

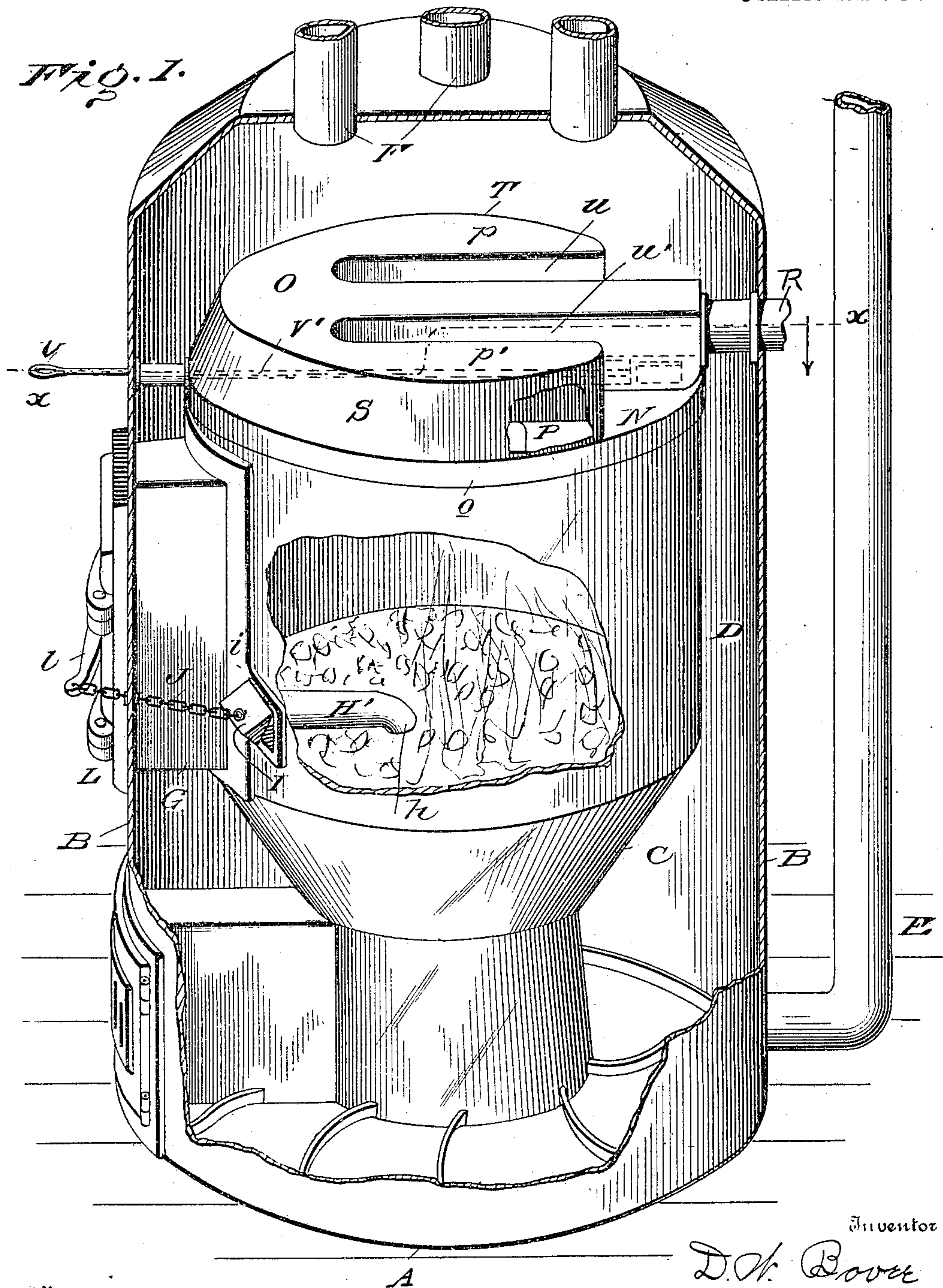
No. 819,632.

PATENTED MAY 1, 1906.

D. W. BOVEE.
FURNACE.

APPLICATION FILED DEC. 30, 1904.

2 SHEETS—SHEET 1.



Witnesses
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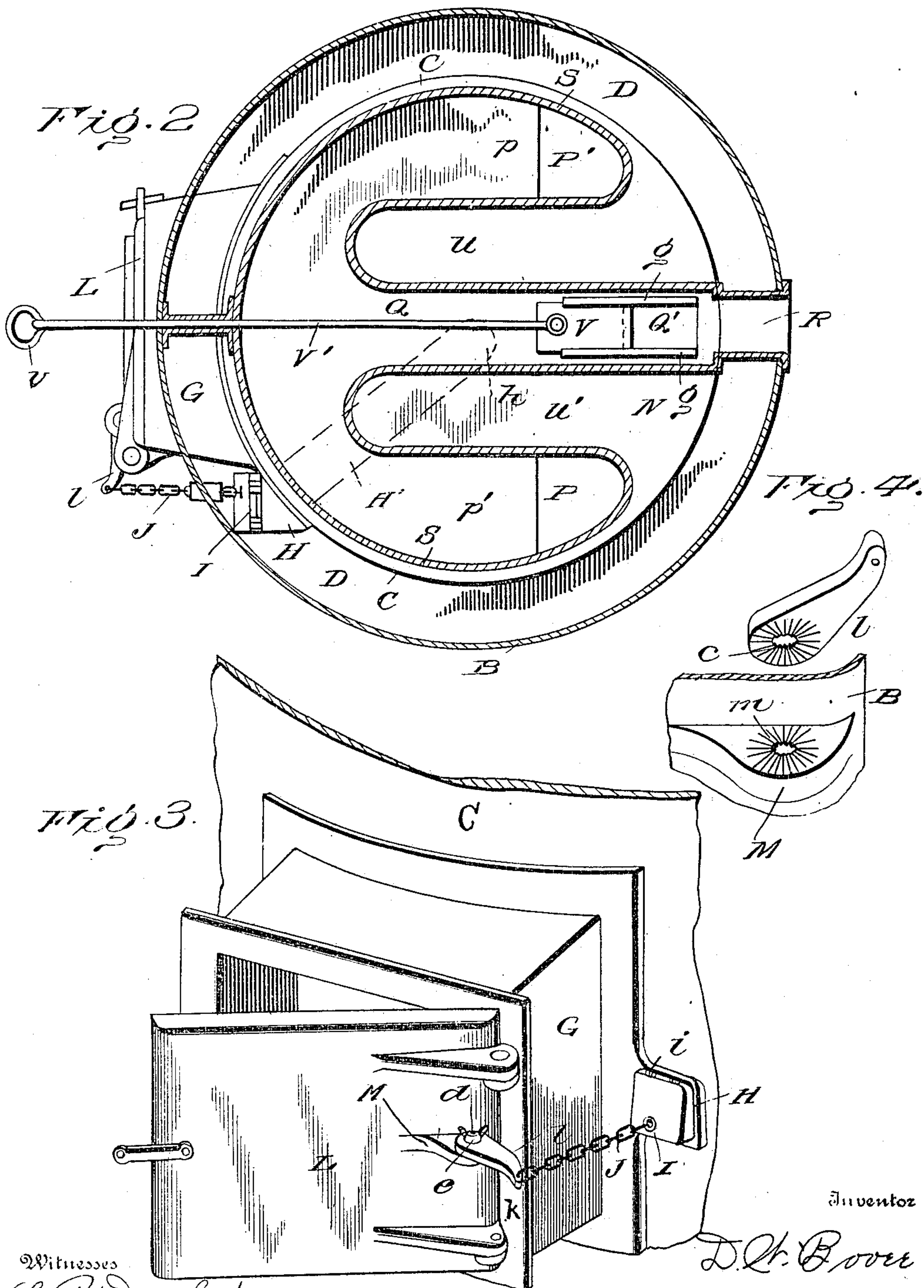
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DAVID W. BOVEE, OF WATERLOO, IOWA.

FURNACE.

No. 819,632.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed December 30, 1904. Serial No. 239,016.

To all whom it may concern:

Be it known that I, DAVID W. BOVEE, a citizen of the United States, residing at Waterloo, in the county of Blackhawk and State of Iowa, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in furnaces, and pertains to that class known as "hot-air" furnaces.

The object of my invention is to provide a furnace of this character in which the air to be heated is taken from the house and caused to be circulated around the fire-pot and discharged again into different pipes leading to the different parts of the house, thus causing a circulation of air through the house and at the same time taking a portion of said air and discharging it into the fire-pot above the fuel, thus disposing of the same and also causing a more perfect combustion of the gases above the fuel. The burning of a portion of the air from the house will cause a certain amount of fresh air to be drawn in from the outside through any crevices or keyholes, and thus the house will be thoroughly ventilated at all times, as a certain amount of the heated and foul air is being disposed of.

Another object of my invention is to provide means for more thoroughly heating the air by causing a longer passage of the smoke and gases through the air-space around the furnace

In the accompanying drawings, Figure 1 is a side elevation of my improved furnace, showing the outer casing broken away and a portion of the fire-pot also broken away. Fig. 2 is a transverse horizontal sectional view taken on the line *xx*, Fig. 1. Fig. 3 is an enlarged perspective view of the door portion of the furnace, showing the damper-operating mechanism carried thereby. Fig. 4 is an enlarged perspective view of the adjustable connection between the arm and the door.

Referring now to the drawings, A represents the furnace, which may be made of any desired structure, but is made in the usual form with the outer casing B and the fire-pot C located centrally therein and of a size to have a space D surrounding the same, and in which is heated the air to be furnished to the different parts of the house. Communicat-

ing with the space D and the lower end thereof or adjacent the bottom of the furnace is the usual cold-air pipe E, which feeds the air around the fire-pot, and thus the air becomes heated and is discharged from the upper end of the furnace by pipes F, and by means of which the air is conveyed to the different portions of the house. The cold-air pipe E is in most instances in communication with the outside atmosphere and in some instances with the house, and in the latter case the same air is constantly circulated through the house, and in order to ventilate the house the windows or doors have to be opened, and the foul air will still remain in the house. In my device the air is constantly circulated through the house; but a certain amount of the same is at all times being disposed of and will necessarily not allow the atmosphere as a whole to become so foul, and a certain amount of fresh air will have to take the place of the foul or warm air that is being discharged above the fuel.

The fire-pot C, as shown, is constructed in the usual manner and is in communication with the outside of the furnace by a door-casing G, which is tightly secured to the fire-pot C, and the outside casing B and the fire-pot adjacent said door-casing is provided with an opening H, which has communicating therewith a pipe H', which extends inwardly to the center thereof above the fuel, and the said pipe being of such a size in proportion to the cold-air-inlet pipe E that the amount of air fed to the fire-box is small in proportion to the amount of air taken into the air-space D around the fire-box, and thus the circulation of the air from the furnace to the different parts of the house and back through the cold-air pipe E is maintained. The cold-air pipe E is preferably in communication with one of the rooms adjacent the furnace and near the floor thereof, so that the cold or unheated air is drawn from the room to the furnace. The inner end of the pipe H is turned downward at *h*, so that the air discharged therefrom will be discharged adjacent the fuel, and thus cause the same to spread over a greater surface.

The fire-box C on the outside opposite the opening H is provided with a swinging door or damper I, which is hinged at its upper end at *i* and swings down and is by gravity normally held in a vertical position closing the opening H, and thus prevents the air from passing from the air-space D to the fire-pot. The said damper or door I has secured thereto adjacent its lower end a chain J, which ex-

tends outward through an opening in the outer casing B of the furnace adjacent the door-frame *k* and is secured to an arm *l*, carried by the furnace-door L, the chain J being of such a length that the door or damper closing the pipe H' will be held open when the furnace-door L is closed, and when the door is opened the arm *l* is moved inward, thus loosening the chain J and causing the door or damper I to close the pipe H'.

When the furnace-door is opened, it is well known that there is practically no draft through the fire, and thus it is very essential that the pipe H' be closed to prevent a back draft through the said pipe into the space D surrounding the fire-box, and thus filling the house with smoke and gases. It is readily seen that the moment the furnace-door is opened for any purpose whatever the pipe H' is closed; but when the door is closed the damper I is raised and the draft through the fire being continued will cause air to be fed from the space D to the fire-pot above the fuel.

The arm *l*, as shown, is provided at its inner end with a ratchet-surface *c*, which rests upon a similar surface *m*, carried by the arm M, which is rigidly secured to the furnace-door L, and passing through the arm *l* and arm M is a bolt *d*, which is provided with a thumb-nut *e* and by means of which the arm *l* may be held in its adjusted position, and thus the chain J can be either tightened or loosened, thus increasing or decreasing the movement of the damper I, whereby the amount of air fed to the fire may be readily regulated, as the circumstances may require.

The fire-box C in my device is of the usual structure with a flat upper end N, which has secured thereon the smoke and gas conveying flue O, which causes a longer passage of the smoke and gases within the air-space D, and thus more thoroughly heats the air therein. This is accomplished by having the upper flat end N of the fire-pot provided with the two openings P and P', which discharge the gases and smoke into flues *p* and *p'*, which extend toward each other and communicate with a central flue Q, which extends all the way across the furnace and communicates with the smoke-pipe R, which conveys the gases and smoke off to the chimney. The said flues *p* and *p'* are composed of a vertically-disposed plate S, which rests upon the flat top N of the fire-pot and secured thereto in any desired manner and so curved as to form the flues heretofore described. The upper end of the plate S has secured thereon a flat plate T, which closes the same and forms the two channels U and U', which form a greater heating-surface for hot air within the space D. The said flue Q adjacent its communication with the smoke-pipe is provided with an opening Q', which communicates directly with the fire-pot, and thus a direct draft

can be established between the fire-pot and the smoke-pipe, thus causing a greater draft to be used when making a new fire or when it is desired to more rapidly allow the fire to burn up. The said opening on each side is provided with guides *g*, in which is slidably mounted a damper V, which has pivotally connected thereto an operating-arm V', which extends out through the front of the furnace and is provided with a handle *v*, by means of which the rod is moved in or out, and whereby the draft is caused to travel either directly through the opening Q' to the smoke-pipe or indirectly by closing said opening, as heretofore fully described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A furnace of the character described, comprising an outer casing, a furnace-door carried by said casing, a fire-pot within the casing and forming a hot-air space between the fire-pot and the casing, the said fire-pot having an opening communicating with the hot-air space above the fuel, and means whereby said opening is closed when the furnace-door is open.

2. A furnace of the character described, comprising an outer casing, a furnace-door carried by the casing, a fire-pot within the casing and forming a hot-air space between the fire-pot and the casing, said fire-pot having an opening communicating with the hot-air space, a swinging damper closing said opening, and means carried by the furnace-door for holding the damper open when the door is closed.

3. A furnace of the character described, comprising an outer casing, a furnace-door carried by the casing, a fire-pot within the casing and forming a hot-air space between the fire-pot and the casing, said fire-pot having an opening communicating with the space between the casing and the fire-pot, a swinging damper closing the opening and a chain connection between said damper and the furnace-door for normally holding the damper open when the door is closed.

4. A furnace of the character described, comprising an outer casing, a furnace-door carried by the casing, a fire-pot within the casing and forming a hot-air space between the casing and the fire-pot, said fire-pot having an opening communicating with the said hot-air space, a swinging damper closing said opening, an arm carried by the furnace-door, and a flexible connection between the said arm and damper, whereby the damper is open when the door is closed.

5. A furnace comprising a fire-pot, a casing surrounding said fire-pot and forming a hot-air space between the fire-pot and the casing, an inwardly-extending pipe carried by the fire-pot and in communication with the hot-air space, a swinging damper closing

said pipe, a furnace-door carried by the casing, an arm carried by the furnace-door, means for adjusting said arm, and a chain connection between said arm and damper.

5 6. A furnace of the character described, comprising an outer casing, a furnace-door carried by the casing, a fire-pot within the casing and forming an air-space between the casing and the fire-pot, an inwardly-extending pipe carried by the fire-pot and in communication with the space around the same, a swinging damper carried by the fire-pot within the air-space and normally closing said pipe, an arm carried by the furnace-door, 10 a chain connection between said arm and damper, and means for adjusting said arm, whereby the movement of the damper is regulated.

7. A furnace of the character described, 20 comprising an outer casing, a furnace-door carried thereby, a fire-pot within the casing and forming a hot-air space between the fire-pot and the casing, an inwardly-extending pipe carried by the fire-pot above the fuel and having a downwardly-turned end at the center of the fire-pot, and its opposite end in communication with the hot-air space, a swinging damper normally closing the outer end of said pipe, an arm carried by the furnace-door, a chain connection between said arm and damper, and means for adjusting the said arm, whereby the movement of the damper is regulated.

8. A furnace of the character described, 35 comprising an outer casing, a furnace-door carried by the casing, a fire-pot within the casing and forming a hot-air space between the casing and fire-pot, said fire-pot having

an opening communicating with the hot-air space, a swinging damper closing said opening, and a flexible connection between said damper and the furnace-door for normally holding the damper open when the door is closed.

9. A furnace of the character described, 45 comprising an outer casing, a furnace-door carried by the casing, a fire-pot within the casing and forming a hot-air space between the casing and the fire-pot, an inwardly-extending pipe carried by the fire-pot above the fuel and having a downwardly-turned end at the center of the fire-pot and in communication with the hot-air space, and means connected to the furnace-door for closing the said pipe when the door is opened.

10. A furnace of the character described, comprising an outer casing, a furnace-door carried by the casing, a fire-pot within the casing and forming a hot-air space between the casing and the fire-pot, an inwardly-extending pipe carried by the fire-pot above the fuel and having a downwardly-turned end in communication with the fire-pot, a swinging damper normally closing the outer end of said pipe, an arm pivotally connected to the furnace-door, means for holding said arm in its adjusted position, and a connection between said arm and damper, whereby the damper is closed when the door is opened.

In testimony whereof I affix my signature 70 in presence of two witnesses.

DAVID W. BOVEE.

Witnesses:

A. S. PATTISON,
C. R. WRIGHT, Jr.