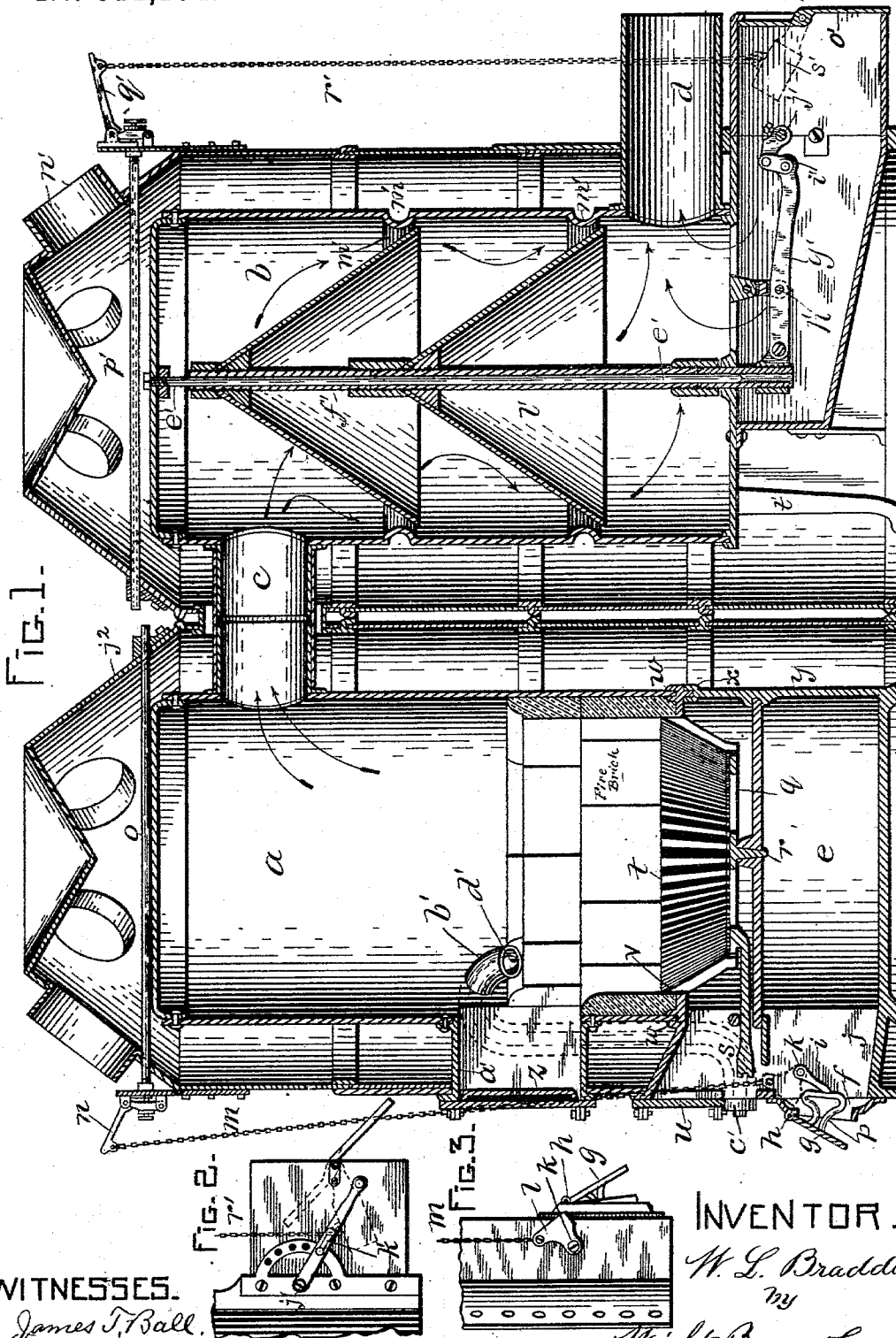


(No Model.).

W. L. BRADDOCK.
FURNACE.

No. 511,194.

Patented Dec. 19, 1893.



WITNESSES.

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UNITED STATES PATENT OFFICE.

WARREN L. BRADDOCK, OF BOSTON, MASSACHUSETTS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 511,194, dated December 19, 1893.

Application filed January 4, 1892. Serial No. 417,004. (No model.)

To all whom it may concern:

Be it known that I, WARREN L. BRADDOCK, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

My invention relates to that kind of furnaces employing two heating cylinders or domes, the fire-pot being arranged in one and the products of combustion passing from or near the top thereof into the top of the other cylinder and out at the bottom of the latter, deflectors being employed in the latter cylinder to deflect the heat to the sides of the cylinder in order that it may be radiated therefrom and carried through pipes to apartments of a dwelling; though portions of the invention may be employed in a single-cylinder furnace, or in furnaces of a different construction from that first mentioned.

It is the object of my invention to provide, first, improvements whereby the fire on the grate may be readily stirred or "poked" at the bottom—that is, at a point directly on top of the supporting grate; second, to provide improvements in means for controlling the air or draft inlet for the regulation of the combustion of the fuel on the grate; third, to provide improved means for igniting and burning the gas on top of the fuel, generated by a low fire; fourth, to provide improvements in means for regulating the draft through the furnace and chimney; fifth, to provide improvements in the construction and arrangement of the check-draft.

To the foregoing ends my invention consists of the improvements which I will now proceed to describe and claim, reference being had to the annexed drawings, and letters marked thereon, forming part of this specification.

Of the said drawings, Figure 1, is a vertical central sectional view of a furnace employing two cylinders or domes equipped with my improvements. Fig. 2, is a detailed view showing the manner of operating the deflectors in the second dome for regulating the draft through the furnace and chimney. Fig. 3, is a detailed side view of the furnace at the ash-pit door.

In the drawings "a" designates one cylinder or dome and "b" a second cylinder, the

two cylinders being connected by a short pipe "c" consisting of a collar connected with each cylinder and a sleeve embracing the two collars, extending and affording communication between the two cylinders near the top thereof, an outlet pipe "d" being provided in the cylinder "b" near the bottom for the escape of the products of combustion.

"e" designates the ash-pit in the bottom of the cylinder "a" to which access is had through a door "f" provided with a supplemental flap door "g" hinged upon door "f" at the point "h."

"i" designates a short arm on the inside of the mouth-piece "j" of the ash-pit, which arm is secured to a pivot "k," on the outer end of which pivot is a weighted lever "l" to which is connected the lower end of a chain, or may be a wire or cord "m," the said chain being connected at its upper end with the outer end of a lever "n" engaged and operated by an expansion rod "o" which extends within the casing "j" so that the heat of the furnace acting upon the said rod and expanding the same may open and close the flap door "g" and thus regulate the draft to the furnace. The arm "i" operates at its free end upon projection "p" connected with the flap door "g," or it may be directly upon the flap door.

"q" designates a flat grate pivoted at a central point as at "r" so that it may be shaken or turned over through the medium of the arm "s" in the usual way.

"t" designates a grate having the form of an inverted frustum of a cone, which grate forms the lower part of the fire-pot, and, as shown in the drawings, extends for nearly its whole depth into the ash-pit "e."

"u" designates a door above the ashpit door "f" whereby access may be had to the frusto-conical grate so that by means of a "poker" or bar, the lower part of the fire on the flat grate "q" may be stirred or poked, as is often necessary. The grate "t" is cast with and forms a part of the bed plate "v," the outer edge of which is provided with double flanges "w" on top and a single flange underneath, the upper flanges affording a seat for the lower edge of the cylinder "a," and the lower flange extending into the cup-joint formed on the upper portion of the ash-pit

wall "y." The upper edge of the grate "t" forms the inner flange for holding the fire-brick in place of which the upper portion of the fire-pot is constructed.

- 5 The fire-pot is provided with the usual door "z" and with the mouth-piece "a'." At one side of the front door "z" and near its top is an air pipe "b'" which enters the cylinder "a" and extends at its inner end down into the fire-pot, its outer portion extending down outside of the cylinder "a" and between the same and the casing below the grate "q" through a hole in the casing to the exterior thereof.
- 10 "c'" designates a gas pipe extending through the air pipe "b'" and provided on its inner edge with a burner "d'." This construction and arrangement of parts are designed to furnish air to the combustion chamber or fire-pot with burner "d'" lighted to aid in the burning of the gases which may be generated by a low fire. As soon as the fire burns up, the gas jet can be shut off as the air pipe "b'" will then take care of the gas from the fire. The products of combustion passing from the cylinder "a" through the pipe "c," enter the cylinder "b" and pass down over the deflectors and escape through the exit flue "d."
- 30 The cylinder "b," which I may term the "radiating" cylinder, can be made of the same diameter as the cylinder "a," or it may be smaller, if desired. Each cylinder may be inclosed by a casing as shown, or both cylinders may be inclosed in a single jacket or case; in the former instance, providing a heater in each jacket; and in the latter, the two heating devices in a single jacket or casing. The said casing may be made of metal or brick, or other material, as desired.
- 40 The radiating cylinder "b" is provided with a rod "e'" arranged at a central point, and fastened to the cylinder at the top by a collar and nut, as shown. The said rod extends down through a sleeve "f'" both passing through the bottom of the cylinder and the sleeve being connected at its lower end with the inner end of a lever "g'" fulcrumed upon a lug "h'" and having its outer end connected by means of a link with a short arm "i'" which is secured to a pivot pin or rod "j'" which constitutes the fulcrum of the lever "k'" on the outside of the casing, the said lever "k'" being arranged as shown in Fig. 2, to be locked in different positions. Connected with the sleeve "f'" are deflectors "l'" made in the form of a cone, the lower outer edges of which extend nearly to the sides of the cylinder "b" which is provided at contiguous points with ribs or beads "m'" which reduce the inner diameter of the cylinder. The said ribs or beads may be formed by securing a ring or bead on the inside of the cylinder, or by indenting or corrugating the cylinder as is represented in Fig. 1, or by otherwise reducing the diameter of the cylinder. The construction and arrangement of

the beads "m'" with respect to the deflectors "l'" are such that by raising the said deflectors through the medium of the lever "k'" and its connections with the sleeve "f'," the lower edges of the said deflectors will be brought into close proximity with the beads and thus close the space for exit or passage of the products of combustion through the cylinder "b," pipe "d," and when the said deflectors are lowered, to open or increase such passage or space, the space between their lower edges and the inside surface of the cylinder will be a little more than is afforded by exit pipe "d" in square inches, and when the said deflectors are raised, the said space will be less in square inches than that afforded by the pipe "d." This construction and arrangement of parts have for their object the provision of means whereby a furnace may be readily and nicely adjusted to suit chimneys of varying draft, and to secure a deflection of the heat to the sides of the cylinder. The space between the lower edges of the deflectors and the cylinder, being equal all around, the heat will be regularly or evenly distributed over the inner surface of the cylinder.

"o'" designates the cold-air-damper or check-draft constructed as a flap door to an opening in the lower part of a casing below the cylinder "b" through which door cold air may be admitted into the bottom of cylinder "b" and pass through the pipe "d."

"p'" is an expansion rod arranged in the casing of cylinder "b" and extends out and acts upon a lever "q'" with the outer end of which is connected a chain "r'" fastened at its lower end to a weighted lever "s'" connected with the pivot or hinge of the check-draft door "o'" so that as the heat in cylinder "b" increases and expands, the rod "p," the lever "q," and the chain "r" will be operated to open and close the check-draft door "o'."

I prefer to form the check-draft as shown, for the reason that the nearer to the cylinder of the furnace that it can be brought the better it subserves the purpose of its construction.

It is obvious that the cylinder "b" and its adjuncts might be removed and the pipe for the escape of the products of combustion connected with the pipe or collar "c," and having therein the deflectors and check-draft, so that the cylinder "a," its casing and other connections could be used alone as a heating furnace.

The cylinder "b" may rest upon suitable legs "f'" or other supports. As is shown in Fig. 1, the casing providing for an air inlet through the check-draft and the base of the cylinder, may afford a partial support for the latter. It is necessary that the connection of the check-draft casing with the cylinder should be air-tight, as is represented, in order that gas and smoke may not escape from the cylinder and be carried through the pipes "n'."

Having thus described the nature of my in-

vention and explained one way of making and using the same, I declare that what I claim is—

1. A furnace comprising in its construction, 5 a flat or supporting grate, and a grate of frusto-conical form above the supporting grate, and having an outwardly extending web or bed plate near its upper edge, as set forth.

2. A furnace comprising in its construction 10 an air-inlet pipe leading from the exterior of the furnace to the interior in the upper part of the fire pot, and a gas pipe similarly arranged and terminating with a burner at the interior termination of the air-inlet pipe, as 15 set forth.

3. A furnace comprising in its construction a heating cylinder having its interior diameter reduced at certain points as described in combination with heat deflectors constructed 20 in the form of cones movable vertically in the cylinder; the sides of said cones being in a plane with the said reduced portions and lower portions of said cones being arranged to be moved into proximity with and away from 25 the said reduced portions of the cylinder, as set forth.

4. The combination with the cylinder "b" provided with the indentations or ribs "m" of the vertical movable heat deflecting cones "l" arranged in the cylinder with their lower edges in proximity to the said ribs and with their sides in the same plane with said ribs, as set forth.

5. The combination with the cylinder "b" the inlet and outlet pipes, and its casing, of a 35 check-draft arranged in the casing communicating with the outlet pipe through the bottom of the cylinder, as set forth.

6. The combination with the heating cylinder, the outlet pipe, and, the furnace casing, 40 of a check-draft arranged in the casing and communicating with the outlet pipe at a point adjacent to its connection with the heating cylinder, as set forth.

In testimony whereof I have signed my 45 name to this specification, in the presence of two subscribing witnesses, this 7th day of November, A. D. 1891.

WARREN L. BRADDOCK.

Witnesses:

ARTHUR W. CROSSLEY,
A. D. HARRISON.