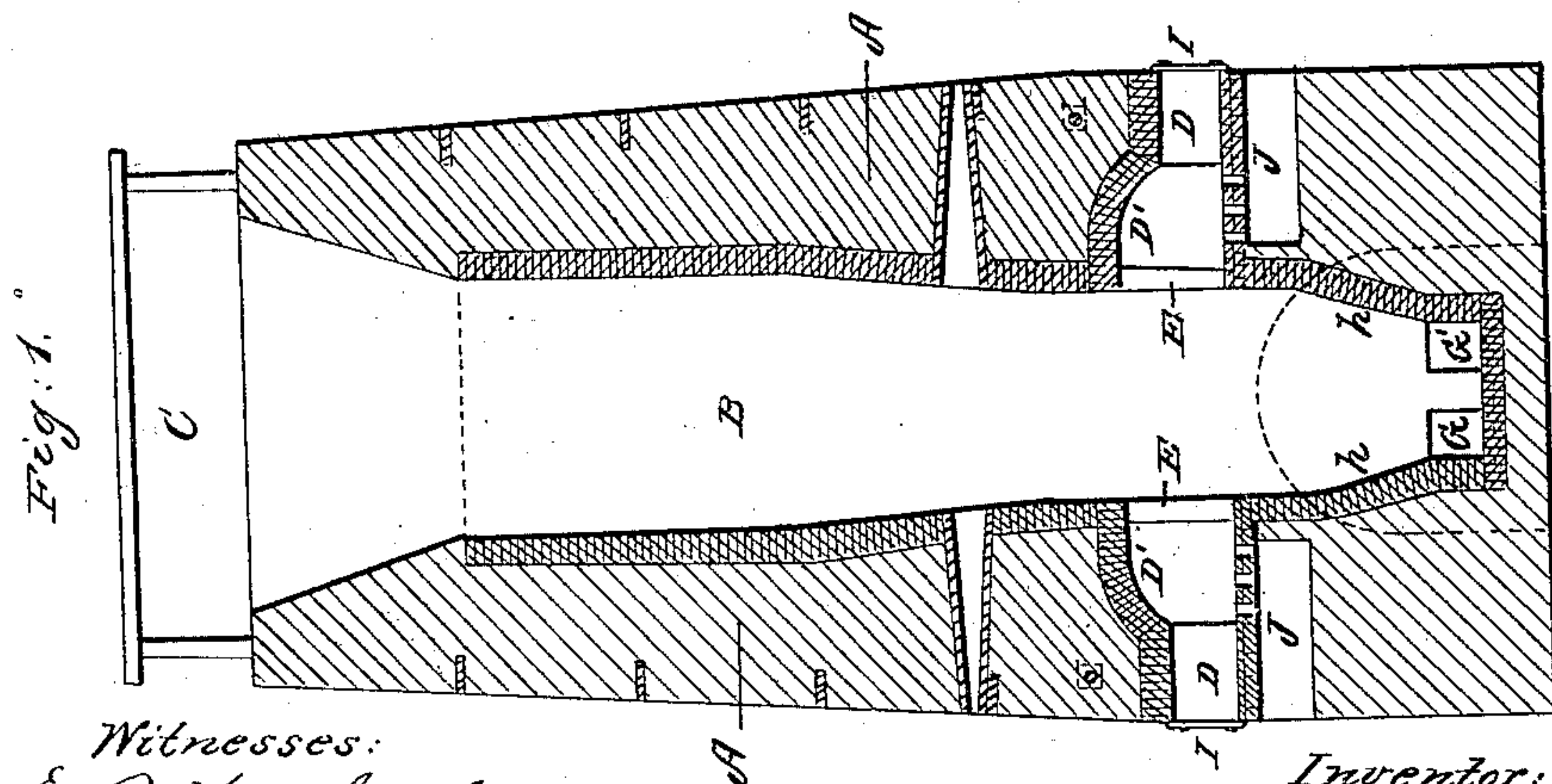
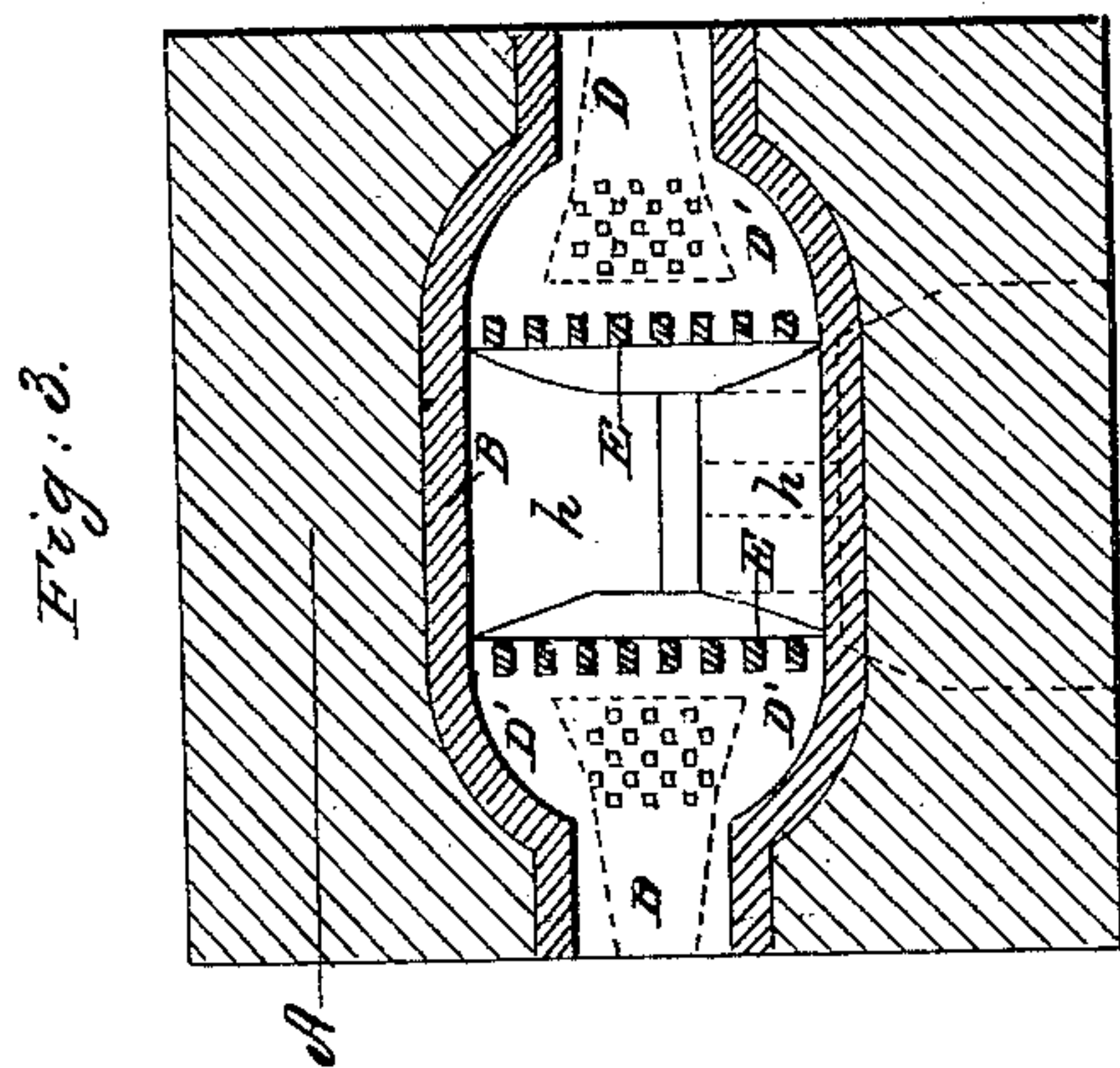
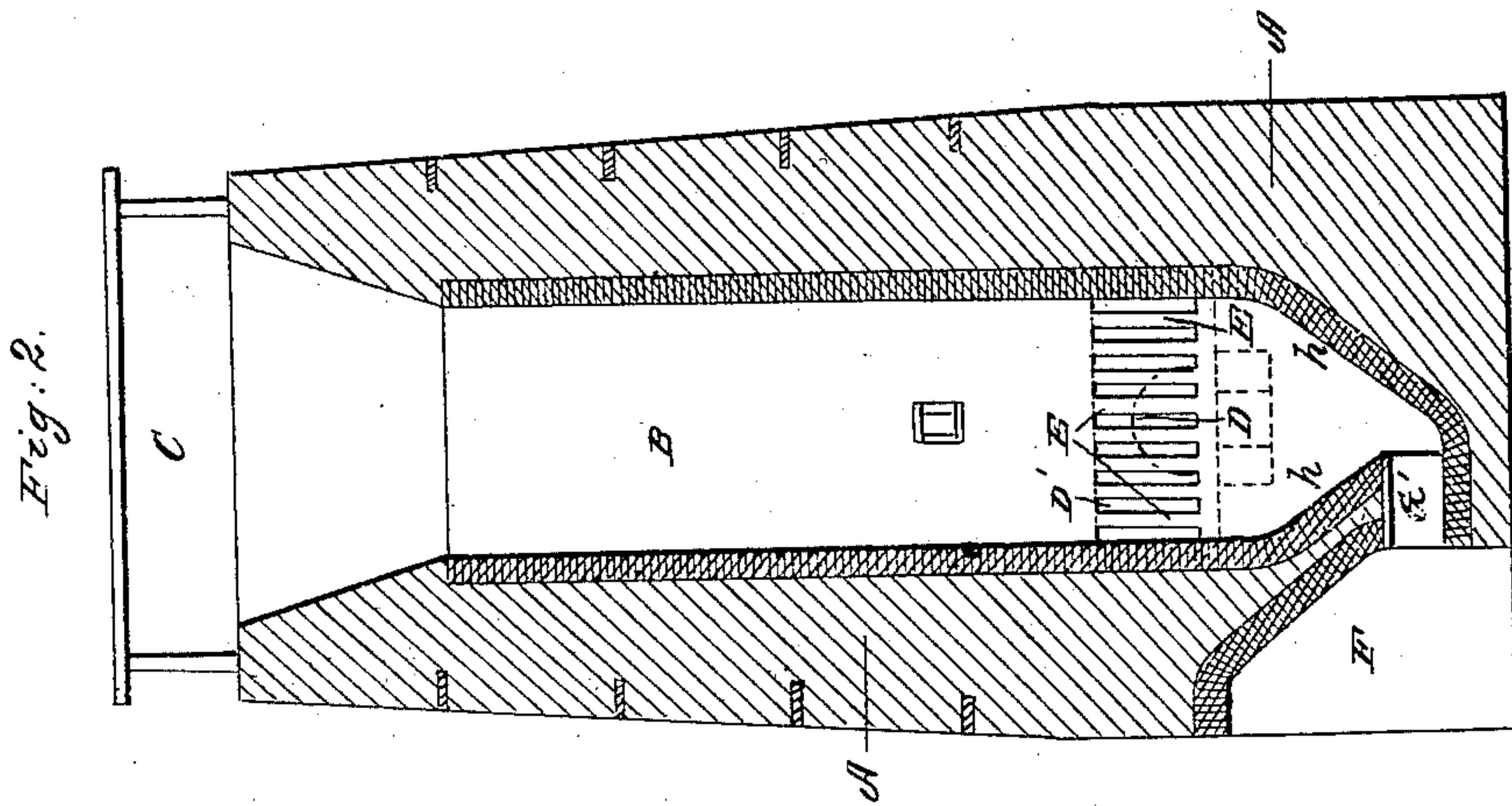


U. CUMMINGS.

Limekiln.

No. 59,760.

Patented Nov. 20, 1866.



Witnesses:
E. B. Forbush,
B. H. Muehler.

Inventor:
Uriah Cummings.

United States Patent Office.

IMPROVEMENT IN LIME KILNS.

URIAH CUMMINGS, OF BUFFALO, NEW YORK.

Letters Patent No. 59,760, dated November 20, 1866.

SPECIFICATION.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, URIAH CUMMINGS, of the city of Buffalo, county of Erie, and State of New York, have invented a new and improved lime kiln, and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Fig. I is a central vertical section, cutting both furnaces.

Fig. II is a vertical section at right angles to Fig. I.

Fig. III is a transverse section on a plane through the furnaces.

The nature of this invention relates to the construction of a lime kiln with furnaces upon opposite sides, which open into enlarged fire chambers, and with a clear unpartitioned space within the cupola opposite the furnaces, so that the stone intermediate the furnaces will be subjected to the action of both fires coming from opposite directions, in connection with draw flues placed side by side, and leading to each fire, so that lime may be drawn from either without disturbing the other, and thus equalize and quicken the reduction.

Reference letters of like name and kind refer to like parts in each of the figures.

The drawings are made upon a scale of one-quarter inch to a foot.

A represents the walls of the kiln as a whole, and B the cupola, or interior thereof, and C the railing or crib on the top of the kiln.

The first part of my improvement relates to enlarging and arching the furnaces at the inner end in proximity to the cupola. The furnaces are two in number, and are placed directly opposite to, and facing each other, and pass through the walls to the cupola in a direct line. The first part, or outer end of the furnace, for about two and a half feet, is made of uniform size, as shown at D. Then it enlarges, and is made arching to the right and to the left, and over to the partition walls or pillars, E, as shown at D¹, so that an enlarged and arching fire chamber is made in proximity to the cupola, as shown in the drawings. This fire chamber increases and equalizes the draught, and causes a more perfect combustion of the fuel, and insures a much larger and increased volume of flame, falling and concentrating upon the stone in the clear cupola space between the furnaces, from opposite directions. It also enables the operator to look directly into the cupola and watch the process of reduction, and to see more of the working thereof.

The fact that the furnaces pass directly through the walls to the cupola, and are enlarged and arched at the inner end, (the cupola being unpartitioned) enables the operator to see a much larger surface of stone within the cupola, and to watch and control the process of reduction much more thoroughly than in any kiln heretofore constructed.

The posts or partitions, E, support the inner end of the arch, and also the inner walls of the kiln. The flame passes into the cupola between these pillars.

When the furnace doors are opened, the flame does not rush out into the open air, as it does in other kilns.

The furnace doors are represented at I, and the ash pit at J.

The second part of my invention relates to the construction and arrangement of the draw flues.

F represents the draw pit. Two draw flues, G G¹, are placed side by side, leading from the draw pit to the bottom of the cupola. The bottom of the cupola is formed slightly oblong, and is hopper shaped, as shown by the lines h h, and these draw flues are parallel with the longest sides, so that the two flues, including the wall between them, are equal in width to the hopper formed bottom of the cupola.

In burning lime kilns, it often happens that the stone on one side of the cupola will be reduced to lime and be ready to "draw" quicker than the stone on the other side of the cupola. There are several causes for this: 1st. The fires from one furnace may be more intense than in the other, and hence the stone in proximity to the flame will be more quickly reduced. 2d. There may be a difference in the packing. 3d. The direction of the wind will often affect one furnace more than the other.

From these and other causes, the reduction process may be faster upon one side than the other, and hence it is often desirable to draw the lime from one side of the kiln before it is ready to be drawn from the other. The arrangement of the draw flues side by side, and between and below the furnaces, as described, enables the operator to draw from one side without disturbing the other, and hence equalize the reduction and prevent the formation of clinkers.

If the flame is continued after the stone is fully reduced to lime, and in a fit condition to draw, it is injurious, and will, in a short time, produce clinkers; hence it is of the utmost importance that the operator be enabled to watch the process, and to know exactly its progress, and to draw the lime as fast and at the time it is in a fit condition, and before clinkers can be formed. This is a perpetual kiln; it is fed at the top in a common manner; the railing or crib should be kept filled with stone.

The advantages arising from these improvements are: 1st. Greater economy in the use of fuel. 2d. Equalizing the action of the flame upon the stone in the cupola, so that the stone will be burned equally and alike. 3d. Ability to draw the lime from either fire in any quantity desired, without drawing from the other, and thereby control and equalize the action of the fires upon the stone. 4th. There is no waste of heat; the kiln can be run day after day without stopping or cooling off, and without waste of material.

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

I claim in a lime kiln the draw flues, G G', and enlarged fire chambers, D', constructed and arranged with an *unpartitioned* cupola, substantially as described.

URIAH CUMMINGS,

Witnesses:

E. B. FORBUSH,
B. H. MUEHLE.