

M. Verhoeven,

Lime Kiln.

No. 76,563.

Patented Apr. 7. 1868.

Fig. 3.

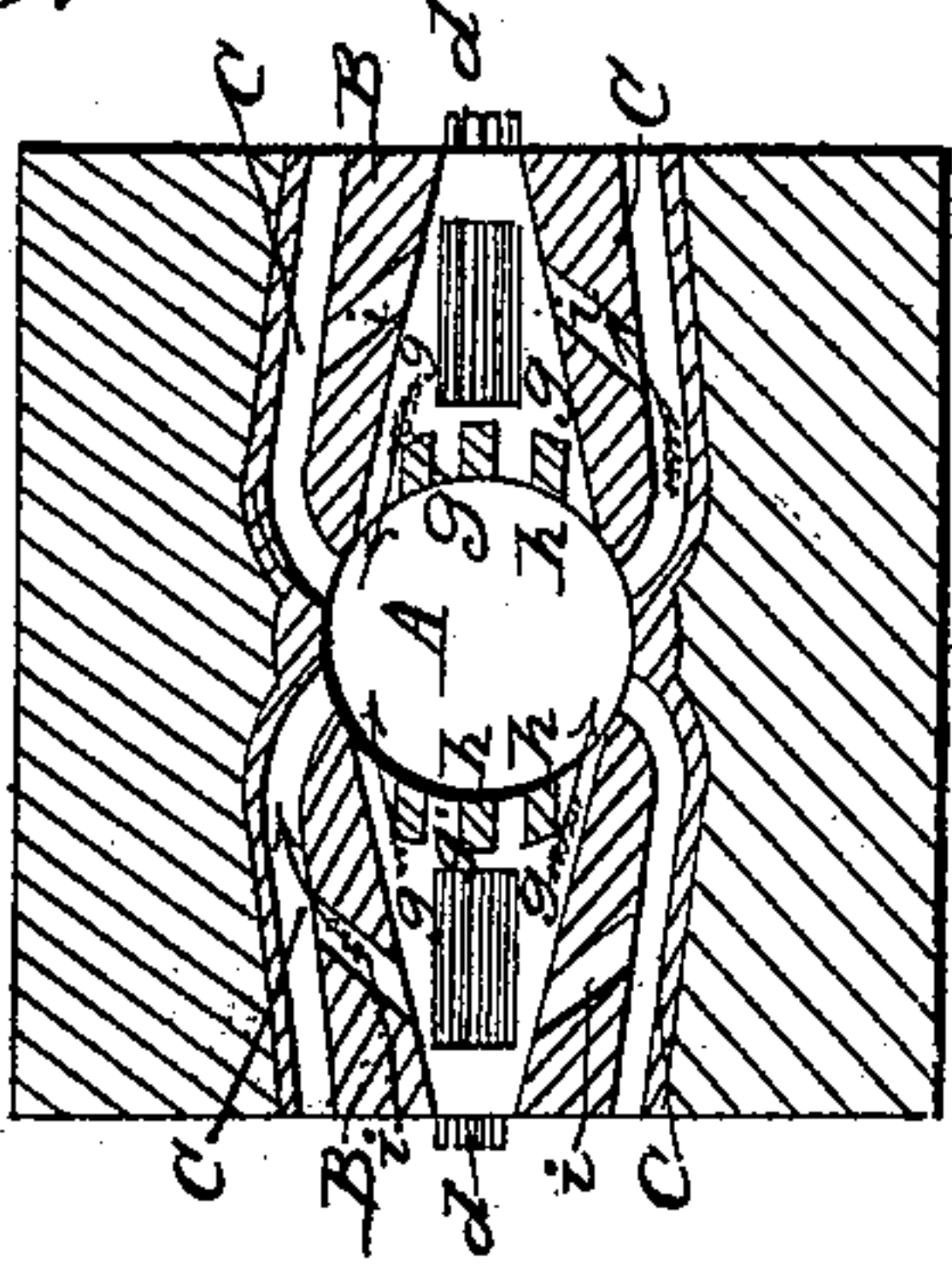


Fig. 4.

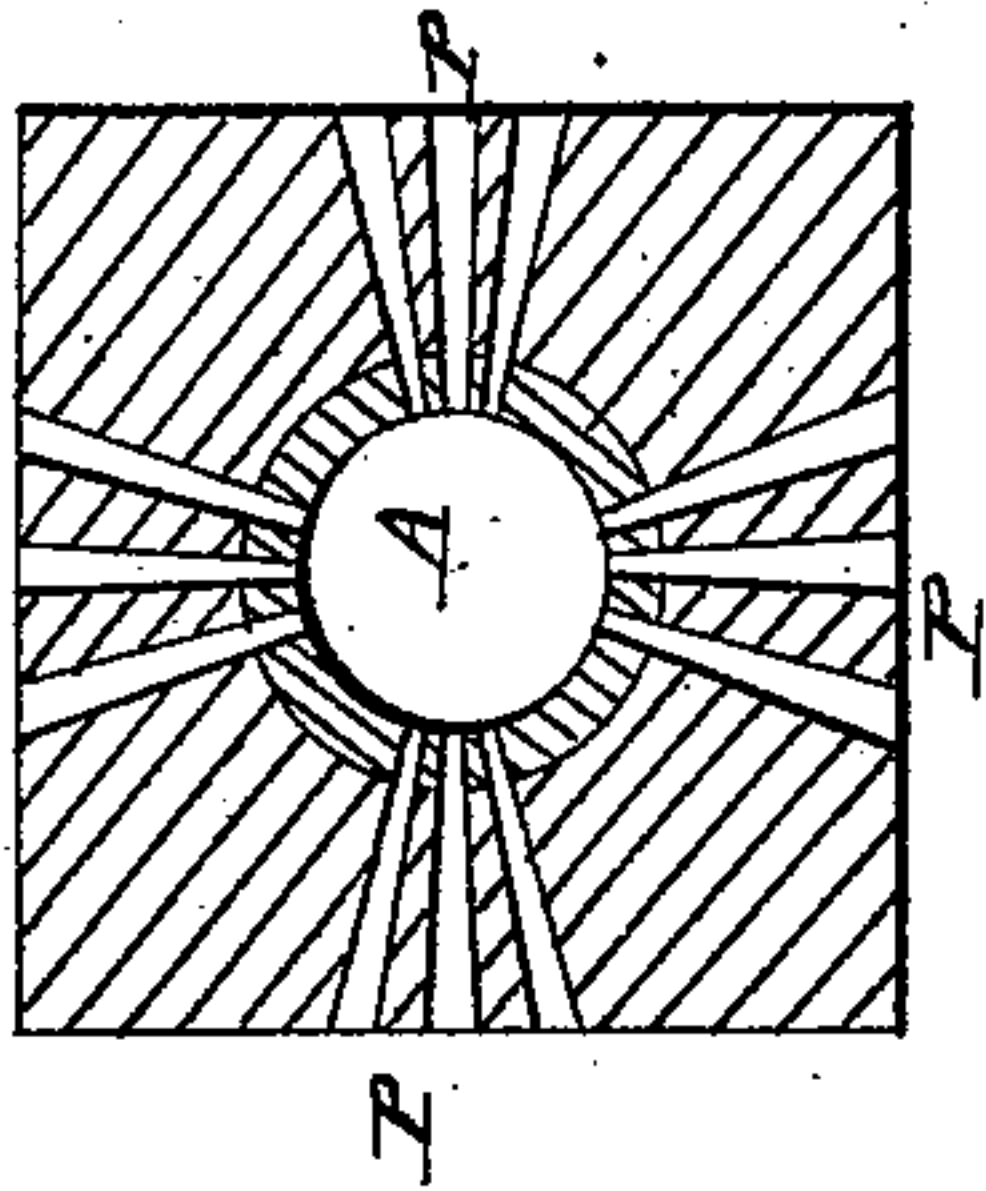


Fig. 2.

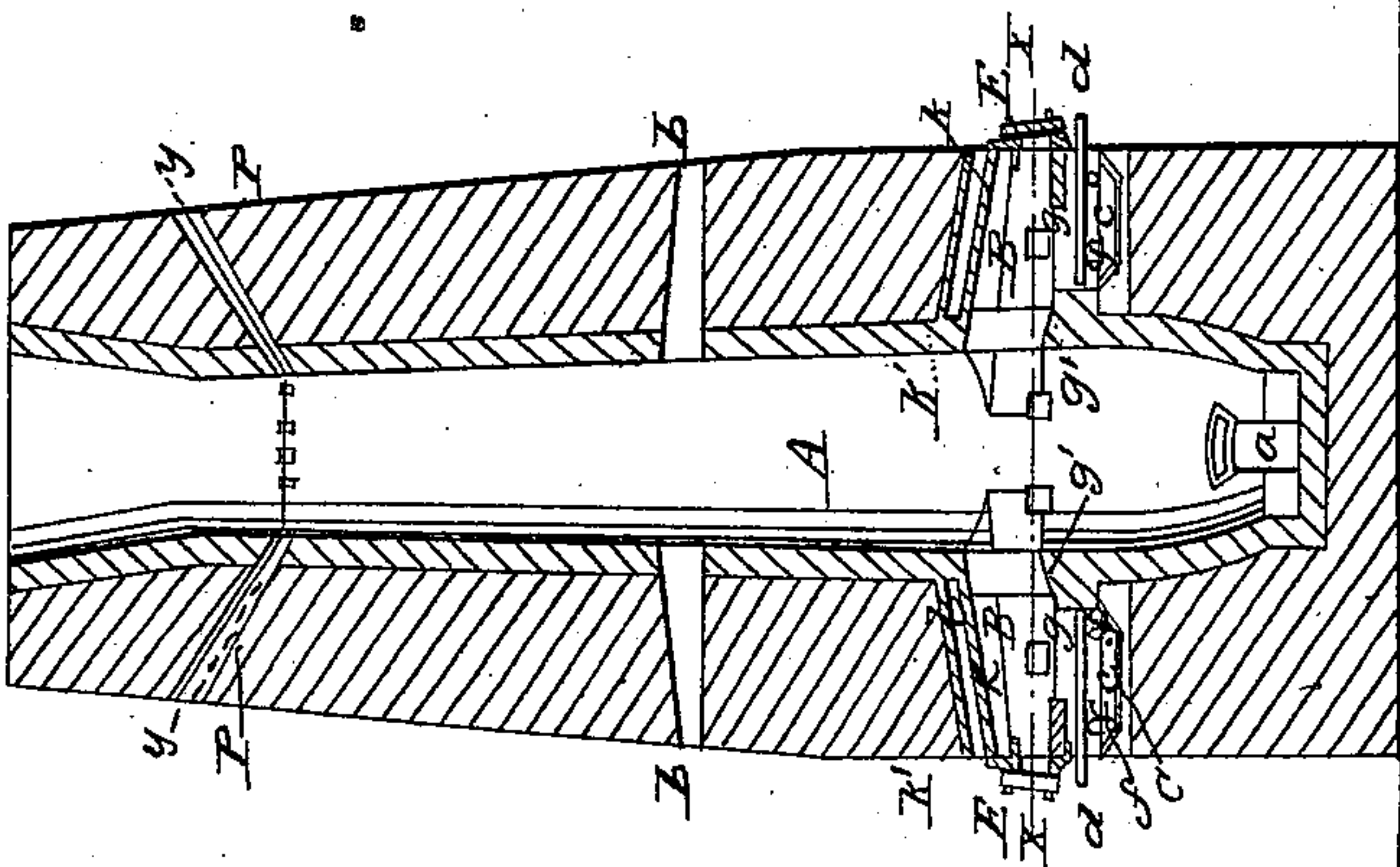


Fig. 1.

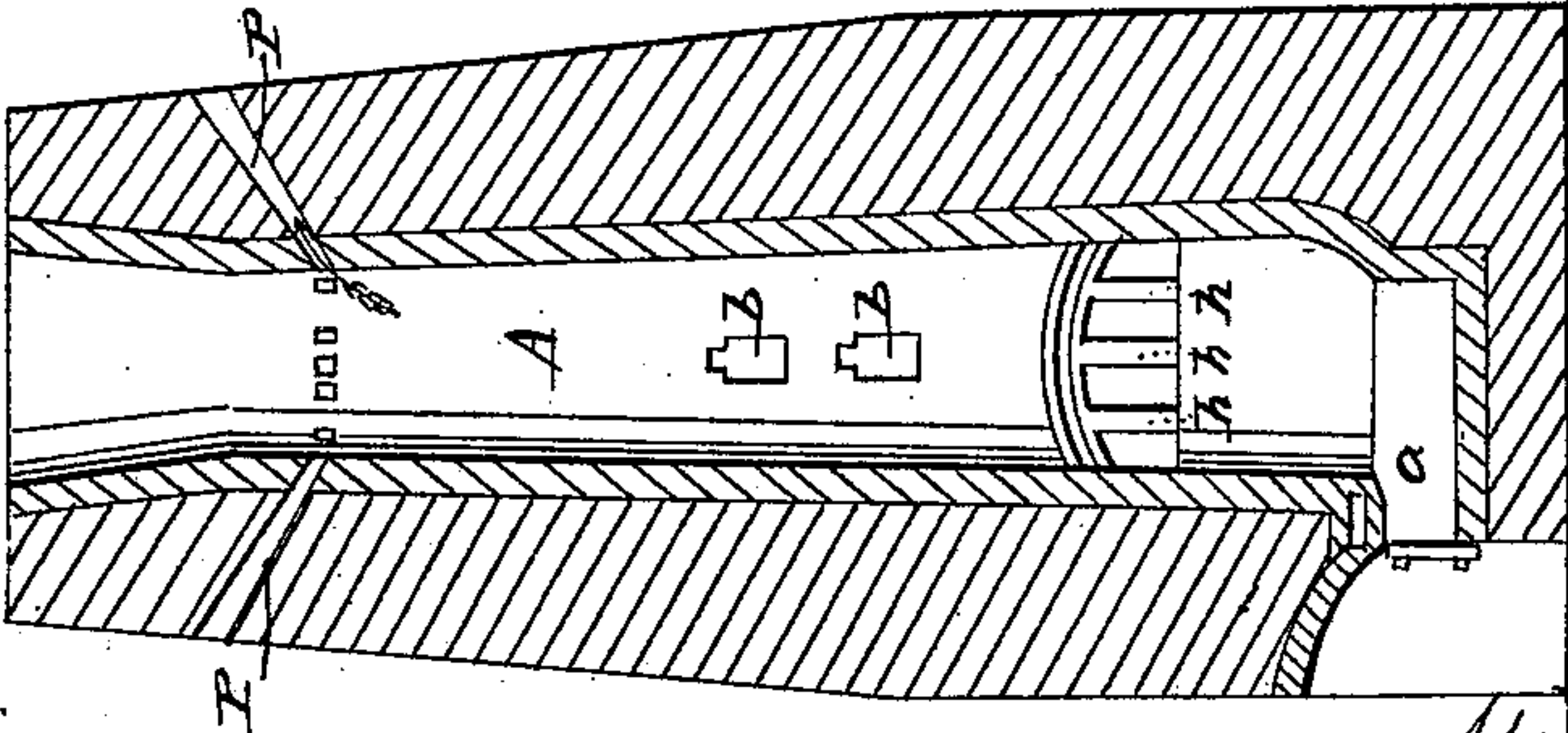


Fig. 6.

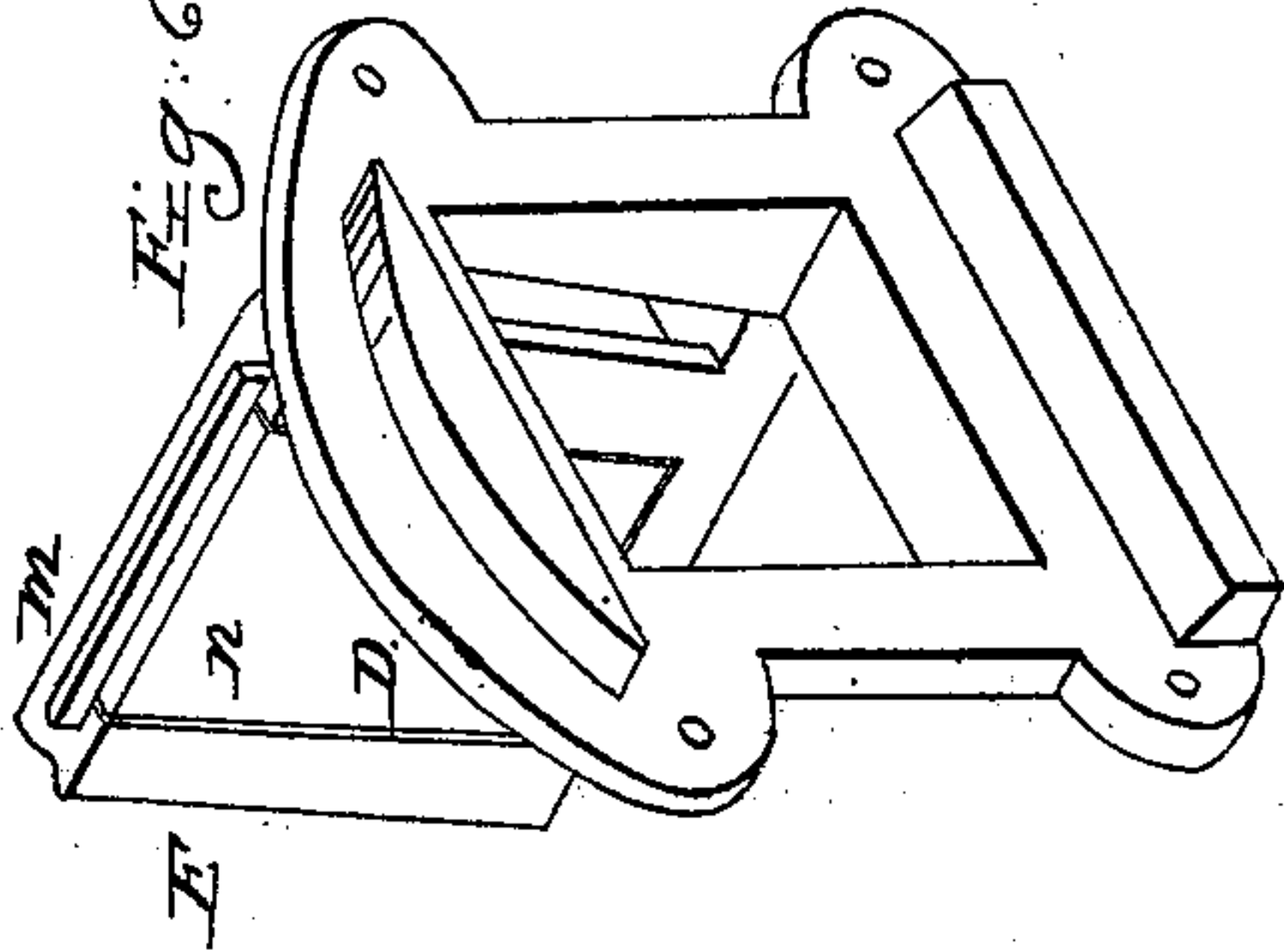
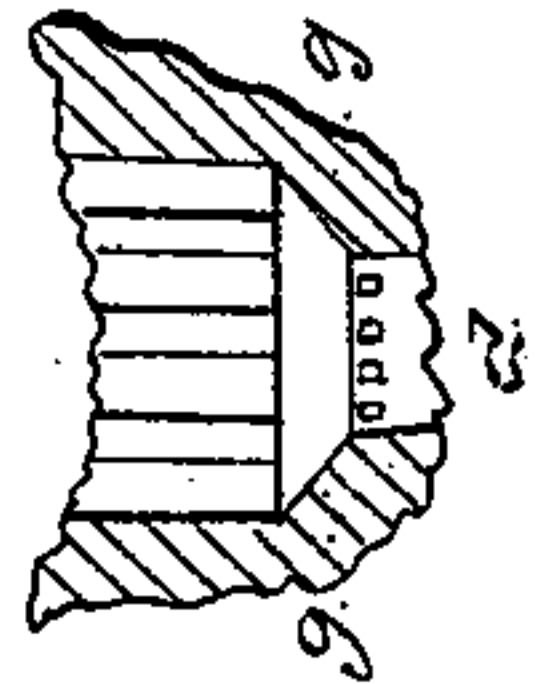


Fig. 5.



Witnesses:

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MICHAEL VERHOEVEN, OF ROCHESTER, NEW YORK.

Letters Patent No. 76,563, dated April 7, 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, MICHAEL VERHOEVEN, of Rochester, in the county of Monroe, and State of New York, have invented a certain new and useful Improvement in Lime-Kilns; and I 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 is a central vertical section of my improved lime-kiln.

Figure 2, a similar section at right angles to fig. 1.

Figure 3, a horizontal section in plane of line xx , fig. 2.

Figure 4, a section in line yy , fig. 2.

Figure 5, a vertical cross-section of one of the furnaces.

Figure 6, a perspective view of one of the furnace-doors.

Like letters of reference indicate corresponding parts in all the figures.

My invention has special reference to the construction and arrangement of the furnace and the flues leading therefrom.

In the drawings, A represents the cupola, which is of usual form, having a draw-arch, a , and peep-holes, $b b$.

At the proper position, on two opposite sides, are situated furnaces, B B, with ash-pits, $c c$, beneath, which serve to hold water. These furnaces are of peculiar construction.

A grate is formed of a series of loose bars, $d d$, which simply rest across sharp-edged supports, $f f$. These bars may be drawn out singly, whenever desired, as in red lines fig. 3, which is a matter of much importance to prevent clinking. Whenever clinkers form, the grate is at once relieved by drawing out one or more of the bars. This arrangement also allows an easy replacing of any portion of the grate whenever it becomes burned out.

On each side and in the rear of the grate are made inclines $g g g'$, those on the side bevelling upward and outward laterally, gradually widening toward the shaft, so as to embrace nearly the whole diameter of the interior of the kiln, while that in the rear simply bevels upward and inward, forming a sort of rim or boundary between the furnace and shaft, as clearly shown. These inclines are of much importance in expanding and directing the heat from the furnaces in a slanting direction up into the body of the rock, so as to spread through the whole area of the shaft, as indicated by the arrows in fig. 3. In ordinary lime-kilns, these sides of the furnace are vertical, and the heat is directed only in a close body toward the interior of the kiln, without striking the sides. It is my object, in thus slanting the sides of the furnace, and widening inward, to obviate this difficulty, by spreading and diffusing the heat, as much as possible, so as to strike the whole cross-area of the shaft, and thus produce an equality in burning.

Piers $h h h$ are built up at the inner ends of the furnaces to support the arch, as shown.

On the sides of each furnace are situated passages, C C, which communicate at the inner ends with the shaft of the kiln at right angles, or nearly so, to the furnaces, while at the outer end they communicate with the open air for the removal of ashes, &c., that collect there. Lateral passages $i i$ connect these side passages with the furnaces, whereby the heat is carried around to the sides of the shaft, and open at that point, where the least heat reaches directly from the furnace. These passages act in conjunction with the flaring sides of the furnace to produce such an equality of heat as will burn the lime effectively.

I construct the top of each furnace with a double arch, $k k'$, with an intervening space, l , which communicates directly with the outer air, as clearly shown in fig. 2. This arrangement not only cools the arch, and in a great degree prevents it from burning out, but it also enables the lower arch k to be replaced when necessary, without disturbing the other parts.

These features of removable grate-bars d , the flaring sides $g g'$, the side passages C, with lateral passages i , and the double arch $k k'$, with an air-space, l , between, constitute the novelty of this part of my invention.

A casing, D, of the form shown in fig. 6, is built into the outer end of each furnace, to which is hung a

door, E, in such a manner that the bottom sets out more than the top, so that when the door swings out, the tendency is for it to close of its own weight, thus making it automatic.

The door itself consists of a cast-iron frame, *m*, and a tile or slab, *n*, of earthenware fitted therein. This arrangement of the door prevents, in a great degree, "burning out," and when the tile becomes worthless, it is replaced by another with the greatest facility.

At a suitable distance from the top of the cupola, angular flues, *p p*, extend from the shaft outward, as clearly shown, the object of which is to allow a free passage of steam, gases, and sulphur-fumes from the body of lime. In filling the shaft, the top of the same becomes in a degree clogged or choked, preventing a free escape of steam, &c., and the consequence is, in ordinary kilns, the calcined lime becomes discolored and injured. The angular flues *p p* obviate all difficulty of this kind, by providing escape below the packed top, which escape is always free.

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

The construction and arrangement of the furnaces with the removable grate-bars *d*, angular diffusing sides *g g g'*, lateral passages *C i*, and double arches *k k'*, with intervening air-space *l*, the whole operating in the manner and for the purpose herein set forth.

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

MICHAEL VERHOEVEN.

Witnesses:

WM. VERHOEVEN,

R. F. OSGOOD.