allow of the absorption and carrying off of the moisture from the interior, as well as the exterior of the wood, as will be hereinafter described.

To enable others skilled in the art to understand our invention, we will describe our improved process.

In the accompanying drawings, we have represented a building, in which the process of seasoning lumber is conducted. The sides, bottom, and top, enclosing the seasoning-chamber A, should be made as air-tight as practicable, so that, when the doors and regulators are closed, no air will be admitted into said chamber from without. A furnace, B, is arranged in said chamber, with one or more pipes leading to a chimney, C, for carrying off the products of combustion, and through the front wall D, leading into the ash-pit of the furnace; and also, into the lower part of the chamber A, openings are made, which are at certain times hermetically closed. Above the top wall or partition A' is a roof, and in the space enclosed by this roof is an air-conduit, E, leading into the chimney C. This conduit E communicates, by means of one or more openings *a*, made through the partition A', with the seasoning-chamber, A, as shown in fig. 2. Between said opening or openings and the chimney C, valves *b* are applied within the conduit E, so as to be operated, by means of rods *c*, from the outside of the structure, which valves are designed for allowing the escape of air charged with moisture from the chamber A, and for preventing such escape, at pleasure. At a suitable point above the furnace or heating-apparatus an open platform, G, is arranged, upon which the lumber to be seasoned is suitably stacked. Instead of the furnace above described, the required degree of heat can be obtained in the chamber A, by the employment of pipes, heated by steam, circulating through them.

Having thus described one form of apparatus which is adapted for use in conducting our improved process of seasoning lumber, we will now describe the process, desiring to be understood as not limiting our invention to



the apparatus shown, as other arrangements may be adopted without departing from the general principle of our invention.

#### *Operation.*

After stacking up the logs or lumber in the seasoning-chamber A, the doors and flue-slides or dampers are tightly closed, so as to make this chamber as tight as possible, and thus prevent the entrance of air, as the prominent feature of this process consists in retaining all the heat and moisture, as it is produced about the timber as it is being seasoned. The fire is then started in the furnace, if a furnace be employed, and continued until the temperature in the chamber A attains about 170° Fahrenheit, when it will be found that the air in said chamber has undergone a material change, and, instead of this air being only highly rarefied from the action of the heat, it has become surcharged with moisture, which is the result of retaining heated dry air in contact with green or moistened wood for a proper length of time, and at this temperature and moist condition of the atmosphere, it is very penetrating in its character, and searches to the centre of the logs of wood, carrying off with it the moisture and sap from the pores. At this stage of the process we open one or more of the valves b, and allow the escape of a portion of the heated, moistened atmosphere from the chamber A, being careful not to allow the atmosphere in this chamber to become too dry so long as the aforesaid high temperature is maintained.

When the greater part of the moisture has been extracted from the wood, we then proceed to regulate the fire in the heater or steam-pipes, as the case may be, so as to reduce the temperature of the chamber A, and by opening the cold-air valves and flue-dampers or valves, obtain a rapid circulation of warm air throughout the chamber, thus carrying off any moisture remaining therein, which completes the process, and leaves the lumber thoroughly dried and seasoned, without injury, by checking or otherwise, and with less attention, labor, fuel, and expense than are involved in any other process for seasoning wood known.

By our process we have no additional moisture generated or supplied to that obtained from the lumber. The air contained in the chamber A, when closed, is highly heated, rarefied, and charged with moisture, which is absorbed or expelled from the pores of the wood being treated. By thus subjecting the wood to the action of heat and moisture, the surfaces of the logs or boards will not be suddenly dried, as in other processes, but the pores of the wood will be kept open until all the moisture is extracted. This moist and heated air is retained in the drying-chamber so long as we find it necessary for the condition, kind, and quality of the wood or lumber to be seasoned, and, by allowing the escape of more or less of this moist air at proper times, we have perfect control of the moisture retained and desirable in the drying-chamber, until the wood is thoroughly dried and seasoned.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

The within-described process of seasoning lumber, consisting in subjecting the lumber to the action of a gradually-increased temperature, in an air-tight chamber, until all or nearly all the moisture has been extracted from it; in retaining all the heat and watery vapor about the lumber until a temperature of about 170° Fahrenheit has been attained in said air-tight chamber; and, finally, in compelling the heated moistened air to escape slowly from said chamber, while the temperature is reduced therein, substantially in the manner herein set forth.

E. C. BENDER,  
WILLIAM STEFFE.

#### Witnesses:

G. J. WEISER,	} as to E. C. BENDER.
KILLIAN SMALL,	
AND'W J. BOSWELL,	} as to WILLIAM STEFFE.
WALTER BOSWELL,	