

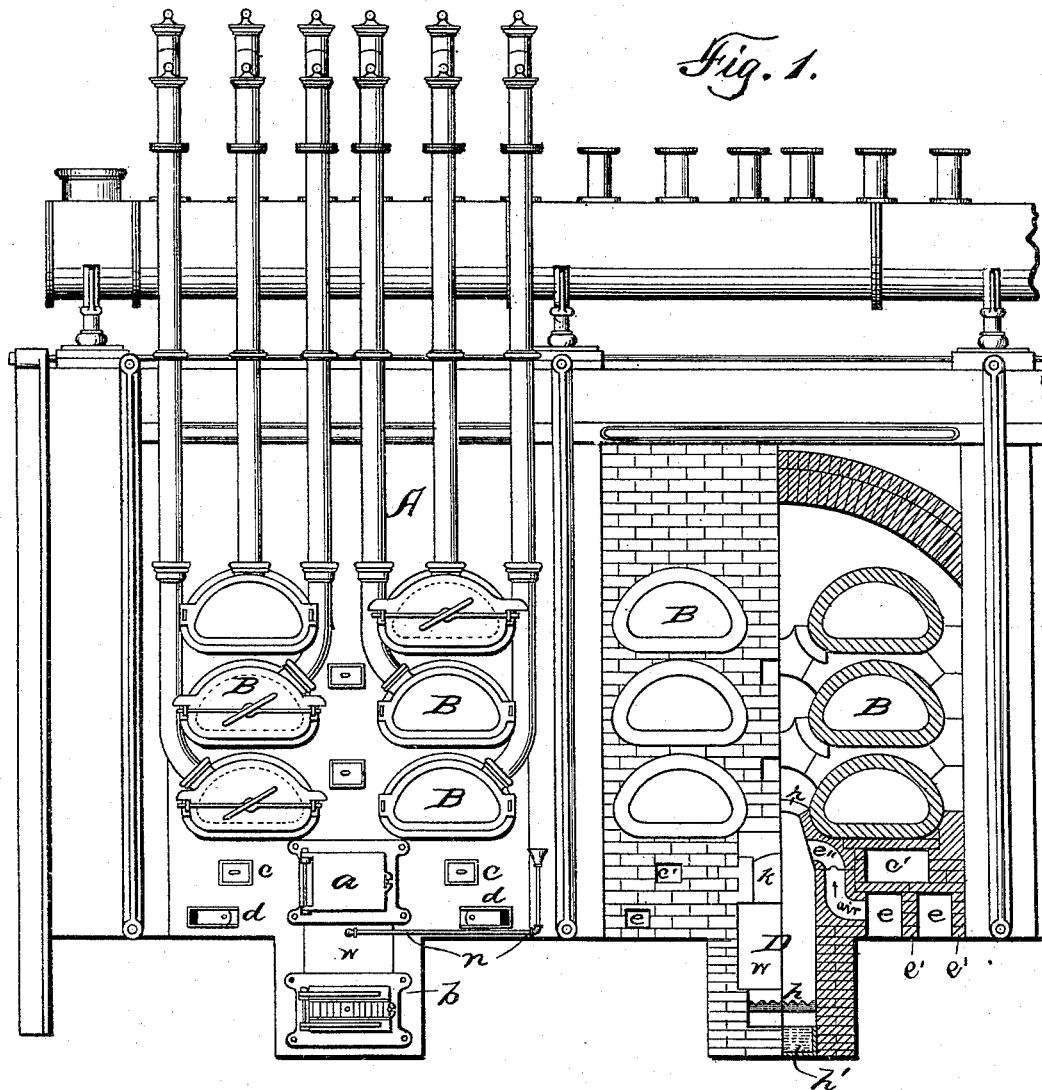
(No Model.)

3 Sheets—Sheet 1.

J. H. TUFFS.
GAS FURNACE.

No. 492,367.

Patented Feb. 21, 1893.



WITNESSES:
H. A. Carhart
C. B. Kinne.

John H. Truffs
INVENTOR.
BY
Smith & Benson
ATTORNEYS.

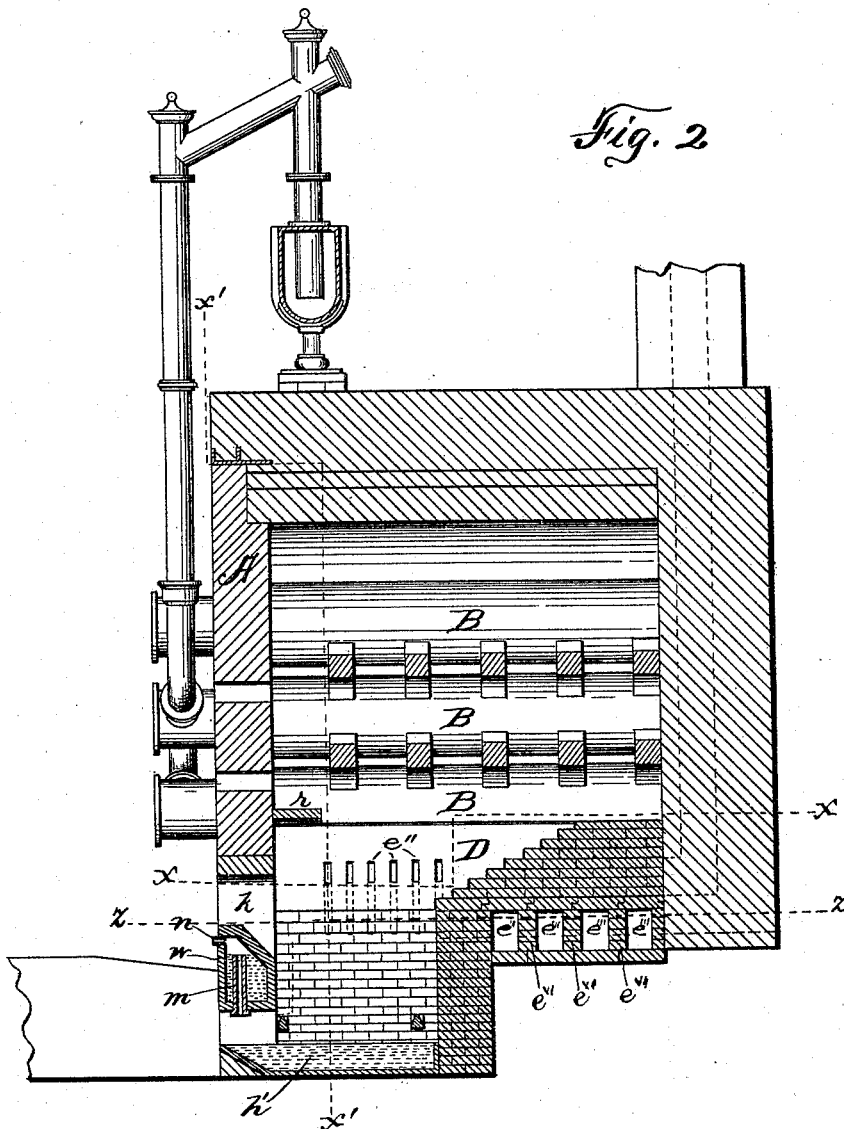
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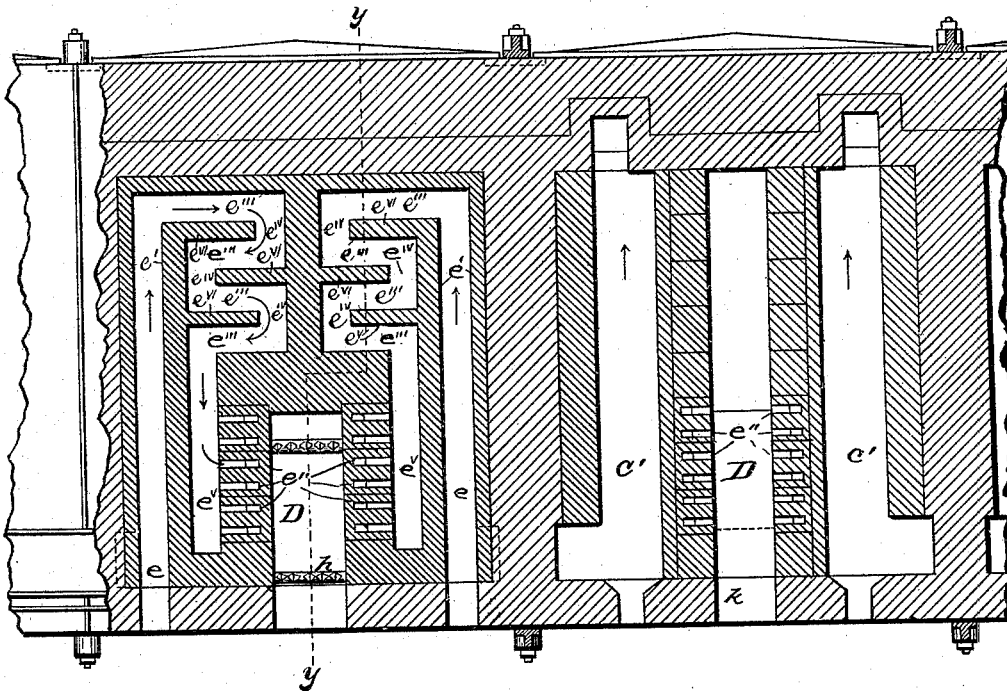
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN H. TUFFS, OF SYRACUSE, NEW YORK, ASSIGNOR OF ONE-HALF TO
AUSTIN C. WOOD, OF SAME PLACE.

GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 492,367, dated February 21, 1893.

Application filed April 1, 1892. Serial No. 427,325. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. TUFFS, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful
5 Improvements in Gas-Furnaces, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to gas furnaces, and
10 my object is to provide improved means for automatically supplying hot water to the ash-pan, and steam to the fire, such steam being supplied below the grate, and fully and evenly distributed through and in the fire, so that
15 the benefits derived therefrom are uniform throughout the fire and combustion chamber.

It consists in the several novel features of construction and operation hereinafter described and which are specifically set forth
20 in the claims hereunto annexed.

It is constructed as follows, reference being had to the accompanying drawings, in which

Figure 1, is a combined front and transversely and vertically sectional elevation
25 showing on the left, the front of the bench and retorts with part of the covers secured thereon showing near the center, part of the front of the bench and furnace removed, and on the right showing a vertical transverse section of part of the furnace, retorts and combustion chamber and ash-pit. Fig. 2, is a vertical longitudinal section of a furnace complete, with the furnace door omitted, on line
30 *y y*, Fig. 3. Fig. 3, shows on the left a transverse horizontal section on the line *z z*, Fig. 2, and on the right a like section on line *x x*, Fig. 2, in a plane higher than that of the section on the left.

A—, is the front provided with the feed
40 door —*a*—, the ash-pit door —*b*—, the stoppers —*c*—, the clean-out openings for the flues —*c'*— (Fig. 3) for the waste gases, and with the slides —*d*— which regulate the flow of air into the flues —*e*— for the secondary draft.
45 These flues —*c'*— are the ordinary rearward, extending take-off flues created by the laying up of the brickwork are connected to the combustion, or retort, chamber by a passage (not shown) and as shown by the dotted lines in
50 Fig. 2, merge into and pass up through the chimney, shown on the upper right hand cor-

ner. They conduct the products of combustion and waste gases through the brick-work, and to the chimney, thereby utilizing much, otherwise wasted, heat by heating the secondary draft flues —*e*—.

B— B—, are the retorts set in benches in the furnace arch in the usual manner.

D—, is the fire-pot or fuel chamber, provided with a grate —*h*— of ordinary construction, and a water pan —*h'*— in the ash-pit below the grate.

The secondary draft flues by means of the vertical walls —*e'*— are extended clear back to the back of the furnace, and then by means
65 of the rear wall and the short alternating vertical partitions *e^{vi}* are made zigzag and conducted to the front, and thence by the lateral goose-neck or doubly curved discharge flues —*e''*— open into the combustion chamber
70 above the fire. These flues consist of longitudinal outer flues *e* extending from the front to the rear of the furnace, the transverse rear flues *e'''* the short longitudinal rear flues *e^{iv}* and the longitudinal inner flues *e^v* extending
75 toward the front of the furnace. These flues are wholly contained within the brick-work constituting the base of the furnace, and are highly heated by the heat absorbed by said brick-work, so that when the secondary draft-
80 air is discharged into the combustion chamber, it will readily combine with the gases of combustion. The longitudinal short flues and the transverse flues being located in the base of the furnace, in the brickwork at the rear
85 of the fire-chamber, I utilize the heat contained in the mass of brickwork beneath the outlet of the combustion chamber. In the front and just below the fuel opening —*k*—,
90 I place a water chamber —*w*— of substantially the form shown in cross section in Fig. 2, constituting the front of the fire-chamber, and the bottom of the feed-doorway, and is heated by the contact of the fuel with its inner vertical and inclined wall. An overflow
95 pipe —*m*— is also provided, by which the water is fed down into the ash-pit water-pan, by which the water is maintained in the chamber at substantially a uniform level, and by which the steam generated in the chamber is
100 conducted into the ash-pit, and together with that generated from the water-pan, is con-

ducted through the grate into the fire, as an aid to combustion. An inlet pipe —*n*— supplies the water to said chamber. A deflecting plate —*r*— across the front of the top of the combustion chamber, prevents the gases of combustion from passing up along the front of the furnace. By this arrangement of a water chamber heated directly by the fire, in conjunction with the water-pan in the ash-pit, I insure an even and uniform supply to the fire of all of the steam which is essential as an aid to combustion, keep the chamber supplied with water and also the ash-pit pan. Also by this arrangement of the secondary draft flues, I save many brick and much expense in the construction of the base, utilize heretofore waste space, utilize heretofore wasted heat, and present the air in a superheated condition to the combustion chamber, and by the goose-neck discharge openings I am enabled to discharge the air into the gases of combustion, above the fire, though these secondary draft flues are substantially below the top of the fire; and also these flues with their upward discharge possess a positive

draft; and further they cannot be clogged, or interfered with in any manner by the coal or ashes. On account of all of these respective and co-operating functions, by my invention the utility of the furnace is very much increased, and much better results obtained, through the more speedy coking of the coal and the saving of fuel.

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

A gas furnace comprising a combined water and ash-pan beneath the fire pot, the water tank *w* forming the front vertical wall of the fire-chamber, and the inclined bottom of the feed-door opening or way, having a combined overflow and steam pipe located therein, over and discharging onto the pan beneath; substantially as described.

In witness whereof I have hereunto set my hand this 29th day of March, 1892.

JOHN H. TUFFS.

In presence of—

JOEL G. JUSTIN,
HOWARD P. DENISON.