2 Sheets--Sheet 1.

L. K. FULLER.

Drying Apparatus.

No. 165,088. Patented June 29, 1875.

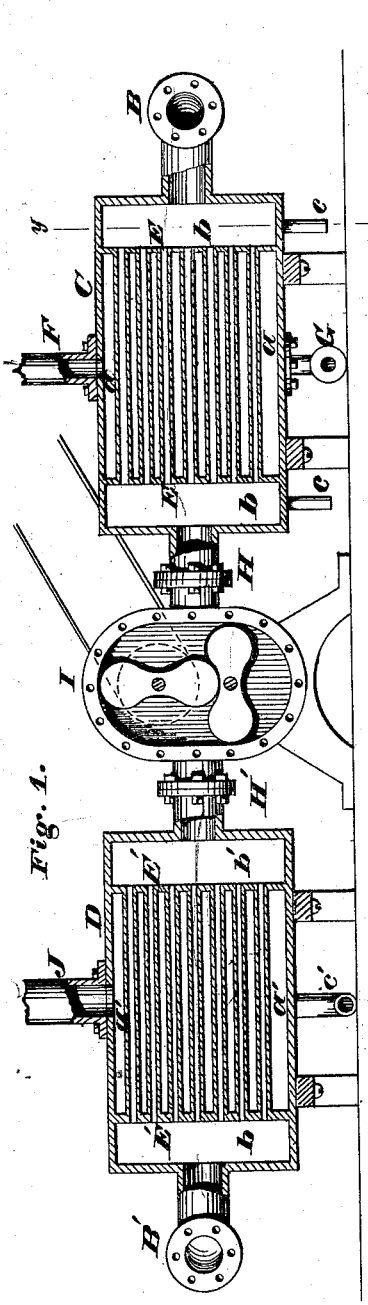

Fig. 1.

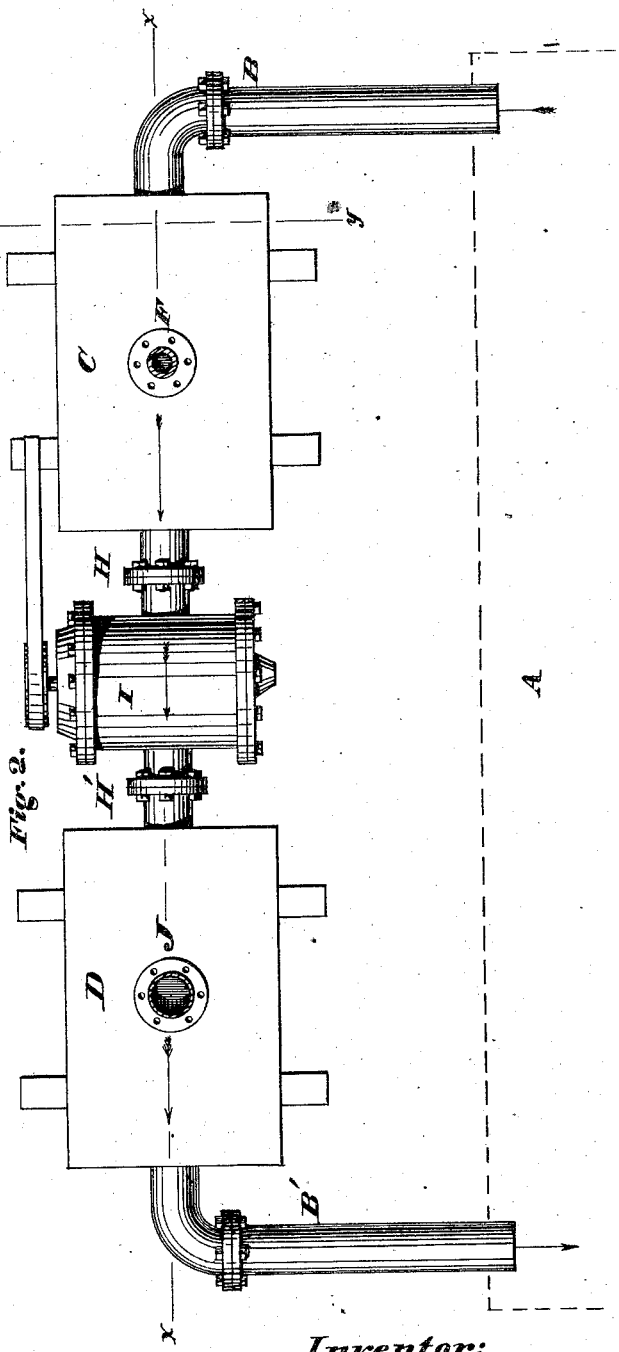

Fig. 2.

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2 Sheets--Sheet 2.

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Fig. 3.

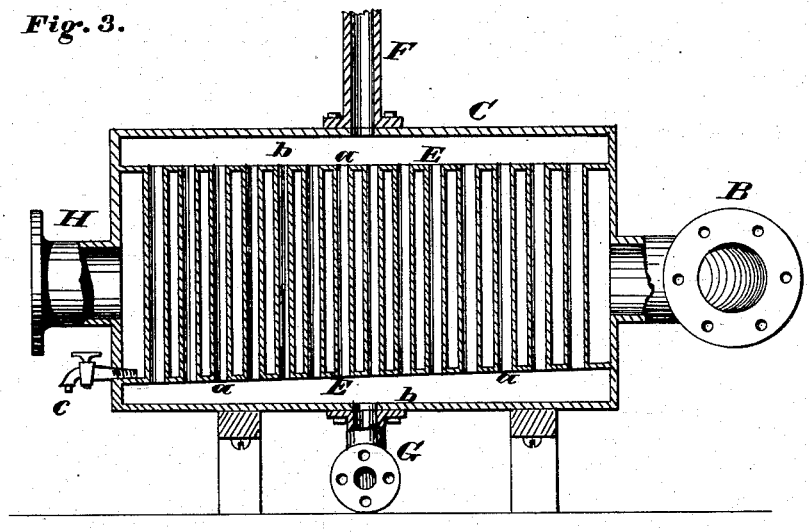
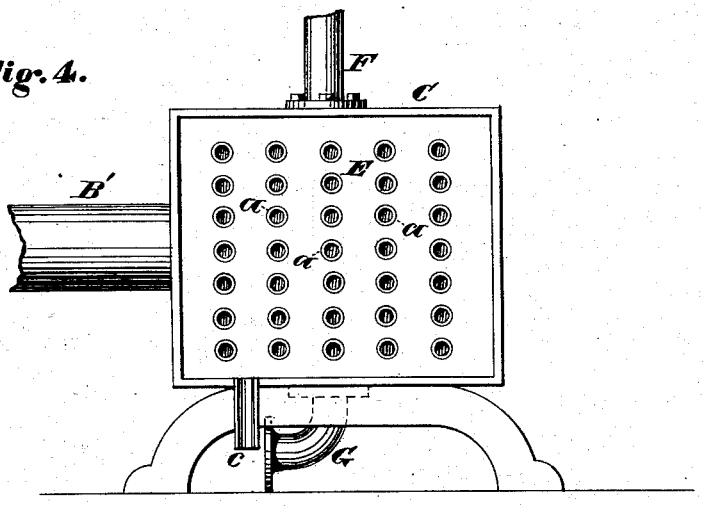


Fig. 4.



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UNITED STATES PATENT OFFICE.

LEVI K. FULLER, OF BRATTLEBOROUGH, VERMONT.

IMPROVEMENT IN DRYING APPARATUS.

Specification forming part of Letters Patent No. **165,088**, dated June 29, 1875; application filed May 17, 1875.

To all whom it may concern:

Be it known that, LEVI K. FULLER, of Brattleborough, in the county of Windham and State of Vermont, have invented certain Improvements in Drying Apparatus, of which the following is a description:

This invention relates to apparatus for extracting the moisture from the air of drying houses or chambers, and heating the said air; and consists in a suitable combination of a condenser and heater with a blower, as will be hereinafter more fully described.

In the drawings—

Figure 1 is a longitudinal vertical mid-section of my apparatus, in the plane of the line *x x* in Fig. 2. Fig. 2 is a plan of the same. Fig. 3 is a sectional view of a modified form of my condenser. Fig. 4 is a sectional view of the condenser shown in Figs. 1 and 2, taken in the plane of the line *y y*.

My apparatus consists essentially of a condenser, a blower, and a heater, preferably placed outside of the drying-chamber, and connected therewith by pipes. The dotted lines in Fig 2 serve to indicate the position of the drying-chamber, which I will indicate by the letter A. B is a commodious exhaust-pipe for conveying the air from the chamber A to a condenser, C.

The precise construction of this condenser, as illustrated in the several figures, need not be closely followed; any good form will answer. That shown in Figs. 1, 2, and 4 consists of a rectangular box with two lateral partitions or tube-sheets, E E, arranged to receive a number of thin metallic tubes, *a a*, which open into the chambers *b b*. F is an inlet-pipe for cold water, and G is an outlet-pipe for the same. By means of these pipes the entire space between the tube-sheets not occupied by the tubes may be kept filled with cold water, which is being constantly changed to preserve the right temperature.

The air passes from the pipe B, through the tubes *a a* and the connection H, to a blower, I, the moisture it contained being condensed in the tubes, from whence it flows into the chambers *b b*, and out at the drip-pipes *c c*, being accelerated in its transit by the blast through the tubes. The blower I, shown in Figs. 1 and 2, is that known as "Root's," and, although I have shown this form, any good blower will answer. From the blower the anhydrous or devaporized air passes through a connection, H,′ to a heater, D. This heater is constructed substantially like the condenser above described, having tube-sheets E′ E′ and tubes *a′ a′*. The air from the blower passes through these tubes, and thence through the inlet tube or pipe B′, on its way back to the drying-chamber A, being heated on its passage through the said tubes by means of exhaust or live steam admitted through the pipe J, the water from condensation escaping through the drip-pipe *c′*. The heater D may be of any suitable length, or the tubes, if necessary, be coiled in the chamber, so that the air in its passage through them can be exposed to the heat longer and be raised to a higher temperature.

I have shown a good form of heater situated outside of the drying-chamber, but the devaporized air may be heated inside the said chamber, and by any of the usual methods of heating. In such cases, the apparatus will be essentially a devaporizer or drier.

The course of the current of air in its passage of the circuit from the chamber A through my apparatus, and back again to the chamber, is indicated by the arrows. The blower may be driven by steam-power in the usual manner, and the steam for the heater obtained from the exhaust of the engine; or it may be had direct from the boiler, if desired. In Fig. 3 I have shown a modification of the condenser, in which the tube-sheets E E are horizontal and the tubes *a a* vertical. In this form the cold condensing-water passes through the tubes and the chambers *b b*, while the air from the drying-chamber passes between the tubes. The lower tube-sheet may be slightly inclined, as shown, to facilitate the escape of the condensed moisture at the stop-cock *c*.

My apparatus is adapted to drying and heating of closed chambers used in seasoning lumber and kindred purposes.

As before stated, I prefer to locate my apparatus wholly outside the drying-chamber, but it may, in some cases, be placed wholly or partially inside the same.

I am aware that coils of pipe through which a current of cold water is passed have been

used in drying-chambers to condense moisture, and I make no claim to that; but what I do claim is—

1. The within-described apparatus for devaporizing and heating the air of a drying-chamber, consisting essentially of a condenser, C, a blower, I, a heater, D, and pipes B B′, constructed and arranged to operate in the manner substantially as shown, and for the purposes set forth.

2. For use in the process of devaporizing the air of drying chambers or kilns, the combination of a condenser, C, and blower, I, substantially as specified.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

LEVI K. FULLER.

Witnesses:
L. W. HAWLEY,
J. O. HALL.