(No Model.) 2 Sheets—Sheet 1.

J. EVANS.

FURNACE.

No. 366,657. Patented July 19, 1887.

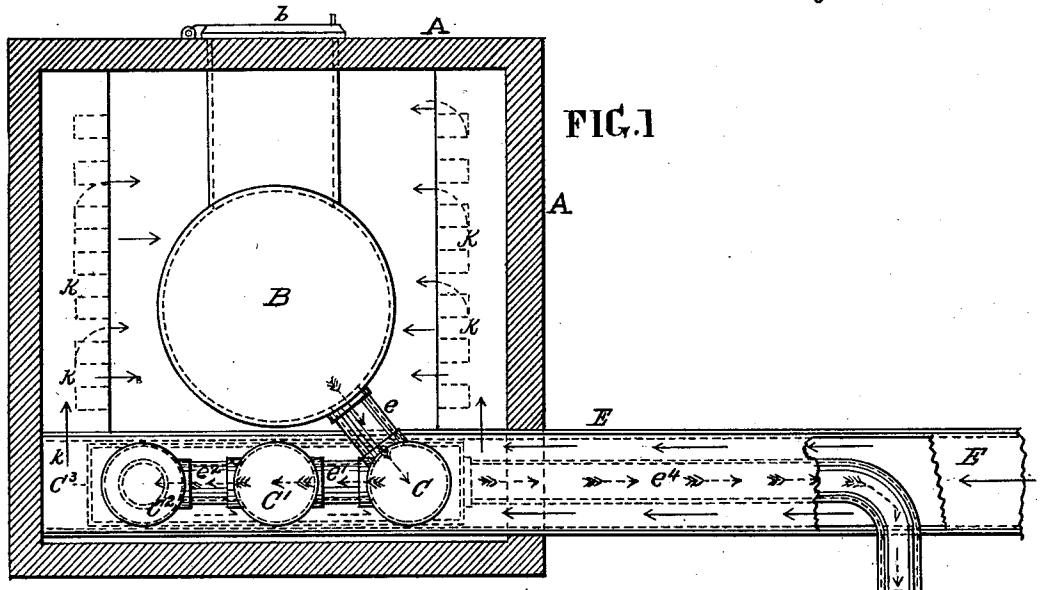

FIG. 1

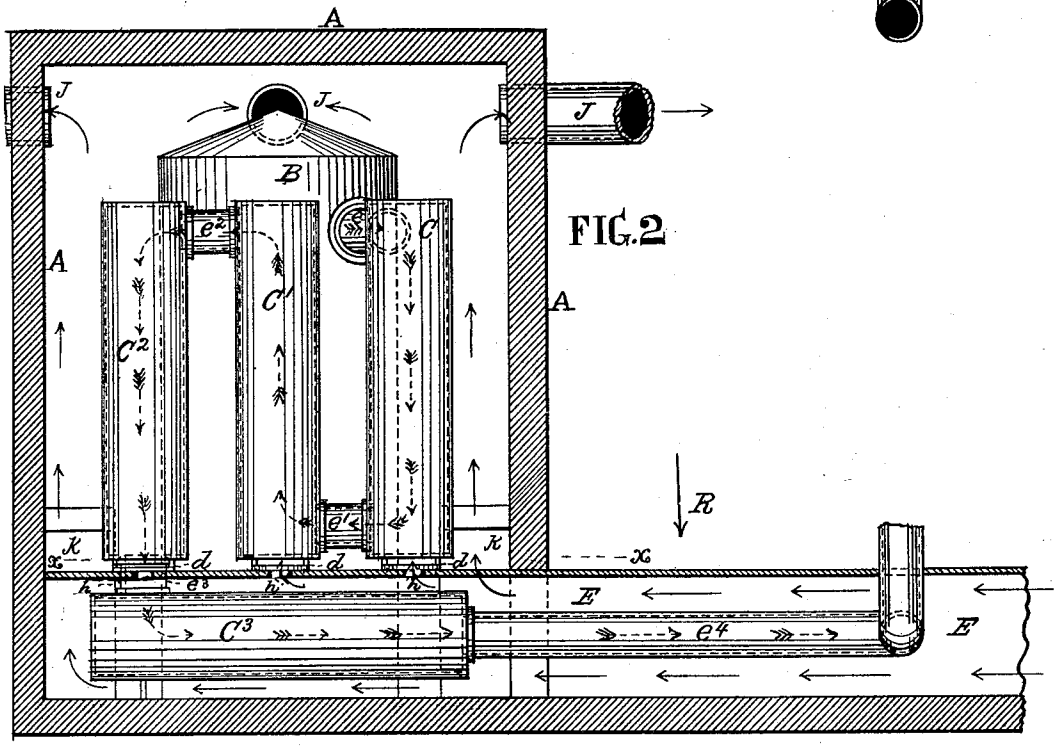

FIG. 2

Witnesses.

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James L. Smith

Inventor

John Evans.

per Thomas J. Bewley, Atty

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FIG. 3

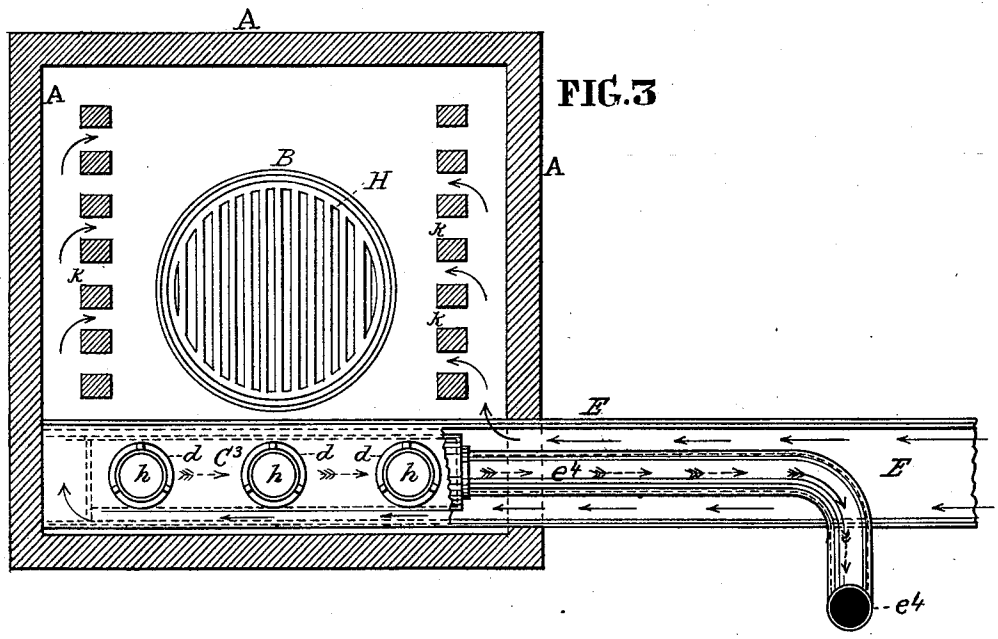
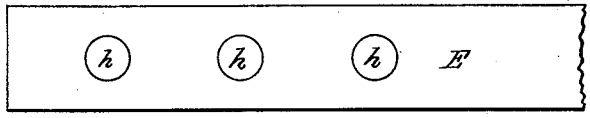


FIG. 4



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN EVANS, OF PHILADELPHIA, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 366,657, dated July 19, 1887.

Application filed March 4, 1886. Serial No. 194,062. (No model.)

To all whom it may concern:

Be it known that I, JOHN EVANS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

The invention consists in the combination and arrangement within an inclosing-casing divided by a horizontal floor into hot and cold air chambers, and provided with openings for the admission of air to support combustion, with smoke-drums forming radiators, a cold-air inlet in the base, within which is the depressed smoke-exit of large and small pipes, as will be more fully understood from the following description and drawings attached thereto.

In the accompanying drawings, which make a part of this specification, Figure 1 is a plan view of my improved furnace with the top of the inclosing-walls forming the hot-air chamber removed. Fig. 2 is an elevation in section with the rear wall of the furnace removed. Fig. 3 is a section taken through the line *x x* of Fig. 2 in the direction of the arrow R. Fig. 4 is a face view of a portion of the upper plate of the air-conductor.

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

A indicates the inclosing-walls of the furnace, divided into hot and cold air chambers by a horizontal floor, having openings to permit of the entrance of air to support combustion, and in which the heater is mounted, with its series of smoke-drums leading to the exit-pipe, forming radiators; B, the central heat-radiating drum, within which in the base is situated the fire-pot and its fire-door *b*. These parts are common in the construction of all furnaces.

C C′ C² are upright cylindrical metallic drums, their lower ends resting upon circular or ring-shaped tripods *d* on the surface of the upper plate of the air-conductor E. The drum C is connected near its upper end to the central radiating-drum, B, by means of the short pipe *e*. The smoke and gas evolved during the process of combustion of the fuel within the fire-pot are caused by the draft carried through the fire, having entrance from the ash-pit opening, from thence through the grate in the customary manner and caused to enter this drum, pass down through it and through the pipe *e′* into the drum C′, whence they are carried upward and into the drum C² through the pipe *e²*, from whence the draft causes them to be carried down, and by means of the connecting-pipe *e³* into and through the horizontal drum C³, from thence into the exit-pipe *e⁴* and into and out of the chimney-flue connected thereto at the outer or extreme end.

E is the air-conductor, constructed of suitable non-heat-conducting material, surrounding the exit-pipe *e⁴* and horizontal drum C³, leaving sufficient space between the drum, exit-pipe, and inner surfaces of its walls for the passage of a current of cold air. This conductor may have its mouth or inlet-opening located at any convenient point upon the exterior wall of a building to permit the entrance therein of air. It is provided with orifices *h* in its upper removable lid or plate immediately beneath each vertical drum. There are also outlet-channels *k* in the base of the inner side walls, through which the main portion of the current of cold air is caused to pass and come into contact with the exterior surface of the fire-pot, thereby absorbing the intense heat therefrom.

The operation of my improved furnace is as follows: Fire having been kindled in the fire-pot H, (seen in Fig. 3,) which is situated in the base of the central heat-radiating drum, B, the smoke and gas evolved from and during the process of combustion of fuel pass from said drum into the pipe *e*, connected to the vertical drum C, and thence through the connected series of drums C C′ C² into and through the horizontal drum C³, from thence into, through, and out of the exit-pipe *e⁴*, connected to said drum, and into a chimney-flue. By reason of the generated heat in the fire-pot radiating through and out of the central drum, B, a current of heated air is caused to ascend within the surrounding chamber of the furnace to the hot-air-exit flues J, consequently drawing air inward from the mouth or inlet-opening of the conductor E, (the course of the current of cold air being indicated by darts,) which passes in a contrary direction to the current of smoke and gas in the exit-flue *e⁴*

and horizontal drum C^3, (the course of this current being indicated by feathered darts,) extracts and absorbs the heat contained therein, a portion of the current of air passing through the orifices *h* in the upper plate of the conductor, extracting the heat from the lower ends of the vertical drums, while the major portion of said current passes through the channels *k*, striking against the wall of the fire-pot, becoming highly heated previous to its exit from the upper part of the furnace through the flues J, and as cold air necessary to create a current into the furnace, from thence into the upper apartments of a building, to be effective in its result can only be brought into a furnace at its base, the smoke and gas must be brought down in order that the heat contained therein may be extracted.

I am aware that a series of connected upright drums connected to a central radiating drum, to provide a large amount of surface to the action of a current of air, have been constructed in a furnace; also, that the exit smoke-pipe has been surrounded by a flue carrying air; but

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

The combination of the inclosing-casing A, divided into a hot-air and a cold-air chamber by a horizontal floor having openings therein to admit air to support combustion, the heater mounted therein, the smoke-drums forming a radiator in the hot-air chamber, the cold-air inlet E in the base of the apparatus, and the depressed smoke-exit composed of large pipe C^3 and the smaller pipe, e^4, located in the air-inlet, substantially in the manner herein shown and described.

JOHN EVANS.

Witnesses:
THOMAS J. BEWLEY,
J. R. MASSEY.