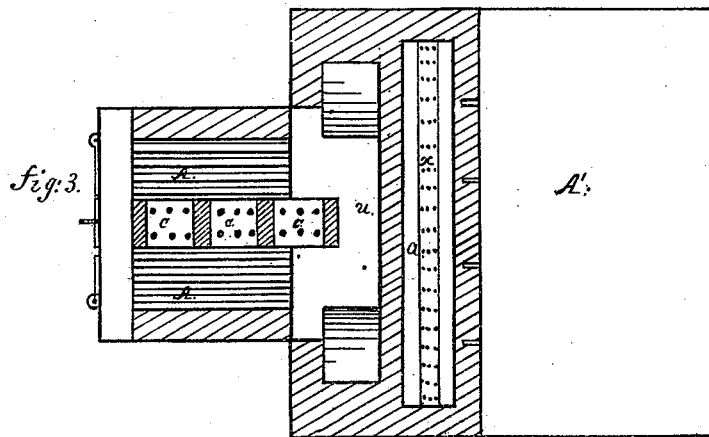
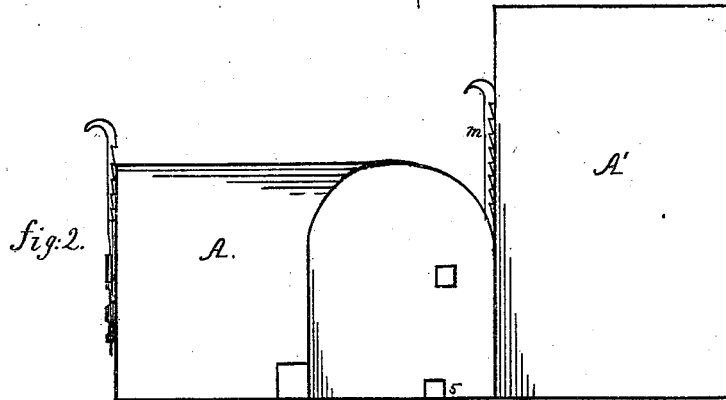
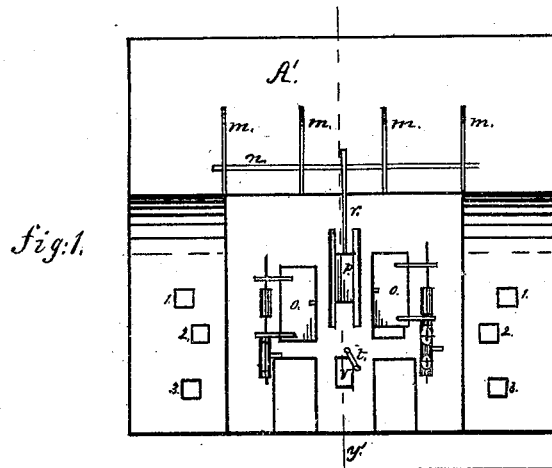


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No. 180,114.

Patented July 25, 1876.



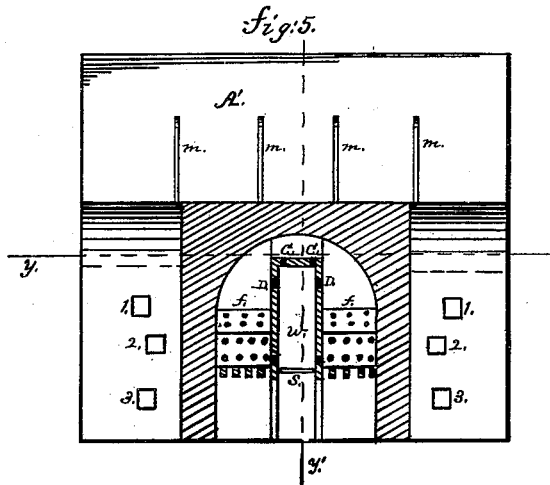
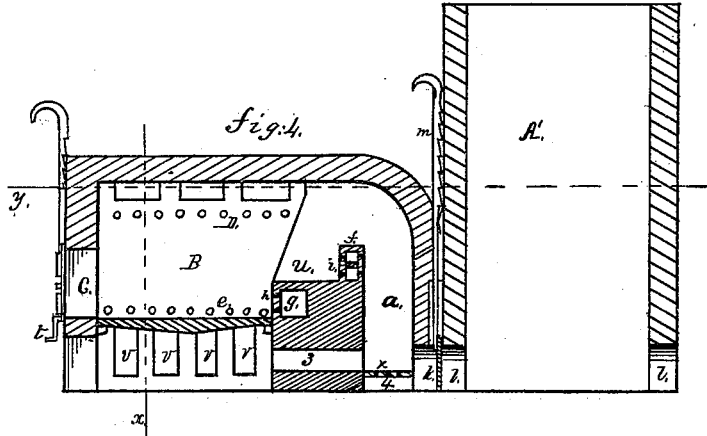
Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM S. COLWELL, OF PITTSBURG, PENNSYLVANIA,

IMPROVEMENT IN FURNACES FOR BRICK-KILNS.

Specification forming part of Letters Patent No. **180,114**, dated July 25, 1876; application filed September 20, 1875.

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 other purposes; 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 other purposes; and consists in dividing the fire-chamber into two compartments by means of a hollow partition, in which is arranged a valve, the hollow space in the partition communicating with the fire-chamber through the medium of a series of apertures, and in combination with said partition two bridge-walls interposed between the fire-chamber and a heat or combustion chamber, and also interposing between said fire-chamber and combustion-chamber a flame-chamber for receiving and spreading the heat, flame, and smoke into a sheet on their passage to the combustion-chamber, the whole being so constructed, arranged, and operating that cold air, in contradistinction to hot air, is commingled with the heat, flame, and smoke of the furnace in counter-currents, whereby complete combustion of the fuel is secured and intense heat generated and distributed throughout the kiln at the will of the operator.

To enable others to make and use my invention I will proceed to describe its construction and operation.

In the accompanying drawings, which form part of my specification, Figure 1 is a front elevation of my improvement in, and represents it applied to, a brick-kiln. Fig. 2 is a side elevation of the same. Fig. 3 is a horizontal section of the same at line *y* of Figs. 4 and 5. Fig. 4 is a vertical section of the same at line *y'* of Figs. 1 and 5. Fig. 5 is a transverse and vertical section of the same at line *x* of Fig. 4.

In the drawings, A represents the fire-chamber of the furnace, which is divided into two compartments by a hollow partition, B, the chamber *w* of which is provided with a valve,

s, which is manipulated with a crank, *t*, and which chamber communicates with the fire-chamber through the medium of openings *e* D *e* in the walls of said partition, through which cold air is commingled with the heat, flame, and smoke of the fire-chamber. Cold air is admitted into the chamber *w* through openings *v*. The flues 2 convey cold air into the hollow bridge-wall *g*, from which it is distributed by openings *h* into the fire-chamber A, and commingled with the heat, flame, and smoke as they pass into the spreading-chamber *u*. The flues 1 convey cold air into the hollow bridge-wall *f*, from which it is distributed through openings *i* into the spreading-chamber *u*, where it commingles with heat, flame, and smoke prior to their entering the heat or combustion chamber *a*. The bottom *x* of the combustion-chamber is provided with a number of openings, which give communication between the air-chamber 4 beneath the bottom and the combustion-chamber *a*. Cold air enters the air-chamber 4 through the openings 5 in the end wall, and passes in jets through the perforations in the bottom *x*, and mingles with the gases and smoke carried from the fire-chambers A A over the bridge-wall and effects their complete combustion. The doors *o* are hinged, so that they can be raised to allow a sheet of cold air to pass over the surface of the fire on the grate of the fire-chamber A.

The construction and operation of the hinges of the door *o* are fully described in Letters Patent numbered 166,749, granted me August 10, 1875, to which reference is made.

The chamber *w* of the partition in the fire-chamber A is provided with an opening, *c*, which is furnished with a sliding door, *p*, to the upper edge of which is attached a notched rod, *r*, for holding it up in the desired position. The opening *c* may be used for admitting air into the chamber *w* when desirable. The openings 3 are used for examining the condition of the fire-arches *l* of the kiln A'. The kiln A' is of ordinary construction, excepting that the mouth of its fire-arches *l* are furnished with dampers *k*, to which are attached rods *m*, furnished with notches, which catch on a projecting rib, *n*, on the side of the

walls of the kiln, for holding up the dampers *k*. Furnaces such as herein described are arranged upon each side of the kiln *A*'.

The operation of my improvement in furnaces is as follows: Fire is made on the grate of the fire-chamber *A*, and cold air is commingled with the heat, flame, and smoke of it in counter-currents, through the medium of chamber *w* and the hollow bridge-walls *f* and *g*, and the series of openings connected therewith. The heat, flame, and smoke, having cold air commingled therewith, pass from chamber *A* into chamber *u*, where they are spread into a sheet, and, passing over the bridge-wall *f*, enter the chamber *a*, and there, coming in contact with jets of air supplied from the air-chamber *4* through the perforations in the bottom, complete combustion takes place, generating an intense heat, which passes into the several fire-arches of the kiln, which is controlled through the medium of the dampers *k*, and by which dampers the operator can distribute to any one part or through all parts of the kiln at his pleasure.

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

1. The furnace *A*, divided by a hollow partition-wall, *B*, furnished with apertures *D e*, in combination with the chambers *u a*, the latter having a perforated bottom, *x*, through which jets of air are supplied to the chamber *a* from the air-chamber *4*, substantially as and for the purpose hereinbefore described and set forth.

2. The combination and arrangement of the double furnace *A*, spreading-chambers *u*, the combustion-chamber *a*, having perforated bottom *x*, and air-flues *3 4*, the perforated bridge-wall *f*, having double air-flues, and the perforated bridge-wall *g*, provided with an air-flue, and the fire-arches *l*, provided with the dampers *k*, all combined, arranged, and operating substantially as hereinbefore described and set forth.

W. S. COLWELL.

Witnesses:

JAMES J. JOHNSTON,
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