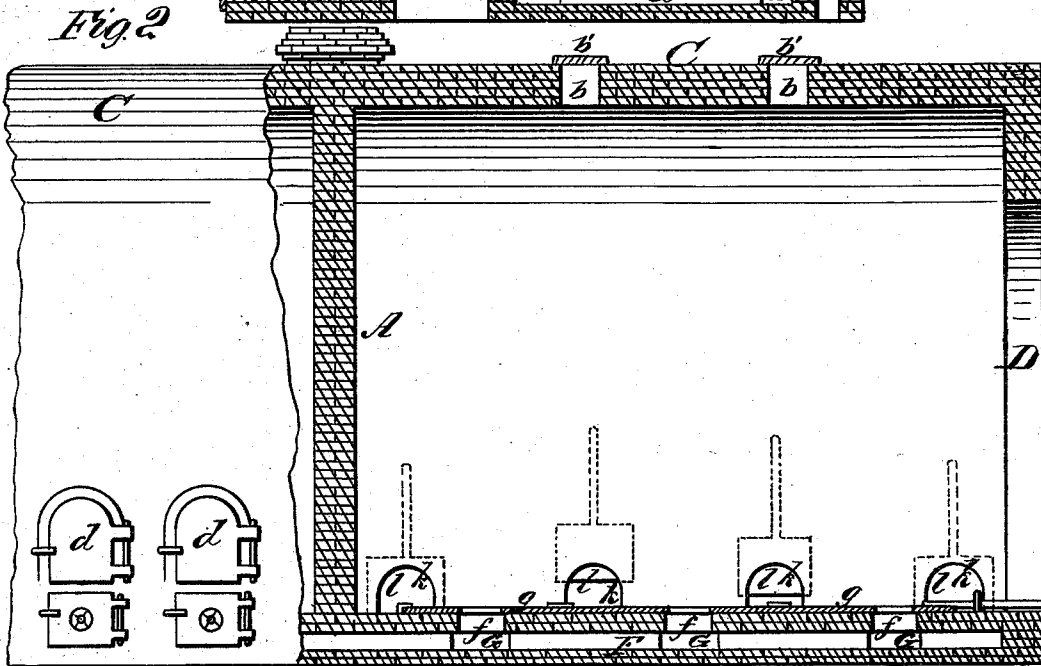
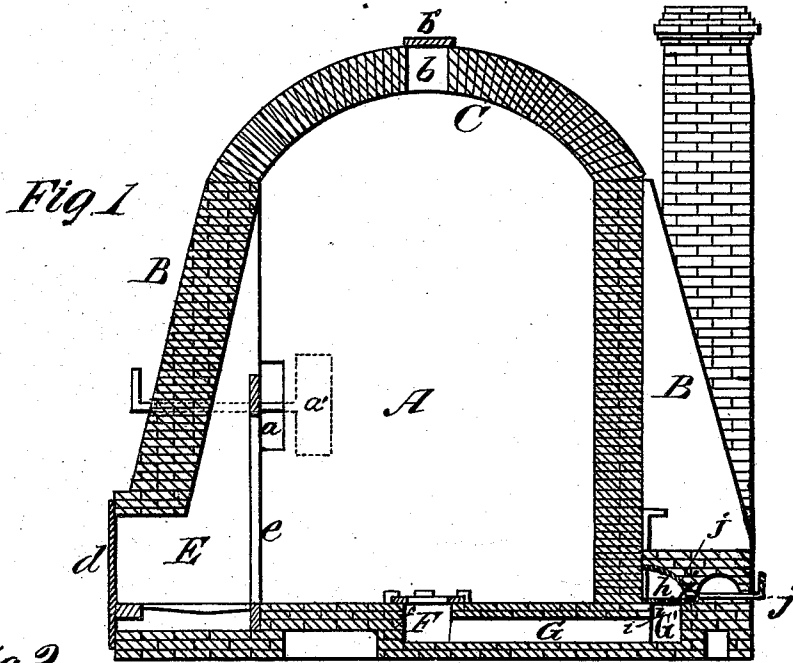


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WITNESSES
E. H. Bates
Robert Everett

INVENTOR
Randolph F. Marshall
Chipman & Son & Co.

Attorneys

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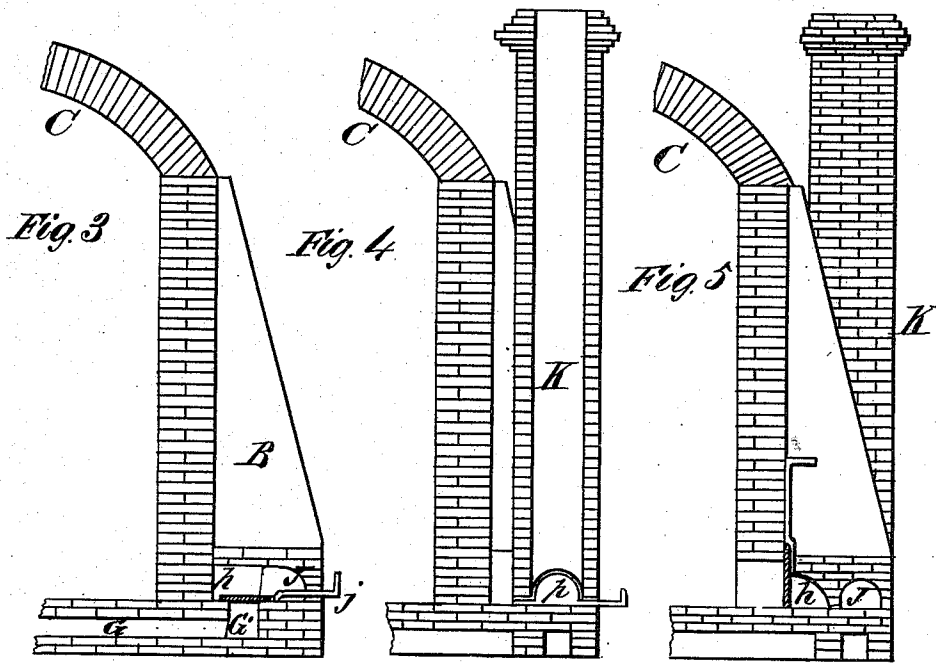
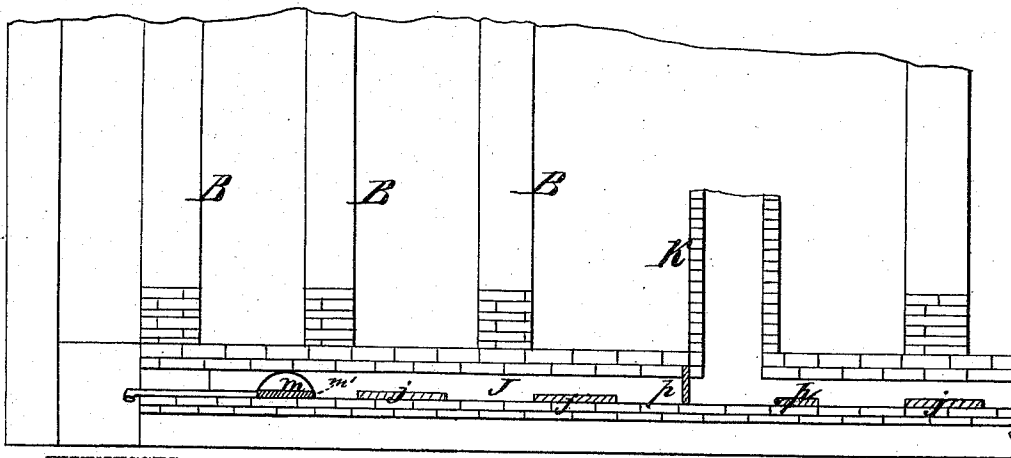


Fig. 6



WITNESSES

E. H. Bates
Robert Everett

INVENTOR

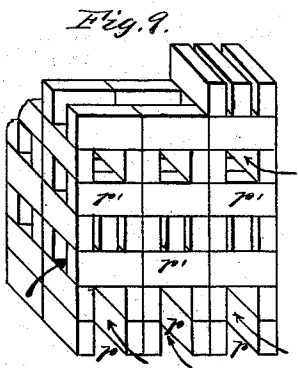
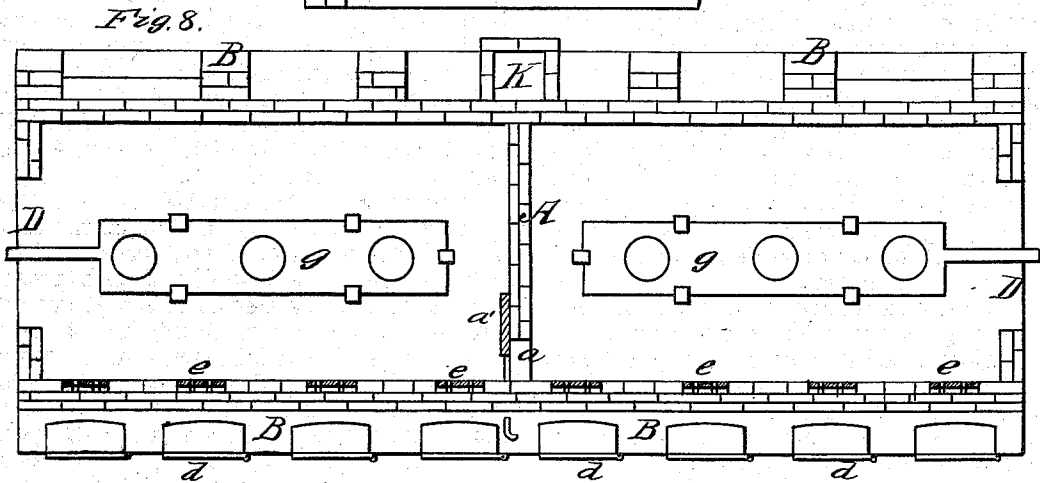
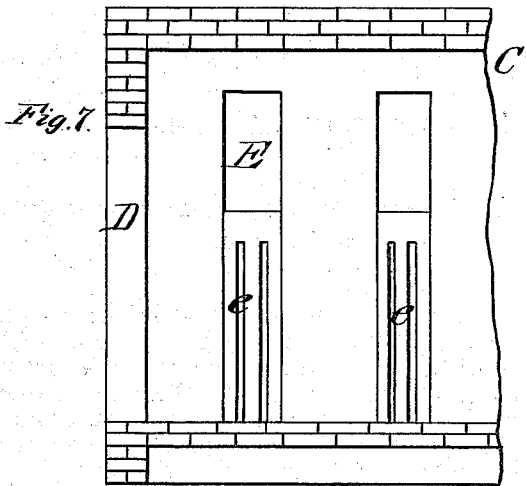
Randolph F. Marshall
Chipman & Son & Co.

Attorneys

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Kilns.

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WITNESSES

E. H. Bates
H. C. Hollingshead

INVENTOR

Randolph F. Marshall
Chipman & Osburn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

RANDOLPH F. MARSHALL, OF LISCOMB, IOWA.

IMPROVEMENT IN KILNS.

Specification forming part of Letters Patent No. **156,364**, dated October 27, 1874; application filed September 26, 1874.

To all whom it may concern:

Be it known that I, RANDOLPH F. MARSHALL, of Liscomb, in the county of Marshall and State of Iowa, have invented a new and valuable Improvement in Kilns; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a representation of a cross-sectional view of my kiln. Fig. 2 is a vertical sectional view. Figs. 3, 4, and 5 are detail views. Fig. 6 is a vertical sectional view. Fig. 7 is a detail view; and Fig. 8 is a longitudinal sectional view. Fig. 9 is a detail view of the same.

This invention relates to kilns for burning and drying bricks, tiles, earthenware, and other objects; and it consists in a novel construction, hereinafter explained.

In the annexed drawings, I have represented two kilns combined and separated by a vertical partition wall, A, having an opening, *a*, through it, provided with a damper, *a'*, operated by a rod from the outside of the kiln. The walls of the kiln are composed of brick or stone laid in mortar, and, if necessary, strengthened with iron rods embedded in them. The front and rear walls are further strengthened by means of buttresses B, which are tapered from their bases to the top of the walls, and which may be tied together by arches or iron plates. The buttresses B are arranged at any suitable distance apart on the outside of the front and rear walls, and they serve to sustain an arched roof, C, which is sprung over the kilns, and constructed with openings *b* through it, provided with valves *b'*, which, when opened, will allow the smoke and moisture to escape at the commencement of the operation of burning. The arch C forms a hot-air chamber above the fire-bed for allowing a uniform distribution and circulation of the heat above the material being burned.

The end walls of the kilns have doors D through them, large enough for the entrance of a wagon, for facilitating the introduction of the material into the kiln and its removal therefrom. The openings D may be closed tem-

porarily with bricks, or permanent doors of iron may be provided. At the front of the kilns, and between the buttresses, are the furnaces E, which are provided with ash-pits, which allow the ashes and cinders to be withdrawn without opening the furnace-doors *d*, and letting cold air into the kiln. The ash-pit doors should be provided with dampers, which allows the attendant to regulate, control, or shut off the draft of any one or more of the furnaces. These furnaces are set outside of the inner face of the kiln, so that direct contact of the fires with the material being burned is prevented.

By reference to Fig. 1, it will be seen that the furnaces taper up to the top of the front wall, for the purpose of distributing the heat the full height of said wall, and each furnace is provided with a grated back, *e*, high enough to prevent the coals from falling into the kiln. Along the bed of the kiln is a trunk or ditch, F, of suitable size, and arranged in the center between the front and rear walls. This trunk F is provided in both kilns with openings *f* and sliding dampers *g*, which latter should be let into the floors flush with the upper surface thereof. From the trunk F shorter trunks G lead back to a long trunk, G', outside of the rear wall, which trunk communicates with an arched flue, *h*, by means of openings *i*, provided with damper-slides *j*. The flue *h* also communicates with the interior of the kilns by means of passages *k*, which are arranged opposite the furnaces E, and provided with damper-slides *l*. The flues *h* of the two kilns do not communicate directly with each other, but they do communicate with a horizontal flue, J, by means of openings *m*, which are provided with dampers *m'*. The flue J communicates with a chimney, K, at its base by means of openings, which are provided with dampers *p*.

In arranging the bricks in the kilns I want to dispense with arches at the base, and to this end I arrange two courses of bricks on the floors of the kiln so as to form "pigeon-holes" *r*, running from the furnaces to the openings *k*, leading into the flues. On top of the upper course I arrange another course of bricks, *r'*, separated as shown in Figs. 9 and 10, and on top of this course is another course

of three bricks lying on a single brick, and so on the kilns are filled. Thus arranged, the bricks are quickly and uniformly dried and burned.

When the kilns are filled and the fires are built in the furnaces, the valves *b'* in the arched roof C are opened, which allow the smoke and moisture to escape. The valves *g* are then opened, and if both kilns are worked at the same time the valves *k* are opened, and the heated products, after circulating in the kilns, are allowed to escape through flues *h* and J to the chimney. The valves *g j* being opened, the heated products will be caused to circulate through their openings for the purpose of equibly distributing the heat in all parts of the kiln; and if it is desired to burn some of the material more than others, this can be done by opening some of the valves and closing others. If only one kiln is worked at a time, valves *a'* and *g* and one valve *p* are shut, and when the material in one kiln is

burned, the material in the other kiln can be dried by opening valves *a'* and *b'*, and utilizing the waste heat from the first kiln. To do this, all of the dampers *l* must be shut in the first kiln.

What I claim as new, and desire to secure by Letters Patent, is—

1. The main central trunk F, with its valve *g*, and the branch trunks G, with their valves *j*, in combination with flues *h* J, passage *m*, and chimney K, arranged as described.

2. The passages *k*, with their valves *l*, in combination with flues *h* J, and valve-opening *m*, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

RANDOLPH FOSTER MARSHALL.

Witnesses:

EBEN B. EATON,

CHRISTOPHER C. DALLY.