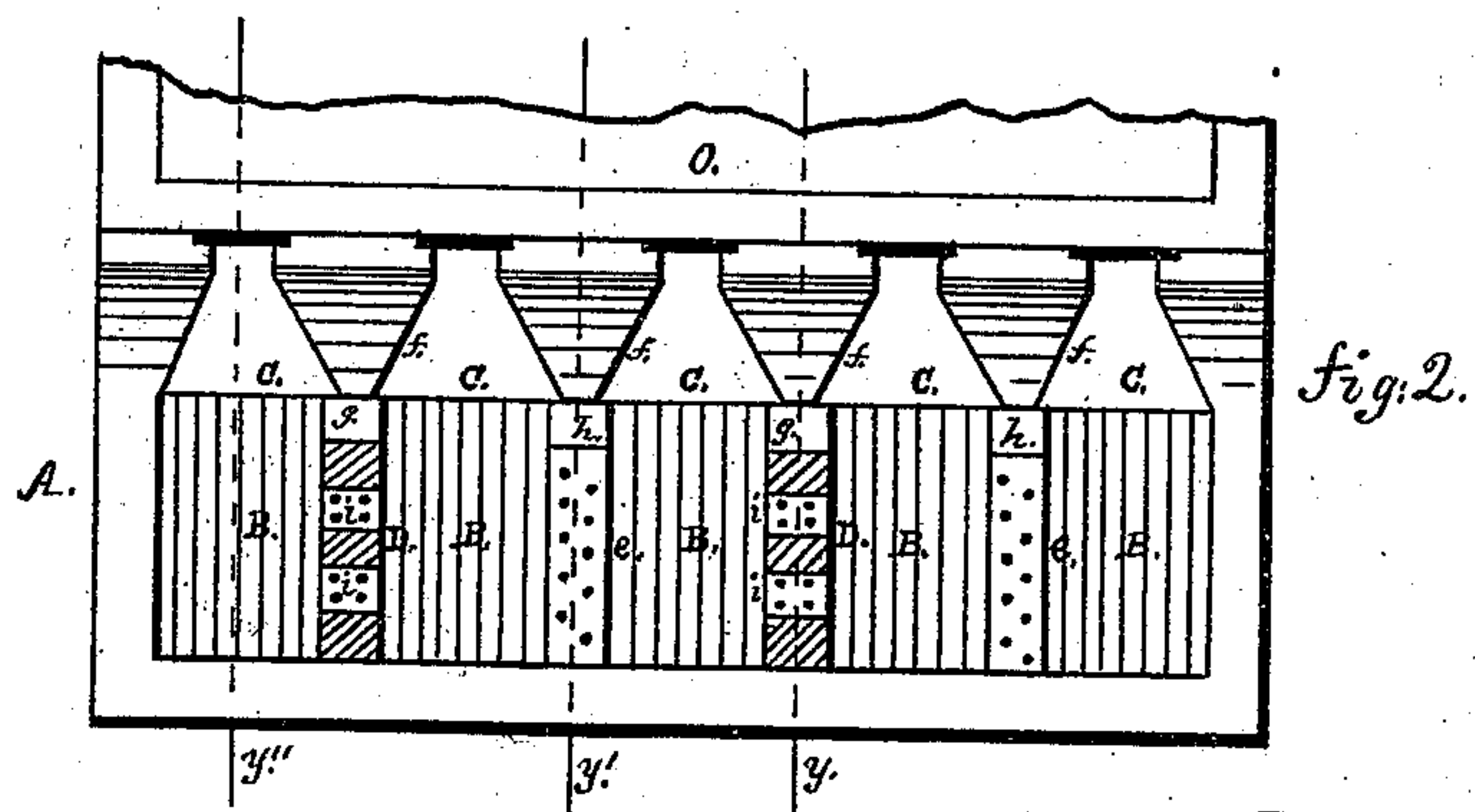
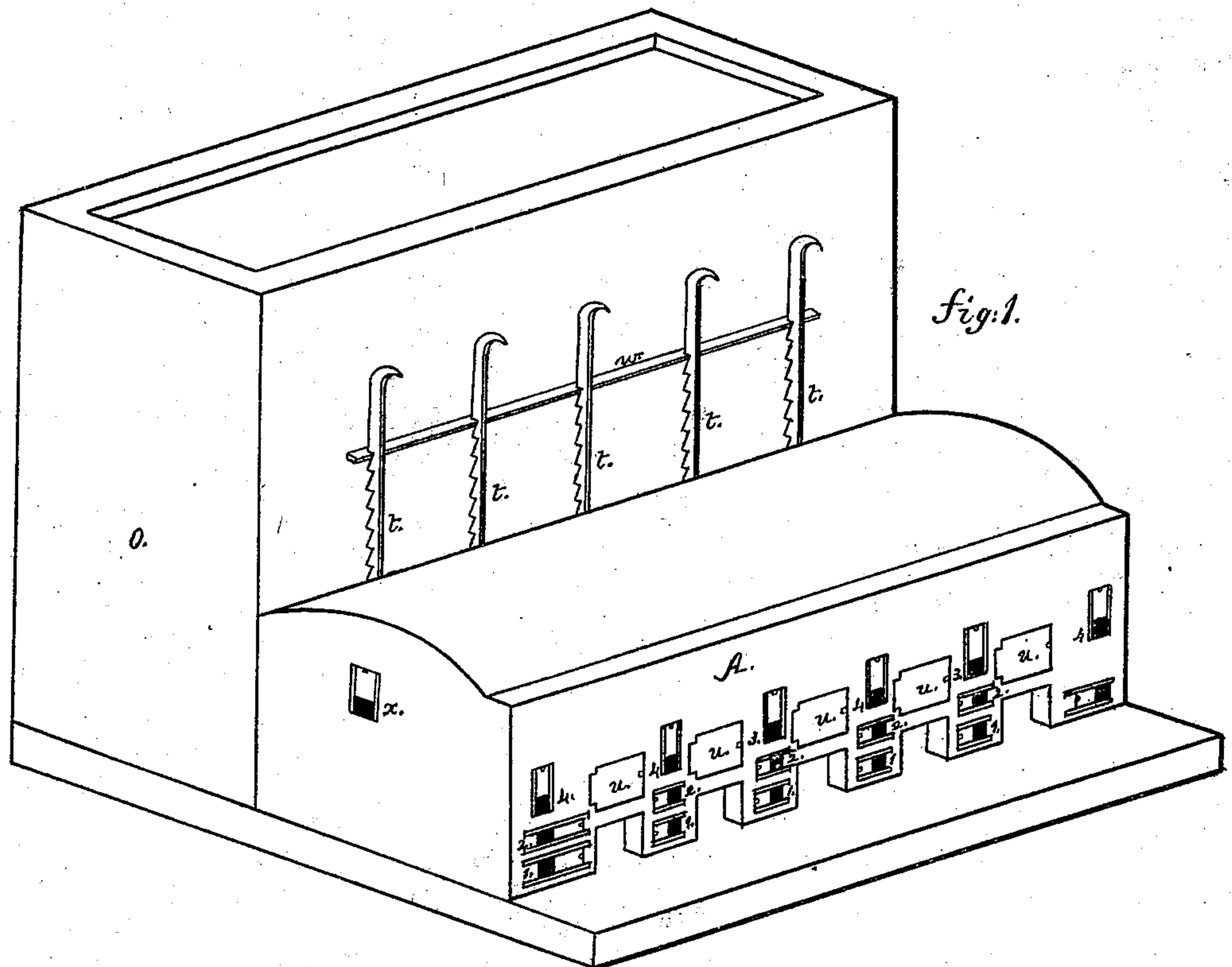


W. S. COLWELL.
FURNACE FOR BRICK-KILNS.

No. 173,445.

Patented Feb. 15, 1876.



Witnesses

James L. Johnston
A. H. Johnston

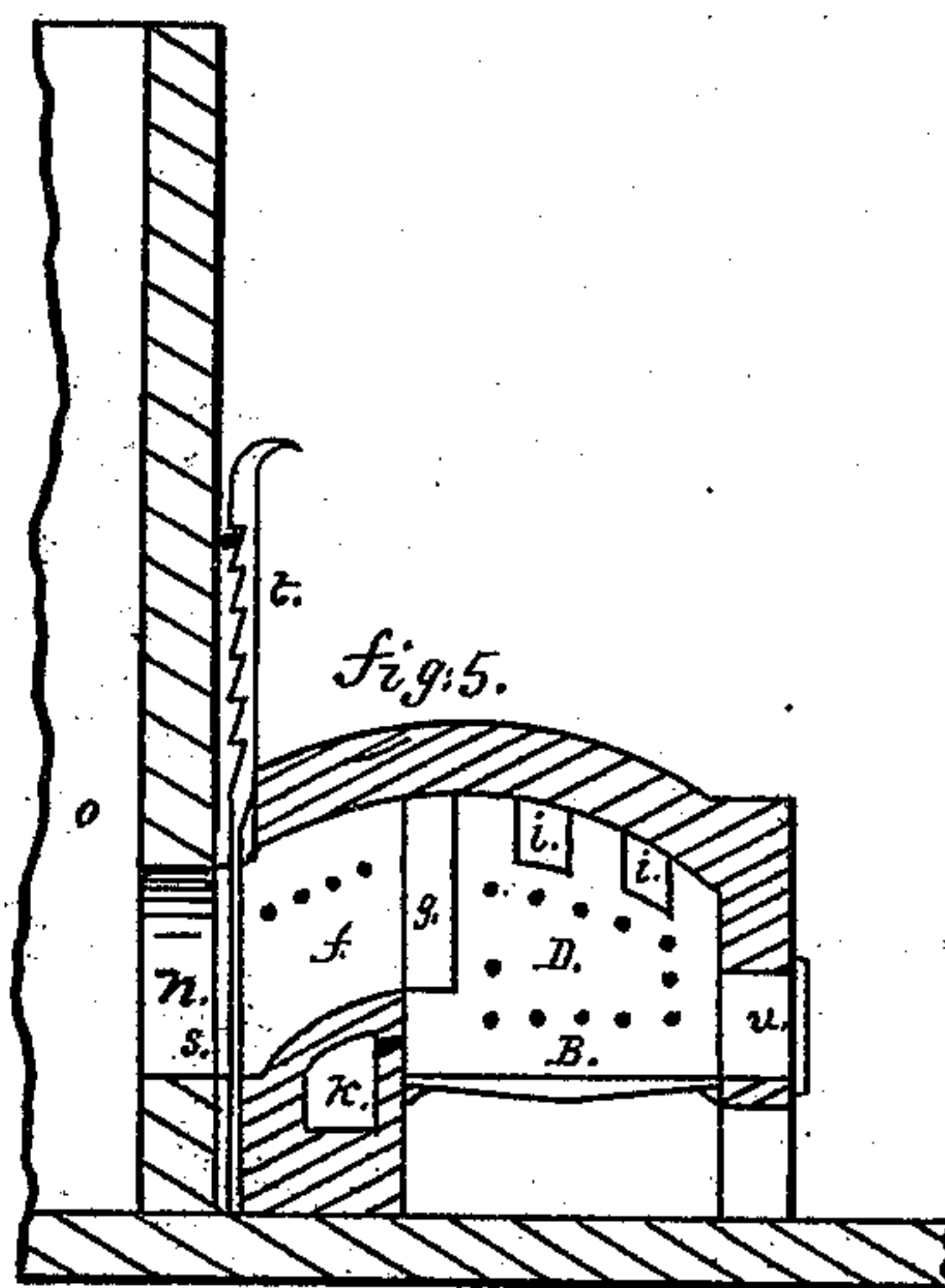
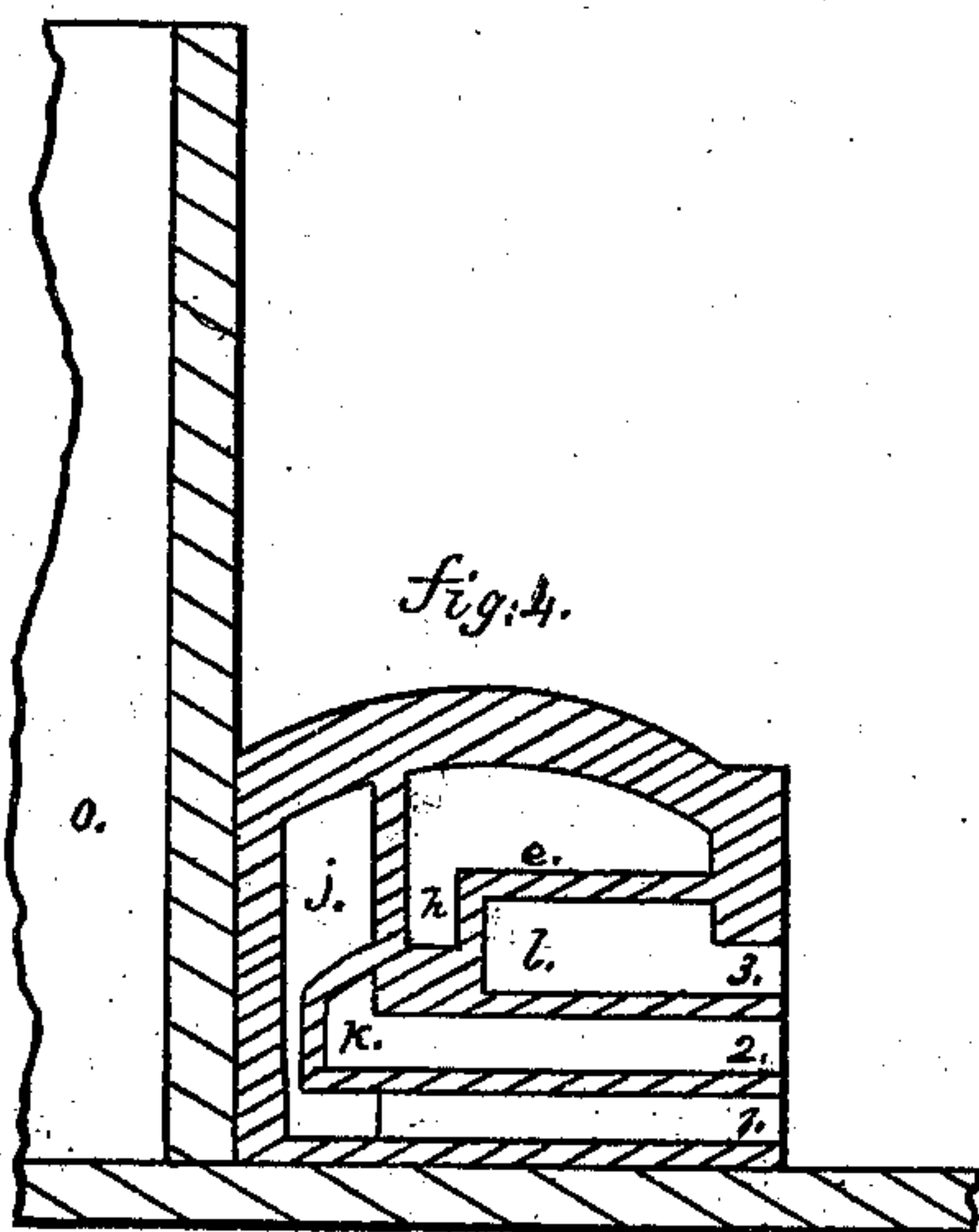
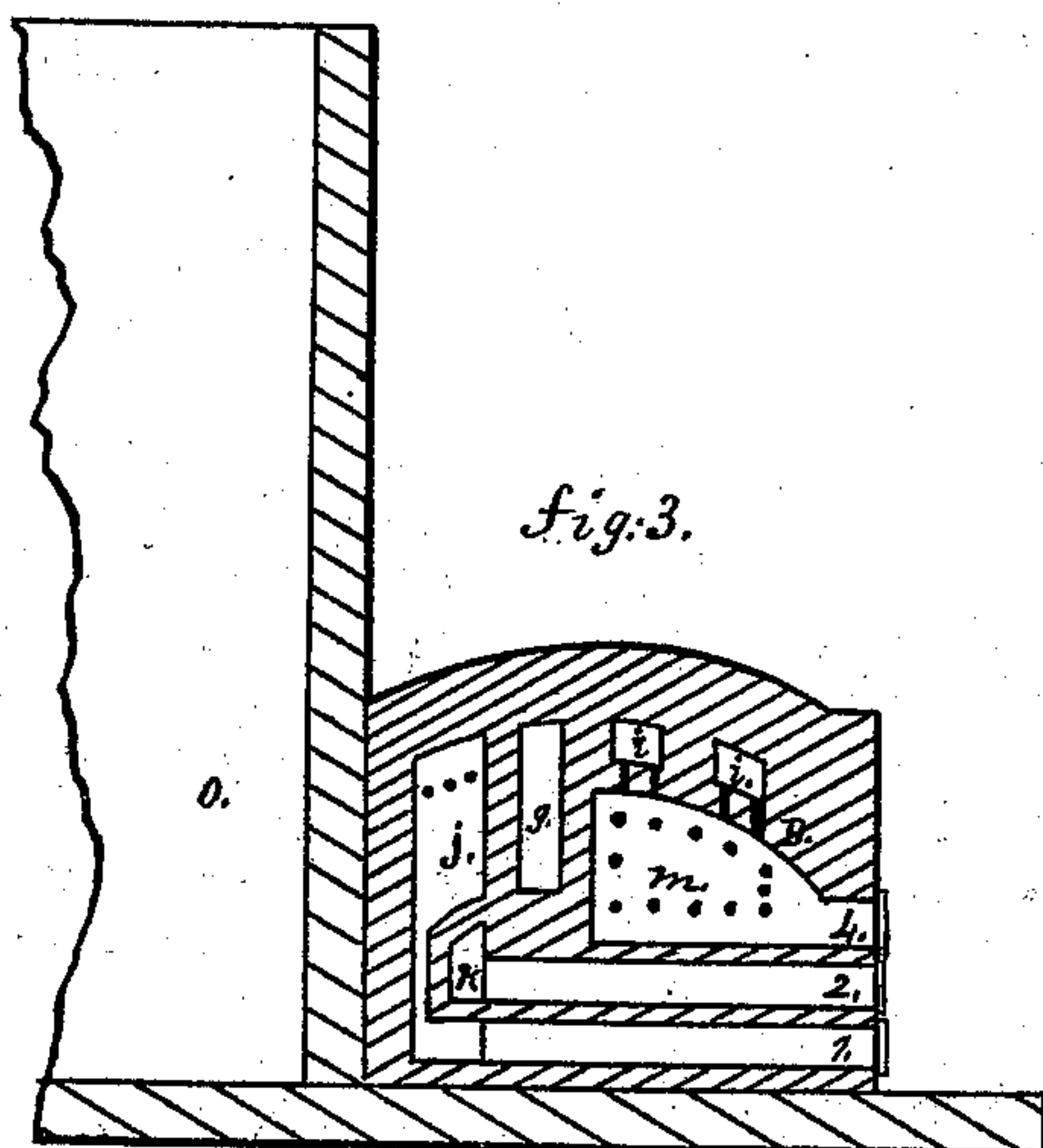
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UNITED STATES PATENT OFFICE.

WILLIAM S. COLWELL, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN FURNACES FOR BRICK-KILNS.

Specification forming part of Letters Patent No. **173,445**, dated February 15, 1876; application filed January 31, 1876.

To all whom it may concern:

Be it known that I, WILLIAM S. COLWELL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Furnaces for Brick-Kilns and for other purposes, the same being an improvement upon furnaces for like purposes for which Letters Patent have been granted me; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to an improvement in furnaces for brick-kilns and for other purposes; and consists in so constructing the furnace that it will extend the entire length of the kiln and communicate with all of its fire-arches by means of separate compartments communicating with each other, and each compartment communicating with a series of air-chambers through the medium of small openings, whereby cold air, in contradistinction to hot air, is commingled with the gases of the fire in the several compartments of the furnace.

To enable others skilled in the art with which my invention is most nearly connected to make and use it, I will proceed to describe its construction and operation.

In the accompanying drawings, which form part of my specification, Figure 1 is a perspective view of my improvement in furnaces as applied to brick-kilns. Fig. 2 is a top view or plan of the same, representing the crown of the furnace removed. Fig. 3 is a vertical section at line *y* of Fig. 2. Fig. 4 is a vertical section at line *y'* of Fig. 2. Fig. 5 is a vertical section at line *y''* of Fig. 2.

In the accompanying drawings, A represents the furnace, which extends the entire length of the kiln *o*, and is furnished with a series of grates, B, and hollow bridge-walls C, and is subdivided into a series of compartments by means of hollow partition-walls D and *e*, the walls D extending to the crown of the furnace, having a series of openings, marked *g* and *i*. The partition-walls *e* extend a short distance above the fire-grate B. *f* are a series of hollow division-walls in the rear of the grates B. These walls are of such form as to give the space over the bridge-wall and between the

mouth of the kiln and the back end of the grate a converging form toward the mouth of the fire-arches *n* of the kiln *o*. The several partitions D *e f* and bridge-wall C are provided with air-chambers *j*, representing the air-chamber in the partition-wall *f*; *k*, the air-chamber in the bridge-wall; *l*, the air-chamber in the partition-wall *e*; *m*, the air-chamber in the partition-wall D. These several air-chambers communicate with the interior of the furnace by means of small apertures made in the sides of the several partitions, and in the top edge of the partitions D and *e*, and in the face of the bridge-wall next to the back end of the grates. The several grates or compartments of the furnace communicate with each other by means of open spaces, marked *g h i*, and by the open space between the crown of the furnace and the top edge of the partition-walls *e*, as indicated in the drawings. The several air-chambers are provided with inlet-flues, marked 1, 2, 3, and 4. The air-flue 1 communicating with the air-chamber *j*; the flue 2 with the chamber *k*; the flue 3 with chamber *l*; flue 4 with chamber *m*. The fire-grates are furnished with doors, marked *u*. The mouth of the fire-arches *n* are each furnished with a damper or gate, *s*, constructed of fire-tile, to which are attached notched rods *t*, arranged so as to catch on a projecting rib, *w*, on the side wall of the kiln. By means of the notched rods *t* and projecting rib *w*, the mouths of the fire-arches may be partially opened or closed at the will of the operator.

The gates or dampers *s*, when used in combination with the several compartments of the furnace, enable the operator to direct the entire heat to any desired part of the kiln by closing several of the mouths of the fire-arches and opening others.

The manner of controlling the heat of the furnace with relation to the several parts of the kiln, through the medium of the dampers or gates *s*, will be readily comprehended by the operator.

It is often the case that the manufacturers of brick have to burn a part of kiln. To meet this emergency a part of the furnace herein described may be used by simply closing the openings *g i* in the partition-walls D.

The advantage of this arrangement will be very apparent when necessary to use the furnace in connection with a part of a kiln in the burning process.

The operation of my improvement in furnace for brick-kilns and for other purposes is as follows: Fire is made upon the grates B, and atmospheric air is allowed to enter the air-chambers *j*, *k*, *l*, and *m* through the flues 1 2 3 4, which air passes through small openings into the body of the furnace, so as to commingle the air with the products of combustion in all parts of the furnace, thereby securing a perfect combustion of the gases and generation of an intense heat prior to its entering the fire-arches of the kiln.

A furnace constructed as hereinbefore described is adapted to the use of the several kinds of fuel used for burning brick—that is to say, that it will work equally as well with anthracite coal as it will with bituminous coal or wood—which advantage is due to the peculiar construction of the furnace, which brings the fire-grates close to the mouth of the fire-arches, as indicated in Figs. 2 and 5. The condition of the furnace throughout its entire length can be seen through the opening *x* in the end of the furnace, and the condition of the fire-arches can be seen through the fire-doors *u* of the furnace.

A furnace such as hereinbefore described is placed on each side of the kiln *o*.

Having thus described my improvement, what I claim as of my invention is—

1. A furnace having a series of fire-grates and subdivided into compartments communicating with each other, said compartments communicating with air-chambers and the fire-arches of the kiln, substantially as herein described, and for the purpose set forth.

2. A furnace having a series of fire-grates, B, subdivided into compartments by means of partitions *D e f*, in combination with air-chambers *j k l m*, which communicate with the interior of the furnace by means of small apertures for the inlet of air, said furnace communicating with the fire-arches of a kiln, substantially as herein described, and for the purpose set forth.

3. A furnace having a series of fire-grates subdivided into a series of compartments communicating with each other, in combination with a series of air-chambers and gates or dampers, *s*, arranged and operating with relation to each other, substantially as hereinbefore described, and for the purpose set forth.

W. S. COLWELL.

Witnesses:

A. C. JOHNSTON,
JAMES J. JOHNSTON.