(No Model.)

2 Sheets—Sheet 1.

# W. H. RIDDELL.

## HEATING FURNACE.

No. 431,151.

Patented July 1, 1890.

Fig. 3.

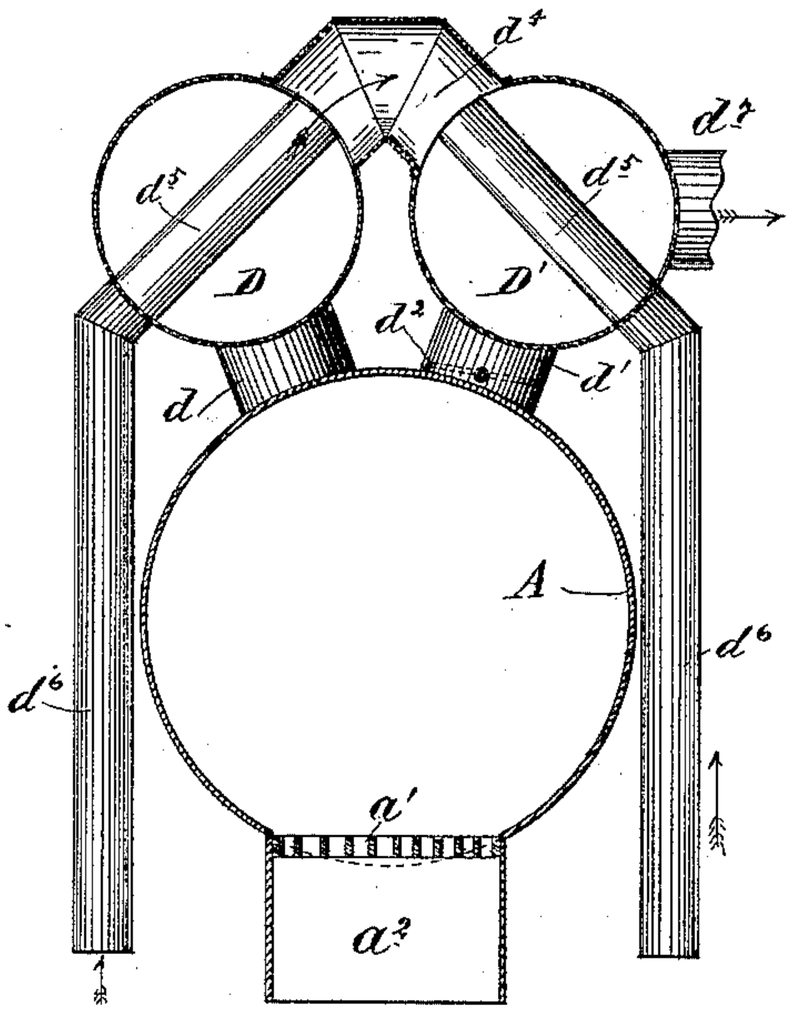



Fig. 1.

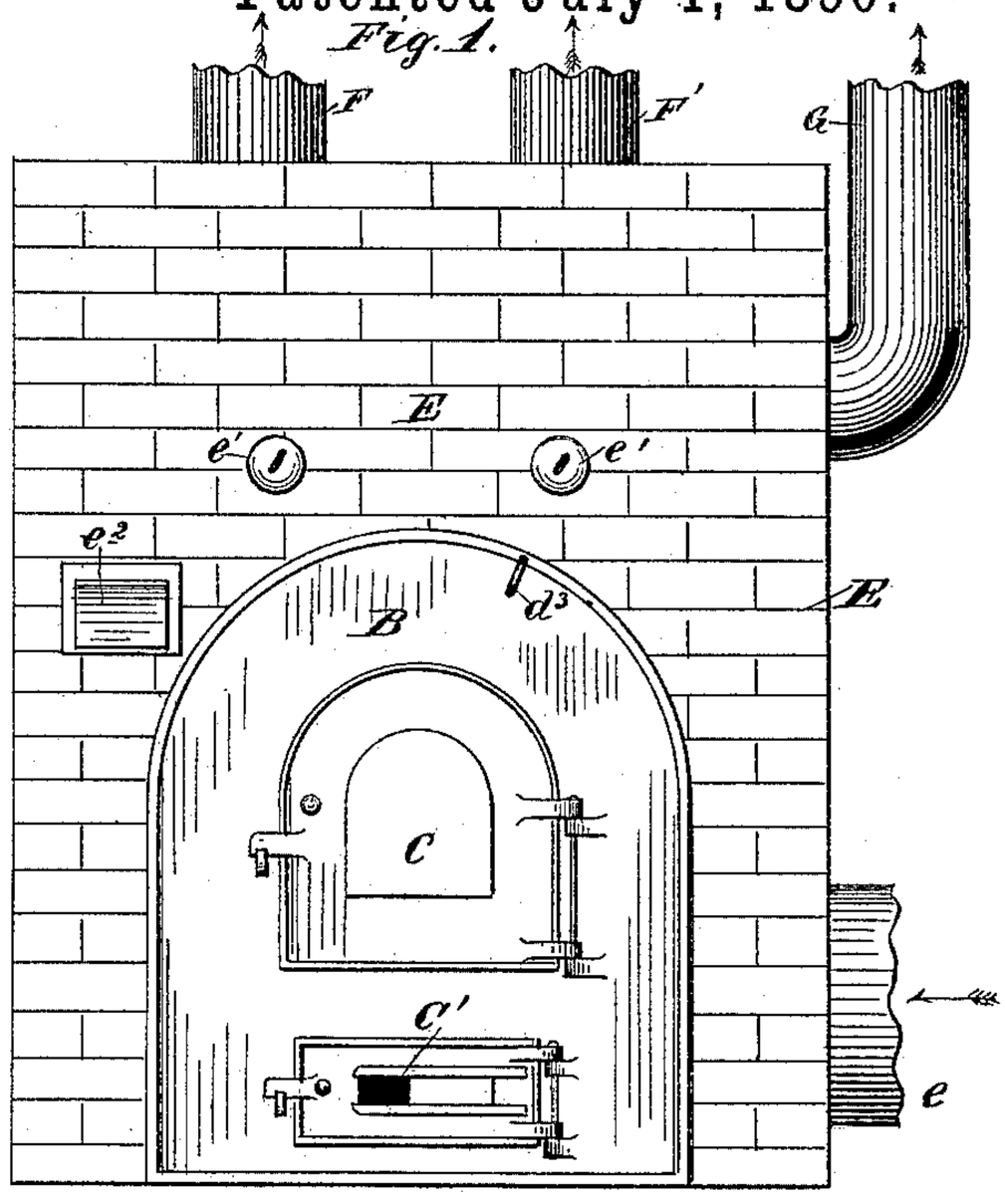
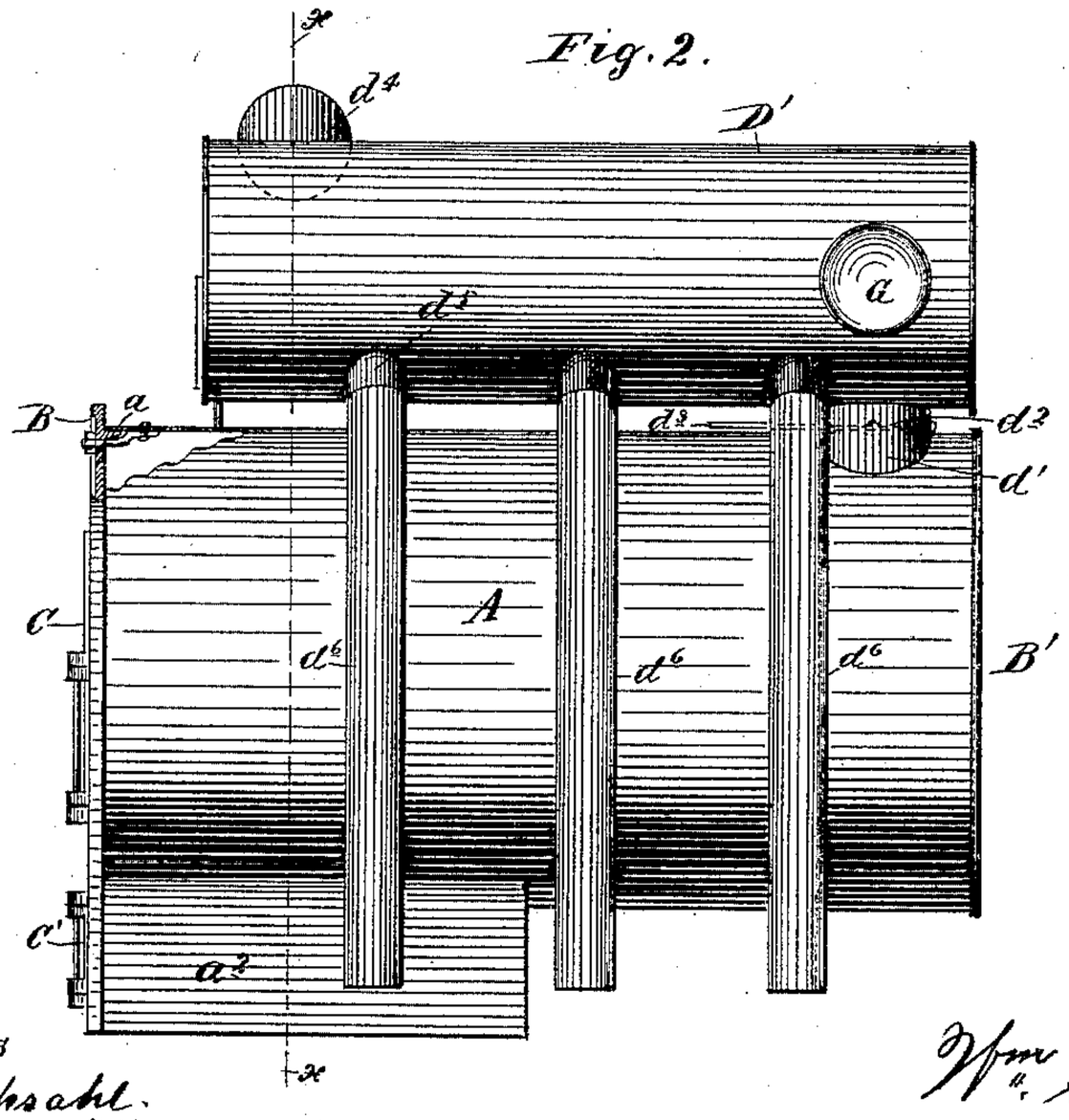



Fig. 2.




Witnesses
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Frank D Merchant.

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By his Attorneys..
Williamson & Blodgett

(No Model.) 2 Sheets—Sheet 2.

# W. H. RIDDELL.

## HEATING FURNACE.

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Fig 4

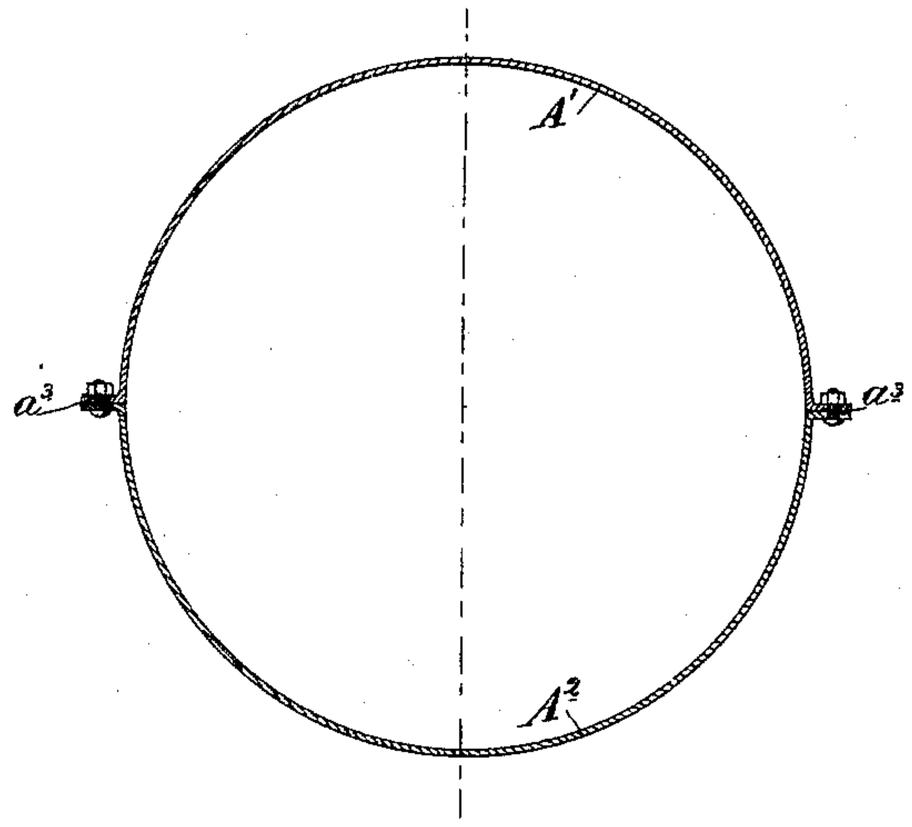
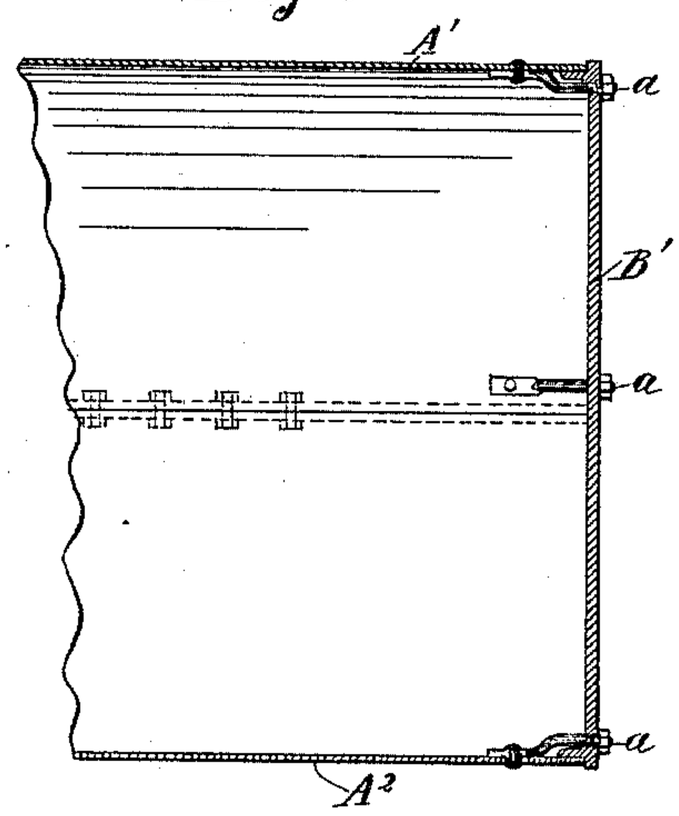



Fig. 5.




Witnesses.
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Frank. D. Merchant.

Inventor.
Wm. H. Riddell,
By his Attorneys.
Williamson & Blodgett

# UNITED STATES PATENT OFFICE.

WILLIAM HENRY RIDDELL, OF NORTHFIELD, MINNESOTA.

## HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 431,151, dated July 1, 1890.

Application filed February 27, 1890. Serial No. 341,983. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY RIDDELL, a citizen of the United States, residing at Northfield, in the county of Rice and State of Minnesota, have invented certain new and useful Improvements in Heating-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to furnaces for heating buildings, and has for its object the provision of means whereby the caloric generated by the combustion of the fuel is more fully utilized to heat the incoming air. With this end in view I mount on top of the furnace a pair of drums, through which the products of combustion pass on their way to the chimney, said drums being connected by a pipe, the elbow or angle of which is so sharp that no soot can lodge therein. Passing through the drums is a series of tubes or passages in communication with fresh-air pipes. The furnace, with its superimposed drums, is inclosed within the usual brick-work case, in the roof of which are pipes for conveying the hot air radiated from the drums and furnace to the various parts of the building. A suitable damper is arranged in the exit-flue of the furnace, and has a stem provided with a handle on its forward end, by which it can be turned to regulate the passage of the products of combustion. By closing this damper all the products of combustion can be made to make the entire circuit of both drums to the exit-pipes, or the damper can be opened and the products allowed to pass equally into the drums or a larger portion into one drum than the other, as required. For convenience of transportation the body of the furnace can be made in sections, secured together by suitable bolts at their flanged edges, and the parts can be packed for shipment by being nested one within the other. Each drum is provided with an opening closed by a door or plug, through which soot or ashes can be removed in the usual manner. Passages are also formed in the outer walls of the brick-work near the bottom, through which air is admitted to the pipes connected to the drums. Bolts having flattened shanks are secured at intervals to the furnace-body and serve to detachably secure the end plates thereto, as will be hereinafter described.

In the accompanying drawings, in which like symbols of reference are placed on like parts throughout the several views, Figure 1 is a front view of the furnace and its surrounding brick-work. Fig. 2 is a side elevation of the invention detached. Fig. 3 is a cross-section on line $x\,x$ of Fig. 2. Fig. 4 is a cross-section, and Fig. 5 a partial longitudinal section, of a furnace-body constructed in two detachable parts connected together at their flanged edges by suitable bolts.

A is the body of the furnace, and $a\,a$ are bolts having flattened ends riveted at intervals apart to the ends thereof.

B B′ are the front and rear end plates, which are perforated to receive the threaded stems of the bolts $a\,a$, and are detachably secured in place by nuts applied thereto.

$a'$ $a^2$ are the usual grate and ash-pit.

C is the door of the furnace, and C′ that of the ash-pit.

D D′ are sheet-iron drums mounted on top of the furnace and in communication by pipes $d\,d'$ with the combustion-chamber thereof.

$d^2$ is a damper in pipe $d'$, operated by a rod passing through the front end plate B and having a handle $d^3$.

$d^4$ is an elbow-pipe connecting the drums D D′, the elbow being so sharp that soot cannot lodge therein.

$d^5$ $d^5$ are passages or tubes extending diagonally through the drums, and $d^6$ $d^6$ are depending pipes for the admission of fresh air, connected to said passages at their upper ends and extending down below the body of the furnace.

$d^7$ is the exit-flue for the products of combustion attached to drum D′.

E is the brick-work casing surrounding the furnace, and $e$ is a fresh-air pipe leading thereto.

F F′ are pipes for conveying the heated air radiated from the drums and furnace-body and contained in the chamber at the top of the surrounding case to the points desired.

G is a pipe connecting with pipe $d^7$ and leading to the chimney.

$e'$ $e'$ are plugs closing ports in the brick work or case E, and $e^2$ is the usual water-pan mounted in the front wall of the brick-work.

In Figs. 3 and 4 the furnace-body is shown as made in two sections $A'$ $A^2$, having flanges $a^3$ $a^3$ on their meeting edges. In virtue of this construction the parts can be nested together for transportation, and if one becomes burned out or unfit for use another can be readily substituted.

As shown, the furnace is adapted for the use of wood or suitable equivalent material as fuel.

The furnace, with its superimposed drums, affords a large radiating-surface, and the cold air admitted through the pipes $d^6$ and passing through the passages in the drums will be quickly heated and will pass through the pipes F F′ to the desired points.

The "knockdown" feature of the furnace is important, as by it the castings and heavy sections of the body can be furnished to local dealers, who will readily put them together and provide their own drums.

What I claim, and desire to secure by Letters Patent, is—

1. A furnace-body, in combination with superimposed drums provided with passages therethrough for incoming air, a series of fresh-air pipes leading to said passages, an elbow connecting one drum with the other, and pipes leading from the furnace-body to the drums, substantially as and for the purpose specified.

2. A furnace comprising a body provided with a grate, a pair of connected drums, pipes for the products of combustion leading from the furnace-body to the drums, an elbow having a sharp angle connecting one drum with the other, a series of passages for incoming air formed in each drum, and a series of fresh-air-supply pipes connected with said passages and extending down on each side of the furnace, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM HENRY RIDDELL.

Witnesses:
R. J. DRAKE,
T. J. DOUGHERTY.