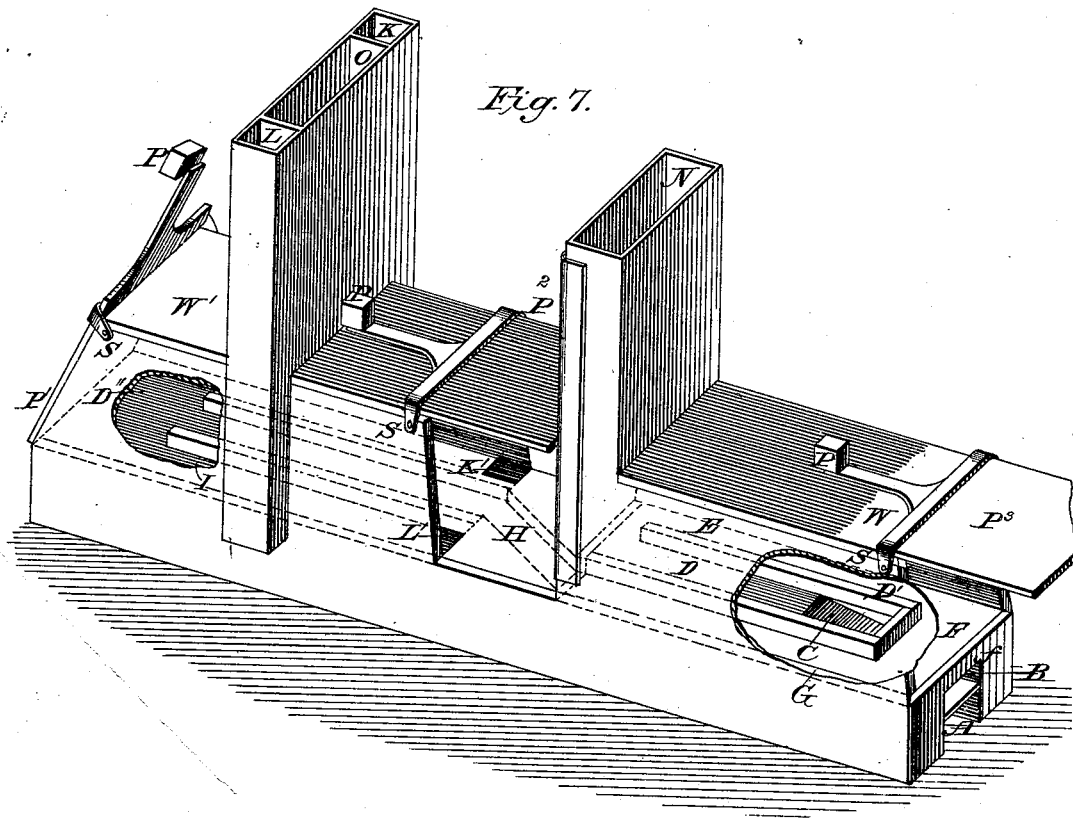


E. R. & W. E. GARD.  
Drying-Oven.

No. 217,935.

Patented July 29, 1879.



*Witnesses:*

*S. H. Gard  
W. E. Gard*

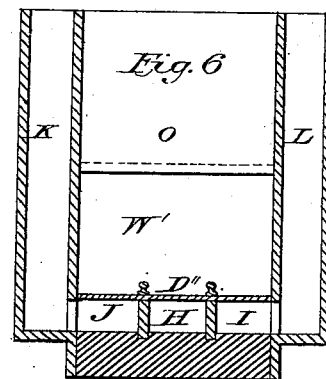
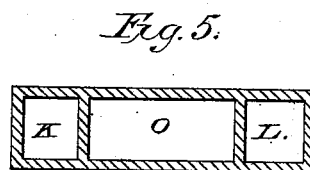
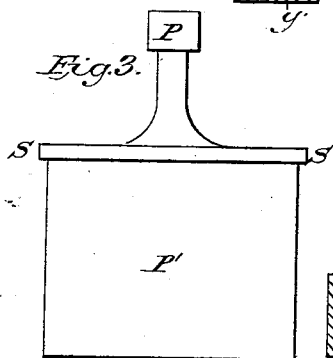
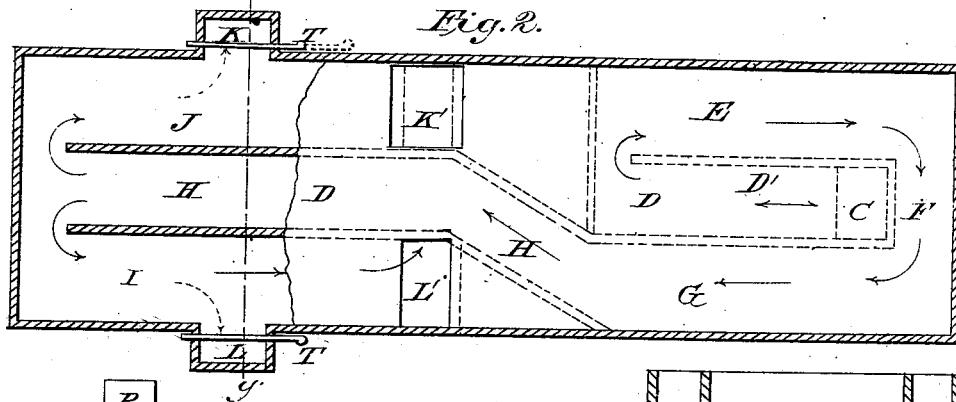
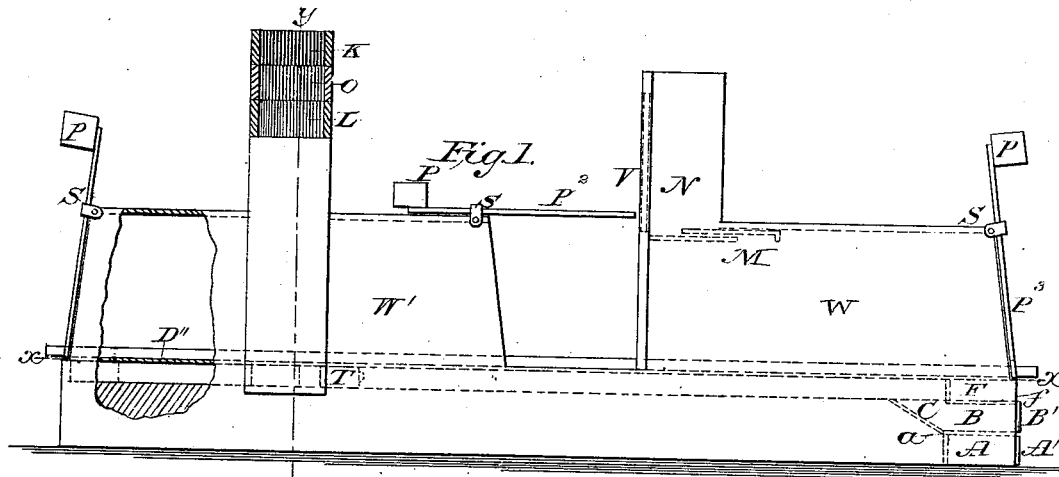
*Inventors:*

*Emery R. Gard  
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Witnesses:  
E. H. Gard.  
Will E. Gard.

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# UNITED STATES PATENT OFFICE.

EMERY R. GARD AND WALTER E. GARD, OF BALTIMORE, MARYLAND.

## IMPROVEMENT IN DRYING-OVENS.

Specification forming part of Letters Patent No. **217,935**, dated July 29, 1879; application filed October 5, 1878.

*To all whom it may concern:*

Be it known that we, EMERY R. GARD and WALTER E. GARD, of the city of Baltimore and State of Maryland, have invented an Improved Drying-Oven for Lumber, Fruit, Brick, &c.; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a side view of the oven; Fig. 2, a ground section through the line *x x* of Fig. 1; Fig. 3, a front view of the swinging balanced door *P*<sup>1</sup>; Fig. 4, a top view of chimney *N*; Fig. 5, a top view of chimney *K O L*; and Fig. 6 is a vertical cross-section taken through the line *y y*, Figs. 1 and 2. Fig. 7 is a perspective view, with parts broken away to more clearly show the construction.

Like letters designate corresponding parts in all of the figures.

The leading feature of the invention has for its important purpose a utilization of all of the heat made in the furnace *B* by causing the smoke, gases, and heated air to pass in flues, as *D E F G*, under the entire bottom of the oven, which is made of tin, iron, or other heat-radiating material, and thus keeping said bottom as hot as may be necessary in the oven *W* to heat the material to be dried; then passing said heat or smoke, &c., by a continuation of said flues *D E F G* into an oven, *W'*, with a like bottom, thus giving to oven *W'* a gentle heat to season the new or raw material just put in, and which cannot stand at first a rapid and intense heating, thus utilizing all the available heat at the proper places wanted.

An additional advantage is given in oven *W'* to get all the remaining heat out of the smoke, &c., after it has done its duty by circulating under the heat-radiating bottom, by passing it through the materials to be dried, and letting it find a common exit with the steam or moisture arising from the material to be dried at *O*; but if the smoke injures the material to be dried, then a separate exit is made for the smoke, and these exits are controlled by dampers.

In the drawings, *W'* represents the seasoning or first drying oven, of any approved dimensions, with swinging balanced doors *P*<sup>1</sup> *P*<sup>2</sup>.

Fig. 3 represents a balanced swinging door,

*P*<sup>1</sup>. The balance or weight *P* is attached to an extension or part of the door or its frame, so that said door will turn or swing easily on its pivot *S* in opening or closing. This pivot *S* is a rod or its equivalent passed through an eye in the door *S*, and is placed just enough above the center of equilibrium to keep the door closed when down. This we consider an improvement over doors that turn on hinges and are balanced by weighted ropes passing over pulleys.

The oven *W'* is heated from flues *H' I J*, Fig. 2, which are under the heat-radiating oven-bottom *D''*.

When the dampers *T* are closed the heated smoke, air, &c., pass through the flues and up into oven *W'*, as indicated at *L'*. When said dampers are open the smoke escapes, as indicated, at *K*, and does not pass through the oven.

In practice both flues, *J* and *I*, are worked the same way.

When the material is seasoned sufficiently to stand the more intense heat of oven *W*, the swinging balanced door *P*<sup>2</sup> is raised, also the sliding door *V*, and through them the material to be dried is introduced into oven *W*, and there subjected to all the heat necessary to dry it thoroughly.

*A'*, Fig. 1, is the door to ash-pit *A* and to regulate the draft. *B* is the furnace, in which the fuel is consumed on the grate-bars *a*. This furnace has a top, *f*, of some heat-radiating material, so that it will superheat the smoke and gases as they pass over it through the flue *F* to *G*.

*C* is an incline or chimney, which conducts the smoke, gases, &c., under the heat-radiating bottom *D'* to the flue *D*, and from thence it follows the course of the arrows, through flues *D E F G H'* and into *W'*, as above described, while the moisture arising from the drying articles or material in *W* finds exit through the chimney *N*, subject to a draft-regulation by the sliding damper *M*.

When the material is dry it is taken out through the balanced swinging door *P*<sup>3</sup>. This door, being so near the furnace *B*, is always hot, and for convenience of handling it is made very easy to operate by perfectly balancing it by weights, so that it will open easily and

quickly by swinging on its center S, and opens in the same manner as door P<sup>2</sup>.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A heat-radiating oven-bottom, D', in combination with the flues D E G, the superheating-flue F, and the heat-radiating furnace-top f, substantially as described, and for the purpose set forth.

2. A heat-radiating oven-bottom, D'', with openings K' L', in combination with chimneys K O L and the swinging balanced doors P<sup>1</sup> and P<sup>2</sup>, substantially as described, and for the purpose set forth.

3. A heat-radiating bottom, D'', with openings K' L', in combination with chimneys K O L, substantially as and for the purpose herein specified.

4. A superheating-flue, F, with heat-radiating furnace-top f and forward and return passages E and G, substantially as and for the purpose herein specified.

5. The combination of the flues D E F G H I J, chimneys K, O, L, and N, the heat-radiating oven-bottoms D' and D'', the balanced swinging doors P<sup>1</sup>, P<sup>2</sup>, and P<sup>3</sup>, and the sliding door V, substantially as and for the purpose herein set forth.

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WALTER E. GARD.

Witnesses:

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