

No. 646,996.

Patented Apr. 10, 1900.

J. W. JOHNSON.  
FURNACE OR RADIATOR.

(No Model.)

(Application filed Jan. 29, 1900.)

2 Sheets—Sheet 1.

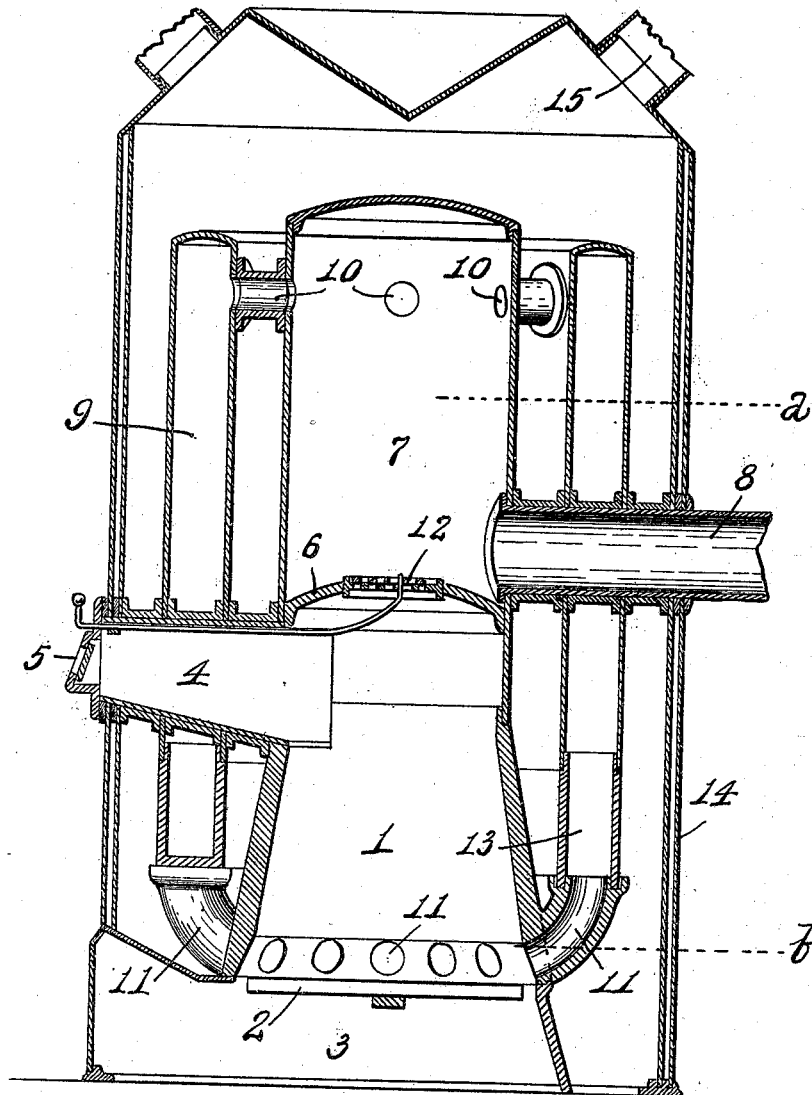


FIG. 1.

Witnesses:  
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*M. S. Filden.*

*Joseph W. Johnson*  
Inventor  
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Attorney

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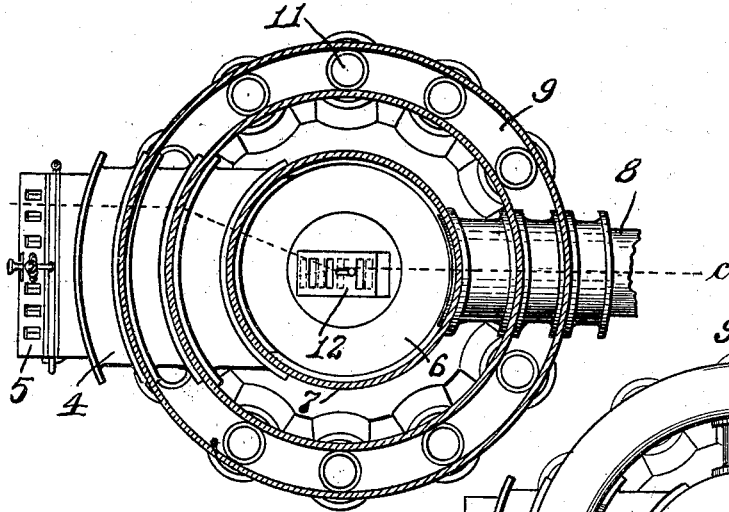


FIG. 3.

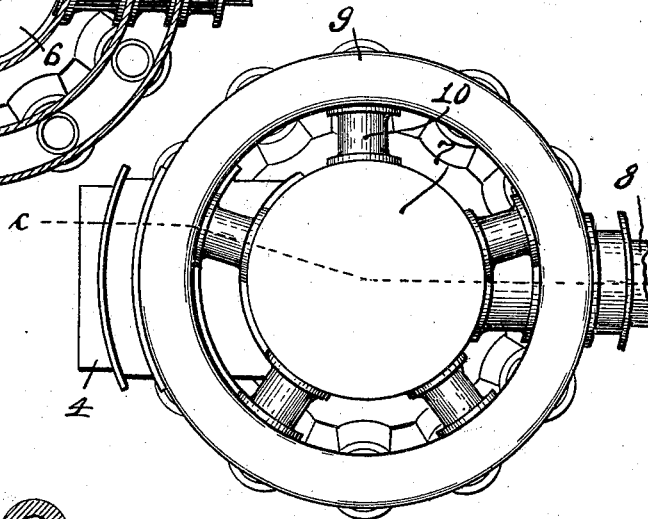


FIG. 2.

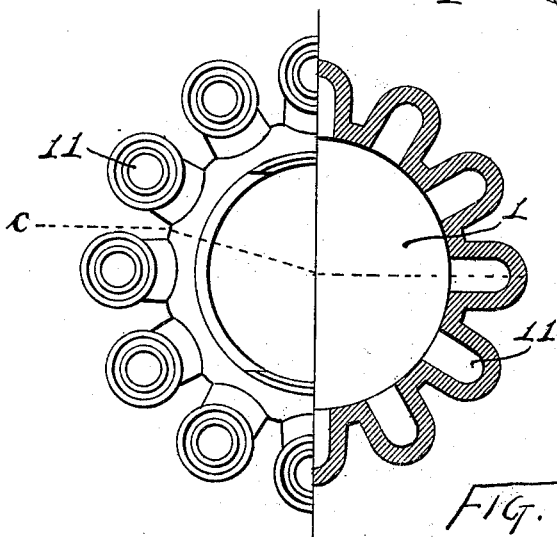


FIG. 4.

Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOSEPH W. JOHNSON, OF HARTWELL, OHIO, ASSIGNOR OF ONE-THIRD TO  
ABRAM ROTHWELL, OF HAMILTON, OHIO.

## FURNACE OR RADIATOR.

SPECIFICATION forming part of Letters Patent No. 646,996, dated April 10, 1900.

Application filed January 29, 1900. Serial No. 3,095. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH W. JOHNSON, of Hartwell, Hamilton county, Ohio, (post-office address Hartwell, Ohio,) have invented certain new and useful Improvements in Furnaces or Radiators, of which the following is a specification.

This invention, relating to improvements in furnaces or radiators, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical section in the plane of line *c* of the other figures of a structure employing my invention in the form of a furnace—that is to say, a radiator provided with a casing; Fig. 2, a plan of the same without the casing; Fig. 3, a horizontal section in the plane of line *a* of Fig. 1 of the structure without the casing; and Fig. 4, a plan of the fire-pot casting, half appearing in horizontal section in the plane of line *b* of Fig. 1.

In the drawings, 1 indicates the fire-pot; 2, the grate at the base thereof; 3, the ash-pit; 4, the feed-nozzle projecting outwardly, as usual, from the upper portion of the fire-pot; 5, the feed-door at the outer end of the feed-nozzle, this door being provided with a register for the admission of air to the fire-pot; 6, the roof of the fire-pot; 7, a radiating-chamber disposed over the fire-pot; 8, the smoke-pipe, leading outwardly from the base of radiating-chamber 7; 9, an annular radiating-chamber concentrically surrounding radiating-chamber 7 and the fire-box, a free annular space being provided between the inner wall of chamber 9 and the fire-box and radiating-chamber 7; 10, a circumferential series of radial flues, placing the upper portion of radiating-chamber 7 in communication with the upper portion of annular radiating-chamber 9; 11, a circumferential series of radial flues, placing the lower portion of the fire-pot in communication with the lower portion of annular radiating-chamber 9; 12, a direct-draft damper in roof 6 of the fire-pot, serving when open to place the fire-pot in comparatively-direct communication with smoke-pipe 8, this damper being arranged for operation by external handle, as usual with direct-draft dampers; 13, the base portion of annular ra-

diating-chamber 9; 14, the usual casing employed in furnace construction, and 15 the usual furnace-pipes for conveying the heated air from the casing to the points where wanted.

Normally direct-draft damper 12 is closed and the air-openings in feed-door 5 more or less open, under which condition air for combustion enters above the fuel in the fire-pot, passes down through the same, radiates in all directions from the base of the fuel through flues 11 and enters annular radiator 9, passes up the latter, passes therefrom in all directions inwardly to top of central radiator 7, passes down the latter, and thence out at smoke-pipe 8, the products of combustion thus moving outwardly from the fire in an evenly-distributed circumferential series of streams and later moving inwardly to radiator 7 in an evenly-distributed circumferential series of streams. Heat is radiated outwardly from the fire-pot from radiating-chamber 7 and from annular radiating-chamber 9, and heat is radiated inwardly from annular radiating-chamber 9. The uprising current of air to be heated passes along the exterior wall of annular radiating-chamber 9 and passes up in the space between the inner wall of that chamber and the walls of the fire-pot and inner radiating-chamber 7, the current passing up through the annular space also receiving heat radiated from the connecting-flues 10 and 11.

For furnace use the air for heating enters the casing as usual and is directed by the casing as usual to more direct contact with the radiating-surfaces of the structure and is conducted away by the furnace-pipes, as usual. For exposed radiator use the casing will of course be omitted.

As mere features of construction it may be mentioned that my preference is to cast the fire-pot 1 with the flues 11 formed integrally with it, to form the base 13 of annular radiating-chamber 9 of cast-iron jointed to the outer extremities of flues 11, to form the upper or remaining portion of annular radiating-chamber 9 of sheet metal jointed to the cast base portion 13, to form central radiating-chamber 7 of sheet metal and prolong its shell downwardly below fire-pot roof 6 to join the top of the fire-pot and to form radial flues

10 with end flanges to join the central and annular radiating-chambers. The formation of the joints may follow any ordinary or suitable construction.

5 I claim as my invention—

1. In a furnace or radiator, the combination, substantially as set forth, of a fire-pot provided with a grate and with a feed-opening for fuel and air, a central radiating-chamber disposed above the fire-pot, an annular radiating-chamber surrounding said central radiating-chamber at a distance therefrom so as to leave a vertical annular air-passage between the walls of the two chambers, a smoke-pipe leading from the base of said central radiating-chamber, a circumferential series of flues placing the fire-pot in communication with the base of said annular radiating-chamber, and a circumferential series of radial flues placing the upper portion of said central radiating-chamber in communication with the upper portion of said annular radiating-chamber.

2. In a furnace or radiator, the combination, substantially as set forth, of a fire-pot provided with a grate and with a feed-opening for fuel and air, a central radiating-chamber disposed over said fire-pot and having its floor forming the roof of the fire-pot, an annular radiating-chamber surrounding said fire-pot and central radiating-chamber at a distance from them so as to form a vertical annular air-passage, a smoke-pipe connected with the base of said central radiating-chamber, a circumferential series of radial flues connecting the fire-pot with the base of the annular chamber, and a circumferential series of radial flues connecting the upper portion of the central radiating-chamber with the upper portion of the annular radiating-chamber.

JOSEPH W. JOHNSON.

Witnesses:

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