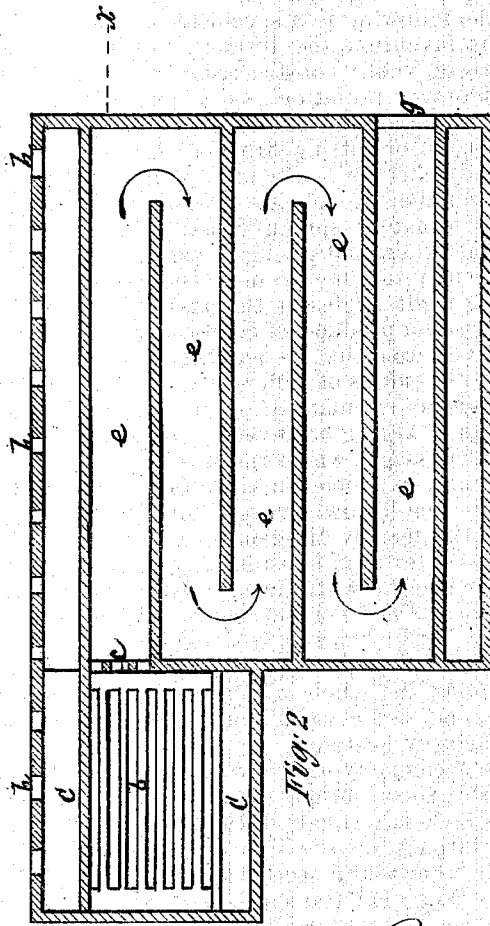
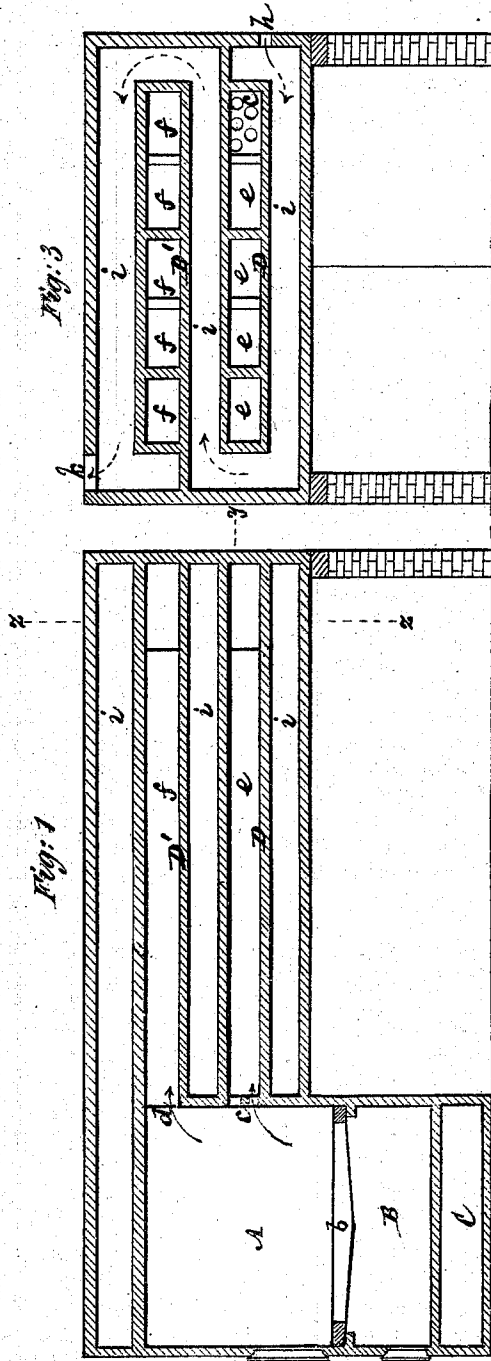


J. G. PORTER & E. DAVIS.
Heating Furnaces.

No. 139,812.

Patented June 10, 1873



Witnesses:
Fred Hargney
Davis M. Bell

John G. Porter
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by their Attorneys
Brown & Allen

UNITED STATES PATENT OFFICE.

JOHN G. PORTER, OF NEW YORK, N. Y., AND ELIJAH DAVIS, OF JERSEY CITY,
NEW JERSEY.

IMPROVEMENT IN HEATING-FURNACES.

Specification forming part of Letters Patent No. **139,812**, dated June 10, 1873; application filed
March 24, 1873.

To all whom it may concern:

Be it known that we, JOHN G. PORTER, of the city, county, and State of New York, and ELIJAH DAVIS, of Jersey City, in the county of Hudson and State of New Jersey, have invented an Improvement in Furnaces for Warming Dwellings and other buildings, of which the following is a specification:

In this invention, the furnace, which may be mainly or wholly constructed of soap-stone without loss by radiation, is of a box or parallelogrammic shape, and composed of a laterally-arranged or jutting fire-box, surrounded by an air-jacket or space in communication with a number of cold-air-circulating passages of a flat or spread construction, one above the other, and giving a zigzag or tortuous course to the air in a succession of sheets at right angles to the passage of the heated gases or products of combustion, which are received from the fire-box through upper and lower openings of different relative area, and made to circulate through upper and lower sets of zigzag or reverse flues exposed to the air-passages which run at right angles to them, and to which the air to be heated is admitted from below through holes of suitable and preferably different area on the one side of the furnace, substantially as herein-after described. A furnace constructed in accordance with this invention combines great simplicity with efficiency, besides being most economical as regards its consumption of fuel, and, as the whole air-heating surfaces may be composed of soap-stone, being withal a most healthy heater.

In the accompanying drawing which forms part of this specification, Figure 1 represents a vertical longitudinal section of our improved furnace on the line *x x* in Fig. 2, which is a horizontal section on the line *y y*. Fig. 3 is a vertical transverse section on the line *z z*.

Similar letters of reference indicate corresponding parts.

A is the fire-box or chamber, fitted with a grate, *b*, and which, with its ash-pit B, is arranged to form a jutting or lateral corner

projection from the body of the furnace, which is of a square or parallelogrammic shape. Said fire-box, with its ash-pit, is incased by an air-heating jacket or space, C, in communication at its sides and above with the air-heating spaces of the body of the furnace. The heated gases or products of combustion pass from the fire-box A, through lower and upper openings *c d*, into, and are made to circulate through, lower and upper horizontal sets D D' of zigzag, serpentine, or reverse flues *e f*, of similar construction, each set, and terminating respectively in outlets *g* (one of which only here is shown) at the back of the furnace, in communication with the chimney. The lower opening *c*, through which a portion of the gaseous products of combustion passes from the fire-box to the set D of flues, may consist of a perforated plate or otherwise, and is of less area than the upper opening *d* that communicates with the set D' of flues, in order that the passage of the heated gases may be equally divided between the two sets D D' of flues or air-heating surfaces, instead of being unduly drawn away through the lower set.

The air to be heated is received through lower openings *h* along the one or fire-side of the furnace, preferably of diminishing area as they approximate the center of the furnace, where the heat is greatest, so as to equalize the distribution of the air over the heating-surfaces. From these openings *h* the cold air passes around the fire-chamber and within the first or lowest passage of a number of zigzag or reverse horizontal passages, *i*, of a flat or spread construction, arranged one above the other, and exposing the air, as it circulates therethrough in a thin or sheet form at right angles to the course or courses of the heated gases, to the whole heating-surfaces of the lower and upper sets D D' of flues, the air thus heated ultimately passing off by any number of openings, *k*, in the top of the furnace. The course of the heated gases is shown by whole arrows in the drawings, and that of the air being heated by dotted arrows.

What is here claimed, and desired to be secured by Letters Patent, is—

The arrangement, substantially as herein described, of the fire-chamber *A*, the openings *c d* of different relative area, as specified, the upper and lower sets *D D'* of reverse or return flues *e f*, and the cold-air-circulating horizontal passages *i* with their inlets

h, for operation in relation with each other, essentially as herein set forth.

JOHN G. PORTER.
ELIJAH DAVIS.

Witnesses:

FRED HAYNES,
MICHAEL RYAN.