J. McADAMS.

Improvement in Lime-Kilns.

No. 131,290. Patented Sep. 10, 1872.

Fig. 1.

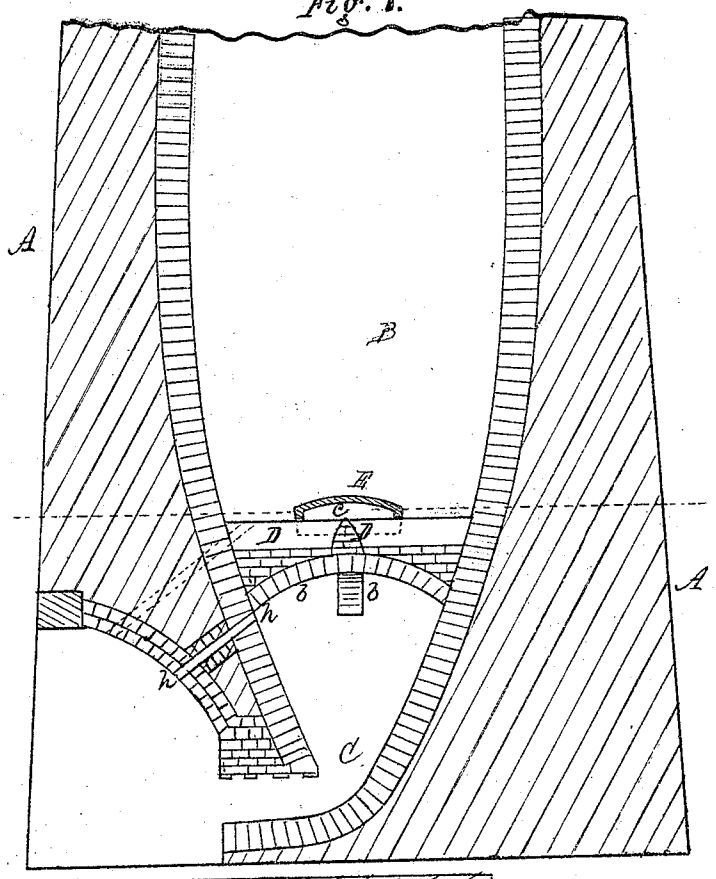


Fig. 2.

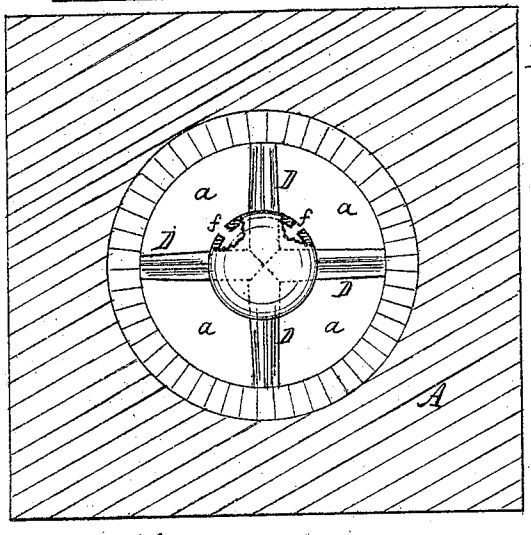
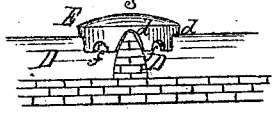


Fig. 3.



Witnesses.
Archie Baine
J. D. Doyle

Inventor:
John McAdams.
per R. F. Osgood,
Atty.

UNITED STATES PATENT OFFICE.

JOHN McADAMS, OF MOUNT PLEASANT, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND C. D. PAGE, OF GREECE, NEW YORK.

IMPROVEMENT IN LIME-KILNS.

Specification forming part of Letters Patent No. **131,290**, dated September 10, 1872.

Specification describing a certain Improvement in Lime-Kilns, invented by JOHN MCADAMS, of Mt. Pleasant, in the county of Westmoreland and State of Pennsylvania.

Nature of the Invention.

My improvement belongs to that class of lime and cement-kilns in which the stone and coal are mixed in alternate layers and the combustion is carried on in the shaft of the kiln. The invention consists in the employment of coping-blocks, arches, and walls of a peculiar kind, and an iron cap surmounting the same, whereby the lime is discharged more freely at the bottom and air is supplied to the center to support combustion, as hereinafter described.

General Description.

In the drawing, Figure 1 is a central vertical section of my improved kiln; Fig. 2, a cross-section above the coping-blocks; Fig. 3, a diagram showing the coping-blocks and cap in elevation.

A represents the stack, which is of usual form; B, the cupola; and C, the draw-pit. At a suitable point above the draw-pit—say about seven feet—are arched walls and the coping-blocks D D, which are of Λ or saddle form, with the apexes upward. These blocks are made of fire-brick, and cross each other at right angles, thus dividing the cross-area of the cupola into four divisions, *a a a a*, which constitute discharge-passages for the calcined material into the draw-pit below. The under sides of the walls underneath the coping-blocks are formed into arches *b b*, which also cross each other at right angles, as shown in Fig. 1, thus insuring a ready passage to the lime as it falls through. On top of the central or crossing portions of the coping-blocks is fitted an iron cap, E. This cap is made convex on top to deflect the lime, and is made hollow to furnish an air-chamber, *c*. Its vertical flange has four Λ-shaped notches *d d* to stride the apexes of the coping-blocks, and four or more intermediate ports or air-passages *f f* to allow the escape of air from the air-chamber upward into the center of the cupola. The air-chamber receives its supply of air from the arch of the draw-pit by means of the passages *h*, which passes up into the center beneath the arch of the coping-blocks. The cupola is charged in the usual way with alternate layers of stone and coal, and the fire is applied. The tendency is to burn most upon the outside or next to the walls of the cupola. This is caused by the stone falling toward the center as the discharge goes on at the bottom. Much difficulty has been experienced from this result heretofore, for the falling in toward the center not only prevents perfect combustion at that point, but it also disturbs the layers of stone and coal by throwing them out of line. It leaves the sides loose and open, so that the fire can penetrate through, while the center is solid and impenetrable. The result is that clinkers will form upon the outside, while the stone in the middle will pass through comparatively unburned.

By the use of the arched and coping blocks and convex cap the center portion of the lime in the cupola is held up and prevented from falling in. The discharge is at the sides instead of the center. This preserves the horizontal line of the layers of coal and stone. The cap E is also effective in helping to hold up the center, and by its convex top it deflects the lime outward so that it will not clog. Its most important function, however, is to furnish a constant supply of air to the center of the mass of stone, which, by rising upward, supplies the combustion in the middle. The currents of air pass out through the ports *f f* in a thin sheet all around the cap, and are diffused through the whole mass. This method of supplying air obviates a difficulty long experienced in this class of lime and cement-kilns. It saves much fuel, produces a better quality of lime, and requires less attention from the operator.

The improvements I have above described are particularly applicable to coal-burning lime-kilns, where the stone and coal are used in alternate layers, and where the combustion is carried on in the cupola itself, and as such are new, so far as I am aware.

In place of the air-passage *h* opening from the arch of the draw-pit, air-passages may be made in any or all of the walls which support

the coping-blocks, and enter the air-receiver at the junction of the coping-blocks.

Claims.

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

1. In a coal-burning lime or cement kiln, the right-angled coping-blocks D D, constructed as a division between the cupola and draw-pit, when the same are formed so as to produce the division-passages *a a* for the discharge of the calcined product from the center outward, as herein shown and described.

2. I claim, in a coal-burning lime or cement kiln, the convex-topped cap E, when combined with the coping-blocks D D, in the manner and for the purposes shown and described.

3. I claim the cap E, constructed with the notches *d d* and intermediate ports *f f*, and made hollow to furnish an air-chamber, when the same is used in connection with the air-passage *h*, as and for the purpose specified.

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

JOHN McADAMS.

Witnesses:
I. LLOYD SHALLENBYER,
MARTIN N. STAUFFER.