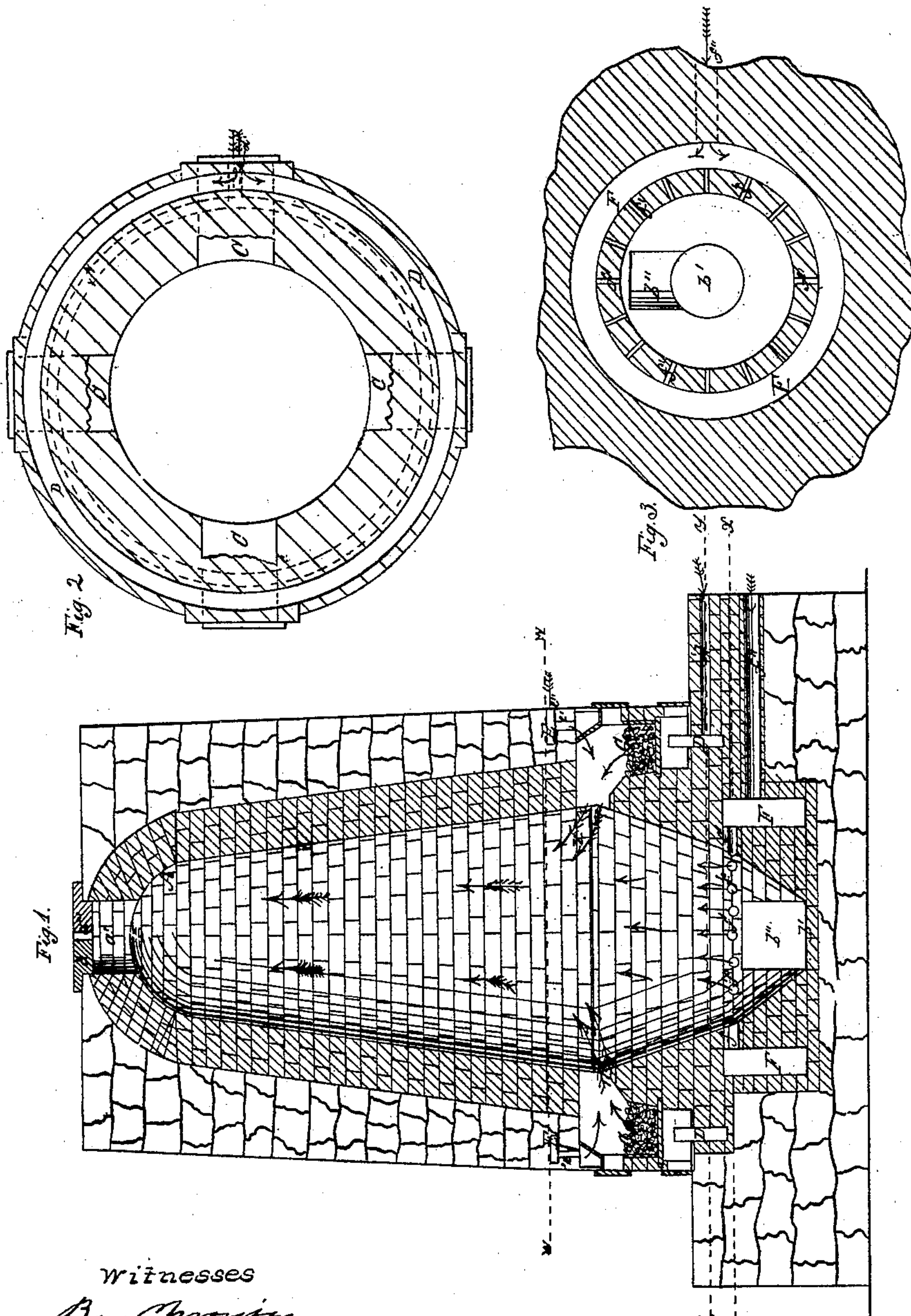


W. W. POTTS.
LIMEKILN.

No. 73,998.

Patented Feb. 4, 1868.



Witnesses
Benjamin
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WILLIAM W. POTTS, OF BRIDGEPORT, PENNSYLVANIA.

Letters Patent No. 73,998, dated February 4, 1868.

IMPROVEMENT IN LIME-KILNS.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM W. POTTS, of Bridgeport, in the county of Montgomery, and State of Pennsylvania, have invented a new and useful Improvement in the Perpetual Lime-Kiln; 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 accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical central section of the said improved kiln.

Figure 2, a horizontal section, just below the dotted line *ww*, of fig. 1, and

Figure 3 a horizontal section, just below the dotted line *xx*, of fig. 1—

Like letters of reference indicating the same parts when in the different figures.

The object of my improvement is to economize the fuel, and also to effect a withdrawal, in a cooled state, of the burnt or decarbonated limestone without stopping the burning-operation upon the carbonate above.

My invention consists, substantially as hereinafter described, first, in a kiln made nearly air-tight at its upper end; second, in simultaneously forcing fresh air, through the fuel, into the kiln, for the purpose of igniting or burning the said fuel, and over or above the surface of the said incandescent fuel in the furnaces for the purpose of igniting the gases arising therefrom; and, third, in forcing fresh air into the lower end of the kiln, below the flues of the furnaces, for the twofold purpose of cooling the burnt lime as it falls therein, and driving the said air, in a hot state, up, through the flames above, into the upper part of the kiln, and thus perfecting the combustion of all the combustible matter and gases.

Referring to the drawings, A B is the kiln; C C C C, the furnaces; D D, a channel around the kiln, for simultaneously supplying the several furnaces C with the requisite fresh air; E E, a channel around the kiln, and above the channel D, for simultaneously discharging fresh air over the fuel-surface of each of the furnaces C, indicated in fig. 2 by the dotted lines *vv*, and F F a channel around the lower end of the kiln, for discharging fresh air into the same, for cooling the burnt lime therein.

The kiln A B is made tapering toward the upper end, and is comparatively lower or shorter than the perpetual kilns heretofore used. It has its upper end arched over, so as to leave only the small feed-hole *a'*, which is provided with a loose cover, *a''*, having a small open vent-hole, *a'''*, in its centre, for the discharge of any undecomposed carbonic acid, the object of closing the kiln being to confine the gases until consumed. The lower end of the kiln A B tapers downward from the flues of the furnaces C C, is closed at its bottom, *b'*, but has a side opening, *b''*, for the withdrawal of the cooled lime.

The furnaces C C are arranged so as to project radially, and at equal distances apart, around the outer side of the kiln, and so as to communicate therewith, and also receive the air which supports the combustion of their fuel from the channel D, it being forced into the latter through the radial channel *d'*.

The channel E communicates with each of the fire-chambers of the furnaces C through the holes *e'*, leading downward into the latter, and receives its supply of fresh air through the radial channel *e''*.

The channel F communicates with the lower end of the kiln through the numerous small radial inlets, *f' f'*, and receives its supply of fresh air through the radial channel *f''*.

Each of the three main inlet-channels, *e''*, *d'*, and *f''*, are intended to communicate with the same air-forcing apparatus that may be used, and the proper relative strength of the different currents regulated at will by means of appropriate valves to be applied thereto.

Operation: The fresh air being steadily driven into the kiln A B, as described, the currents passing through the incandescent fuel in the furnaces C, from the channel D, are joined in the fire-chambers, above the fuel, by the currents coming from the channel E, thus igniting or inflaming the rising combustible gases, and, together, driving the hot flames into the centre of A B, as indicated by the arrows *zz* in fig. 1, while, at the same time, the currents of fresh air coming from the channel F, in the lower end of the furnace, effectually cool the burnt lime as it falls therein; and the said air, passing in a highly-heated state directly upward toward the top of the kiln, affords a copious supply of fresh air, which, together with the currents from the channels E and F, decomposes the carbonic acid, and, with the oxygen derived, effectually consumes all the carbon and the balance of any combustible gases yet unburnt which may have come from the incandescent fuel in the furnaces, and, at the same time, allows the burnt or decarbonated limestone, as fast as it is produced, to be withdrawn from the kiln.

in a cooled state, through the opening *b''* at the bottom, thus economizing the fuel, and affording facility in removing the burnt lime as produced.

Having thus fully described my improvement in the perpetual lime-kiln, what I claim as new therein of my invention, and desire to secure by Letters Patent, is confined to the following, viz:

1. I claim arching over the upper end of the kiln A B, substantially as described, and covering the feed-hole *a'*, left thereby, by means of a removable cover, *a''*, provided with the small vent-hole *a'''*, substantially as and for the purpose described and set forth.

2. I claim the combination of the furnaces C and the channels D and E, when the same are constructed and arranged in the relation to each other and to the kiln A B, as described and set forth, for the purposes specified.

3. I also claim forcing the currents of air up through the lower part of the kiln, and onward therein, by means of the channel F, substantially as and for the purposes described.

WILLIAM W. POTTS.

Witnesses:

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