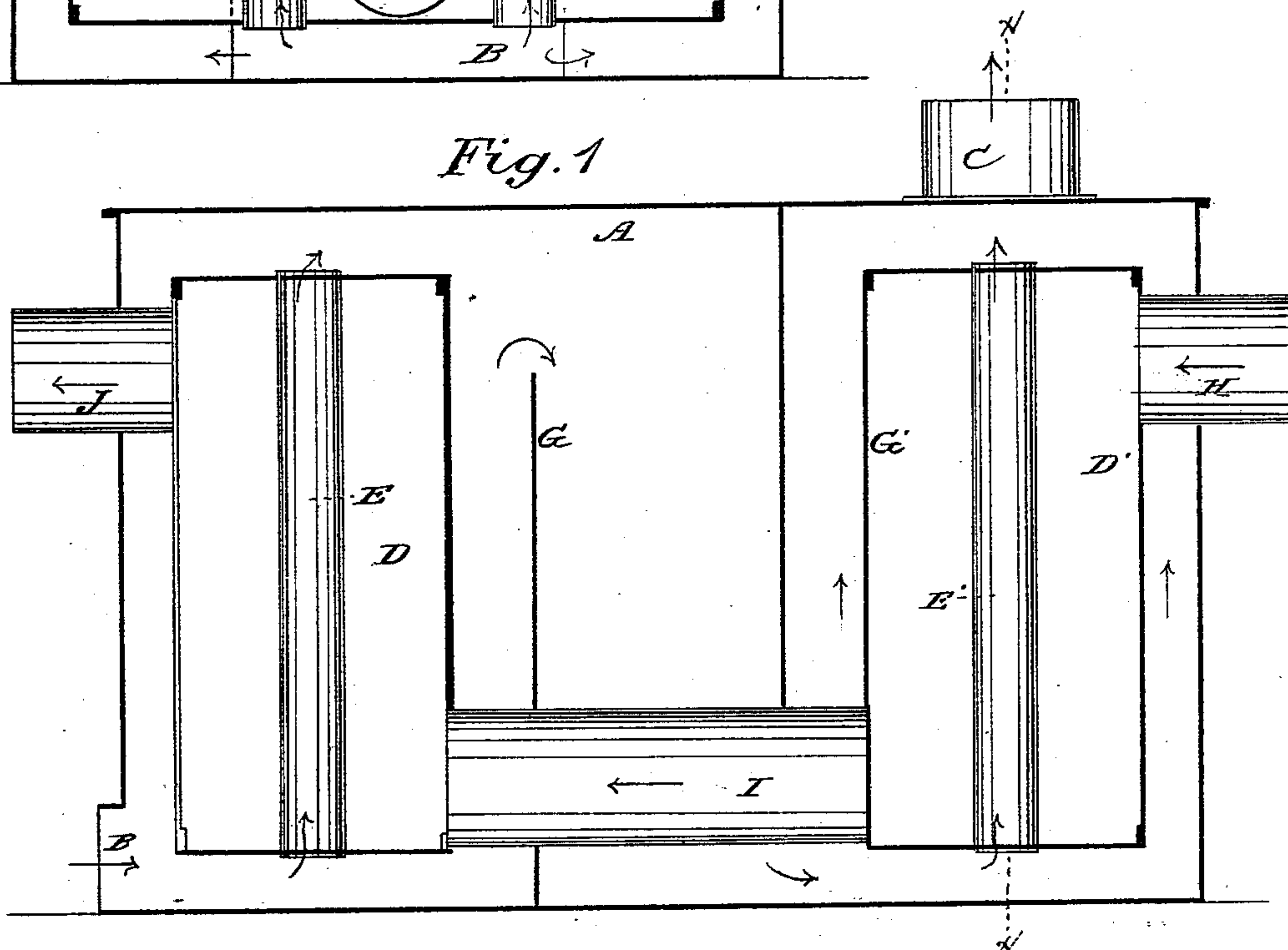
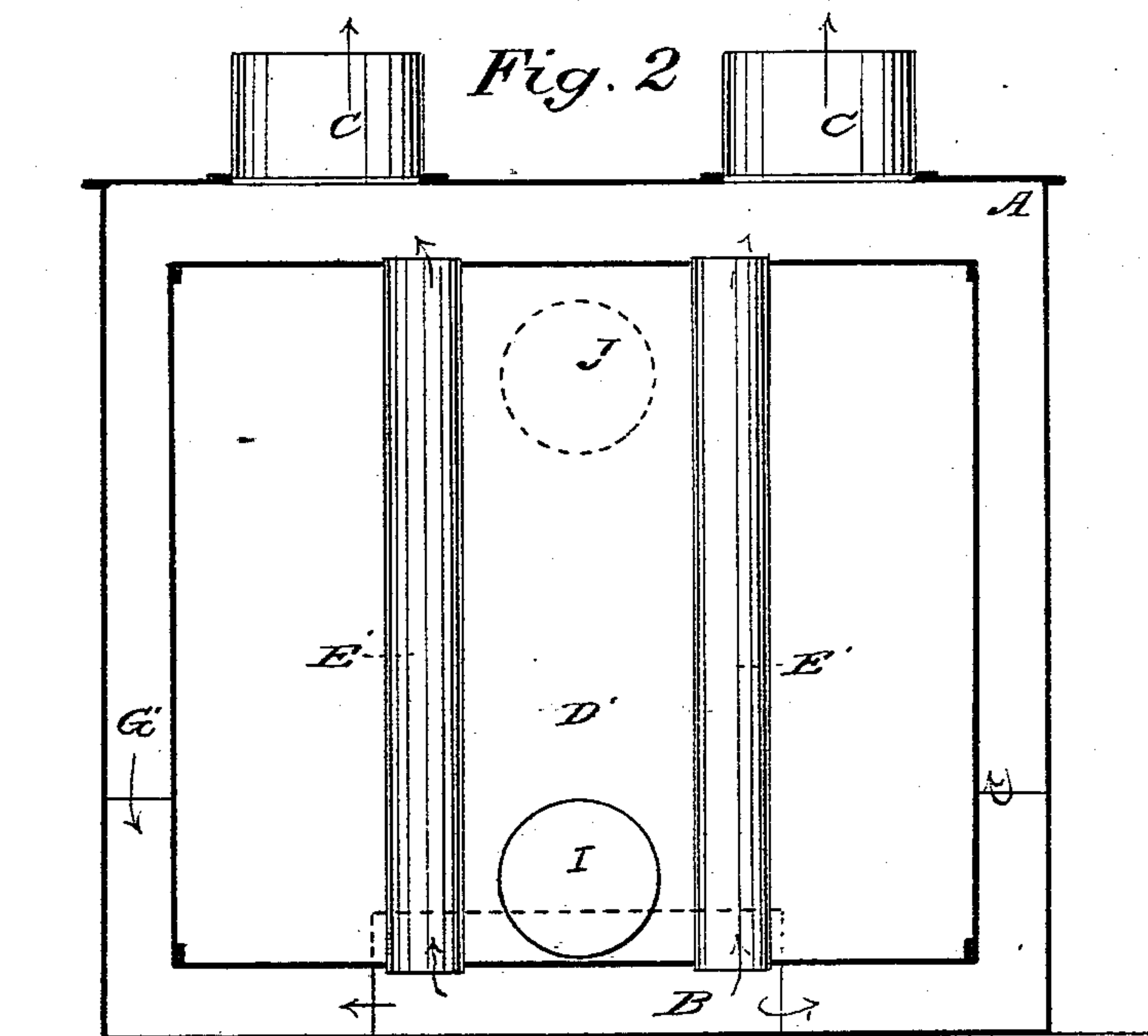


DURYEA & ENNIS.

Heating Drum.

No. 64,293.

Patented April 30, 1867.



Witnesses:

J. W. Coombs  
J. W. Reeds

Inventors:

Wright & Ennis  
William Ennis

# United States Patent Office.

WRIGHT DURYEA. OF GLEN COVE, NEW YORK, AND WILLIAM ENNIS,  
OF HUDSON, NEW JERSEY.

*Letters Patent No. 64,293, dated April 30, 1866.*

## HEATING-DRUM ATTACHMENT FOR FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, WRIGHT DURYEA, of Glen Cove, in the county of Queens, and State of New York, and WILLIAM ENNIS, of Hudson, in the county of Hudson, and State of New Jersey, have invented a certain new and useful Improvement on Air-Heating and Circulating Attachments to Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a vertical longitudinal section of the apparatus constituting our improvement.

Figure 2, a transverse section of the same, taken as denoted by the line *x x* in fig. 1.

Like letters indicate like parts in both figures.

The nature of our invention consists in a novel combination of tubular smoke-boxes, arranged one in advance of the other, within a chamber provided with partitions, and through which and through the tubes in the smoke-boxes, which latter act as radiators, the air to be heated is made to circulate in reverse vertical directions, being first brought in contact with the radiator nearest to the smoke outlet, and after ascending over one partition and descending below another, is finally passed off in an upward direction round and through the smoke-box nearest to the fire, where the heat is greatest, and which by the increased rarefaction there produced creates a suction on the incoming air that prevents all blowing back or failure of the air to circulate; the smoke and heated gases also being made to circulate through the smoke-boxes preferably in reverse vertical directions, in succession or alternately, and entering, to give out the greatest heat, at the upper portion of the last radiating smoke-box, to aid in producing the effect specified as regards suction on the incoming air through that circulating within the apparatus.

Referring to the accompanying drawing, A represents a chamber of any desired size or shape, also of any suitable material, and, if preferred, built in masonry or brick-work. B is the air inlet to said chamber, connecting with the outside atmosphere in any appropriate manner, and C the outlet or outlets thereto for the air, after it has been circulated within the apparatus, to pass or be led off as required for heating a building or other purpose. With this chamber A are arranged any number in succession of smoke-radiating boxes D D', two of which will be sufficient to illustrate the invention. These smoke-boxes are isolated, as it were, to allow of the air circulating round them, and to secure a large and effective radiating surface, and are furthermore provided with any number of tubes E E' for circulation of the air through the boxes. Partitions G G', the one open above and the other below, are arranged across the chamber A, between the smoke-boxes D D'. H is the smoke inlet from the furnace to the rear radiator or box D'. I a lower connecting smoke pipe between the boxes D D', and J the smoke outlet from the advance radiator or box D. Now, it will be observed that air entering at the inlet B is gradually heated by its circulation round and through the radiating smoke-box D, after which it is made to descend over the partition G, then pass from under the partition G', and upwardly through and round the second or rear smoke-box D', after which it may be distributed or conducted by the pipe or pipes C. The air in entering at the end of the apparatus where the smoke makes its exit by the pipe J, and where, of a consequence, less heat prevails than at the opposite or smoke-entry end of the apparatus, combined with its reverse travel in vertical directions, and having wholly an ascent at the hottest end, will be restrained from working back, and a suction or perfect circulation kept up, even though the entry pipe should be exposed to an adverse current of wind, and in this connection it may be mentioned that the superior rarefaction at the air-exit end is not due simply to the length of circulation established through the apparatus, but to the relative arrangement of the courses taken by the smoke and air, the admission of the smoke to the upper portion of the radiating smoke-box D' also aiding in such beneficial effect.

What we claim as our invention, and desire to secure by Letters Patent, is—

The apparatus constructed substantially as described, of tubular radiating smoke-boxes D D', within a chamber, A, partitions G G', and smoke and air inlets and outlets, arranged relatively to each other to establish a circulation through the apparatus, substantially as specified.

WRIGHT DURYEA,  
WILLIAM ENNIS.

Witnesses:

J. W. COOMBS,  
G. W. REED.