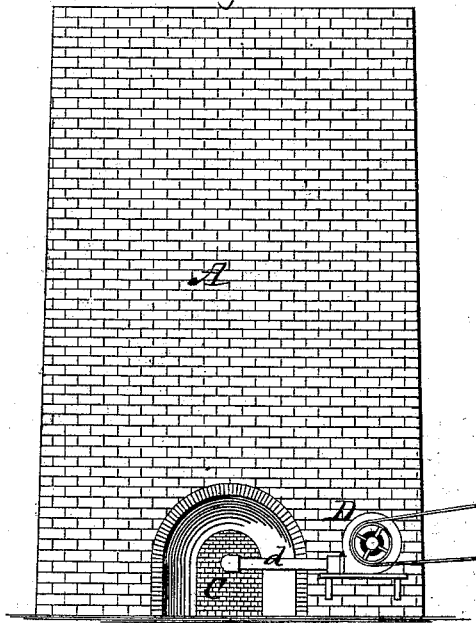


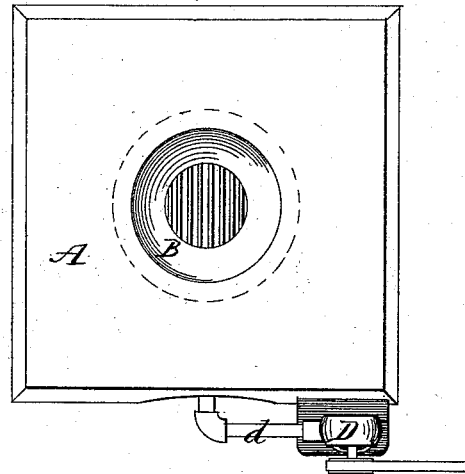
J. K. SHINN.  
 Manufacture of Lime and Cement.

No. 217,415  
*Fig. 1.*

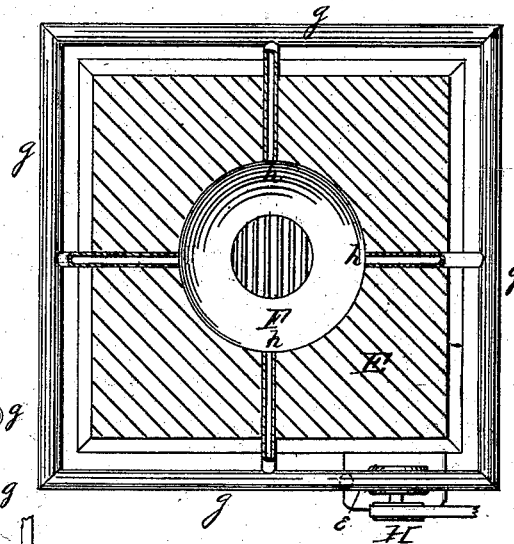
Patented July 8, 1879.



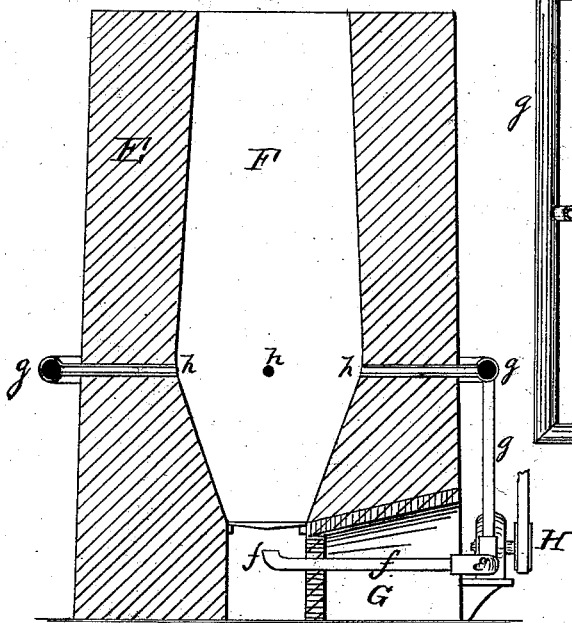
*Fig. 2.*



*Fig. 4.*



*Fig. 3.*



Witnesses.

*F. A. Pollock.*  
*G. Smith*

*John K. Shinn Inventor.*

*by Connolly Bros & McTigue*  
*Attorneys.*

# UNITED STATES PATENT OFFICE.

JOHN K. SHINN, OF NEWCASTLE, PENNSYLVANIA.

## IMPROVEMENT IN THE MANUFACTURE OF LIME AND CEMENT.

Specification forming part of Letters Patent No. **217,415**, dated July 8, 1879; application filed November 1, 1878.

### *To all whom it may concern:*

Be it known that I, JOHN K. SHINN, of Newcastle, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Lime and Cement; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figures 1 and 2 are, respectively, elevation and plan of a cement-furnace after my invention. Figs. 3 and 4 are vertical and horizontal sections, respectively, of a limekiln with my improvements.

In limekilns it is next to impossible to obtain regularity of product. The operation of burning is slow and unnecessarily expensive. The limestone burns irregularly, pieces of half-burned stone coming down prematurely to the bottom, where no sufficient heat exists to complete the burning; consequently the product is more or less irregular, and never absolutely reliable unless tested or selected for use.

Similar disadvantages are found in cement-kilns and others in addition. Cement requires rapid combustion, which cannot properly be secured by means at present in use in kilns. Failing to get the required rapidity, the material "dusts"—*i. e.*, crumbles into powder—because the draft is insufficient to quickly cool the lower portions as the combustion proceeds upwardly; hence the material remains in its own heat too long, the hard cinder desired crumbles into dust, impedes the draft still more, thus interfering more and more with the combustion of the remainder of the charge, causing the proportionate amount of "dusting" to constantly increase. The result of all this, and of the further dusting after burning is completed, caused by the slow cooling of this air-excluding compacted mass, is that fifty per cent. of possible product is lost in the process.

I propose to surmount all the above difficulties by my invention, which consists in injecting a forced draft into the lower part of the kiln, operating or utilizing said draft in the first or burning stage to promote combustion,

and then continuing the same for the purpose of effecting the cooling of the contents of the kiln, the application and operation being as follows, reference being had to the drawings.

My invention embodies not only the forced draft for rapid combustion, but also the continuation of such forced draft to effect rapid cooling.

A designates a cement-kiln of the ordinary pattern, having the combustion-chamber B and eye C. D is a blower or other device for injecting a forced blast, having the pipe *d* for conveying the blast through the eye C. The kiln is charged, fire started, and the eye bricked up, having the pipe *d* passing through it, as shown. The blower is operated and the blast is continuously maintained until the charge is thoroughly burned, and then without ceasing until the charge of cement-cinder is completely cooled.

Results: The draft being uniform and of the required energy, the material burns more rapidly and more regularly; dusting or slaking is absolutely prevented, what material would otherwise dust being preserved in true cement-cinder; the burning is completed much sooner; the product is more uniform and perfect, and the yield is fifty per cent. greater. It is unnecessary to dwell on the value of such results to cement-makers. Time and fuel are saved in the burning, time of cooling lessened, and both quantity and quality of product largely improved.

I modify the arrangement somewhat for burning limestone. E designates a limekiln of ordinary form, having combustion-chamber F and eye G. H is my draft-forcing apparatus, leading the blast into a supply-pipe, *e*, which is so arranged as to send at will the blast through pipe *f*, projecting through the eye G, or through the tuyere-pipes *g* and tuyeres *h*, disposed at a suitable point higher up. Fire is started, the eye G bricked up, and the blast commenced through pipe *f*, and continued through it until the fire has burned to a point somewhat above the tuyere-nozzles. Then the blast is shifted to tuyere-pipes *g*, and, passing out at the tuyeres *h*, is maintained as in the cement-kiln. The combustion is rapid and thorough, leaves no half-burned stone, and when all combustible material is burned the blast is

maintained in order to rapidly cool the lime. All the fuel is consumed, the stone is properly, because thoroughly, burned, and the result is a superior and uniform quality of lime.

I am well aware that it is not new in kilns to employ a forced blast to promote combustion; nor do I lay claim, broadly, to the employment of a blast for cooling the material as it falls from the kiln. My invention, however, has reference to kilns in which the material is burned in layers, and particularly to the burning of Portland cement, and consists in the employment and continuation of the one forced blast, both for promoting the combustion and afterward effecting the cooling of the burned material.

I claim as my invention—

1. The herein-described process of rapidly producing lime and cement, consisting in sub-

jecting the raw material while burning to the action of a forced blast, continuing the same until burning is completed, and then sustaining the forced blast to effect rapid cooling, substantially as described.

2. A kiln provided with tuyeres above and a blast-pipe below the grate-bars, in combination with a blast-forcing apparatus constructed and arranged substantially as set forth, whereby it may be interchangeably connected with either tuyeres or blast-pipe at will, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of October, 1878.

JOHN K. SHINN.

Witnesses:

GEO. W. VEACH,  
A. L. HAZEN.