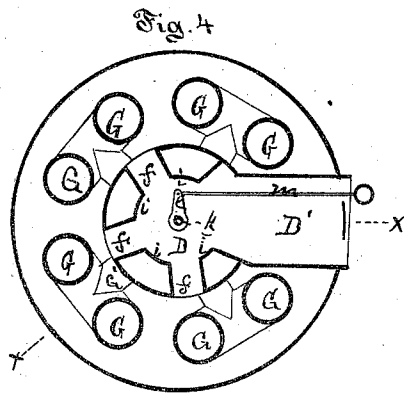
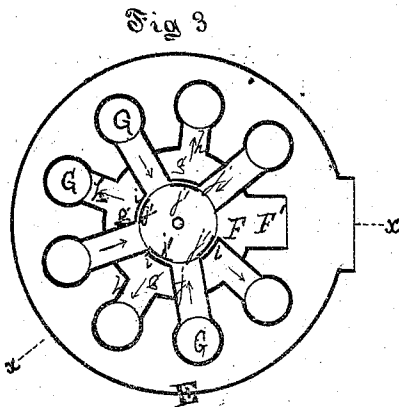
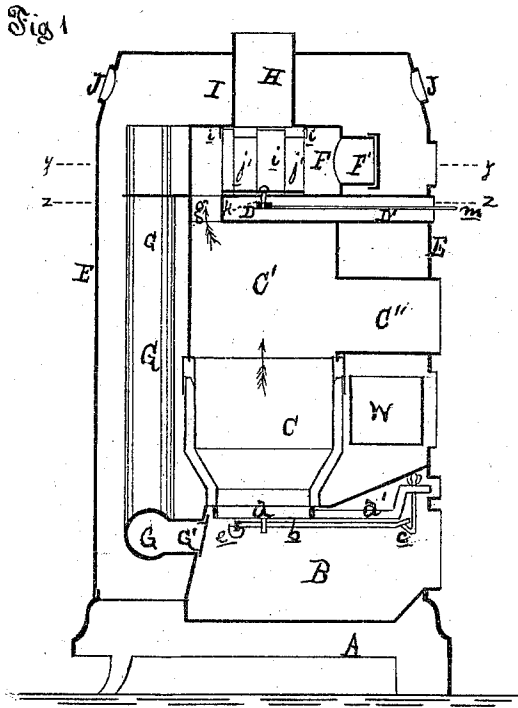


W. T. POWELL & R. F. BROWN.

Hot-Air Furnace.

No. 130,595.

Patented Aug. 20, 1872.



Witness
N. S. Sprague
H. F. Sheet.

Inventors
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By Atty of
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UNITED STATES PATENT OFFICE.

WILLIAM T. POWELL AND ROYAL F. BROWN, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 130,595, dated August 20, 1872.

To whom it may concern:

Be it known that we, WILLIAM T. POWELL and ROYAL F. BROWN, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Hot-Air Furnaces; and we do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon and being a part of this specification, in which—

Figure 1 represents a vertical section of the heater on the plane xx in Fig. 3. Fig. 2 is an elevation of one of the U-shaped flues. Fig. 3 is a horizontal section of the heater on the plane yy in Fig. 1; and Fig. 4 is a horizontal section on the plane zz in the same figure.

Like letters refer like parts in each figure.

The nature of this invention relates to an improvement in the construction of air-heating furnaces; and has for its object to so arrange the flues and passages as to keep the heated currents and gases of combustion in them until all the available heat is extracted and imparted to the fresh-air currents passing around the stove or heater inside of its shell or jacket. The invention consists in the peculiar form of the flues, and their arrangement with relation to the combustion-chamber at one end and with the smoke-box at the other; in the peculiar construction of the passages in the smoke-box and combustion-chamber from and to the flues, with an annular register or damper so arranged that the draft is reverted to pass down the leg of a flue and return up through the other leg; also, in the general construction and arrangement of the various parts, as more fully hereinafter set forth.

In the drawing, A represents the base of our heater, open, except where the ash-pit B in a circular opening in which, at the back, the grate a is pivoted in a supporting-bar, b , the outer end of which is sustained by a bale, c , hooked in lugs cast in the side walls of the ash-pit. The grate is circular in form, and is cast with a lever, a' , extending to the front of the ash-pit, by which lever it may be oscillated or shaken in a horizontal direction. The back end of the bar b is T-shaped, and has its arms pivoted in brackets e in the back part of the side walls of the ash-pit, so that by unhooking the bale, the grate and support may be

tilted down at the forward side to allow the clinkers on the grate to be removed. Above the grate is placed the fire-pot C, and over it a combustion-chamber, C', into which a passage, C'', leads from the exterior (to be closed by a door) for the introduction of fuel. On top of this combustion-chamber we place a flat circular box, D, with a passage, D', extending to the front and through the casing E of the furnace. The circular box has a series of radial air-passages, f , leading from its interior through the outer wall of the upper part of the combustion-chamber. The spaces between these passages f allow the products of combustion to pass up into the smoke-box F, which surmounts the combustion-chamber, the said spaces being shown at g , Figs. 1 and 3. From the spaces g radial passages h are carried outwardly from the smoke-box, as seen in Fig. 3. i is a cylindrical smoke-chamber within the smoke-box, and has a series of vertical slots, from which return-flue passages j radiate outwardly. Within the chamber i is a cylindrical register, j' , composed of vertical segments rising from the periphery of a disk which is pivoted within the chamber by a shaft, k , which passes through the top plate of the chamber D, and provided with a crank, l , to which is attached a damper-rod, m , which extends outwardly from the front end of the chamber D', by which the register j' may be rotated to open or close the passages j . G are U-shaped flues, suspended from and communicating with the passages h and j . H is the smoke-pipe, leading from the smoke-chamber through the hot-air chamber, which is provided with the usual hot-air ducts J J, &c. F' is a capped flue opening into the front side of the smoke-box, through which access is had to its interior to remove accumulations of dust and ashes, an opening being made in the casing opposite the flue for the purpose. G' is a lateral pipe from the bend of each flue G, opening into the ash-pit, where it is fitted with a cap, as seen in Fig. 1, by removing which cap the flue may be emptied of any deposit settling in the bend.

The heated currents rise from the combustion-chamber through the passages g into the smoke-box, where they are cut off from the smoke-chamber i by the walls of the return-passages j , which are partitions, compelling the currents to pass down one leg of the flue

to the bottom, and rise through the other, as indicated by the arrows in Fig. 3; thence going through the passages *j* into the smoke-chamber *i*, and escaping through the pipe H, thus warming a large volume of air passing up inside the shell, in contact with these flues, the fire-pot, combustion-chamber, and smoke-box.

As the top and bottom plates of the chamber D are exposed to a high degree of heat, which, unchecked, would in time burn them out, especially the latter, which forms the top of the combustion-chamber, we avoid this result and utilize their surfaces by allowing fresh air to freely flow into the chamber D' and out through the passages *f* to join the rising currents of warmed air, and to pass with them into the hot-air chamber I, to be distributed through the ducts J.

It will be seen that the entire surface of metal above the base-plate is available for the transmission of heat to the air-currents passing up, which makes this a powerful but economical heater.

Within the casing, below the feed-chute C'' and above the ash-pit, we place a water-reser-

voir, W, in which may be evaporated a sufficient amount of water to give the warmed air the requisite amount of moisture.

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

1. The arrangement within the smoke-box F of the partitional smoke-box *i* and cylindrical register *j'*, as and for the purpose set forth.

2. The intermediate air-chamber D D', and passages *f*, placed between the combustion-chamber and smoke-box, as shown and set forth.

3. The herein-described air-heating furnace having the base A, ash-pit B, fire-pot C, combustion-chamber C', air-chamber D D', smoke-box F, smoke-chamber *i*, pipe H, cylindrical register *j'*, passages *g h j*, register-shaft *k*, crank *l*, and rod *m*, the U-shaped flues G and casing E, constructed, arranged, and operating substantially as described and shown.

WILLIAM T. POWELL.
ROYAL F. BROWN.

Witnesses:

WM. H. LOTZ,
GEO. FERRIS.