No. 675,978. Patented June 11, 1901.

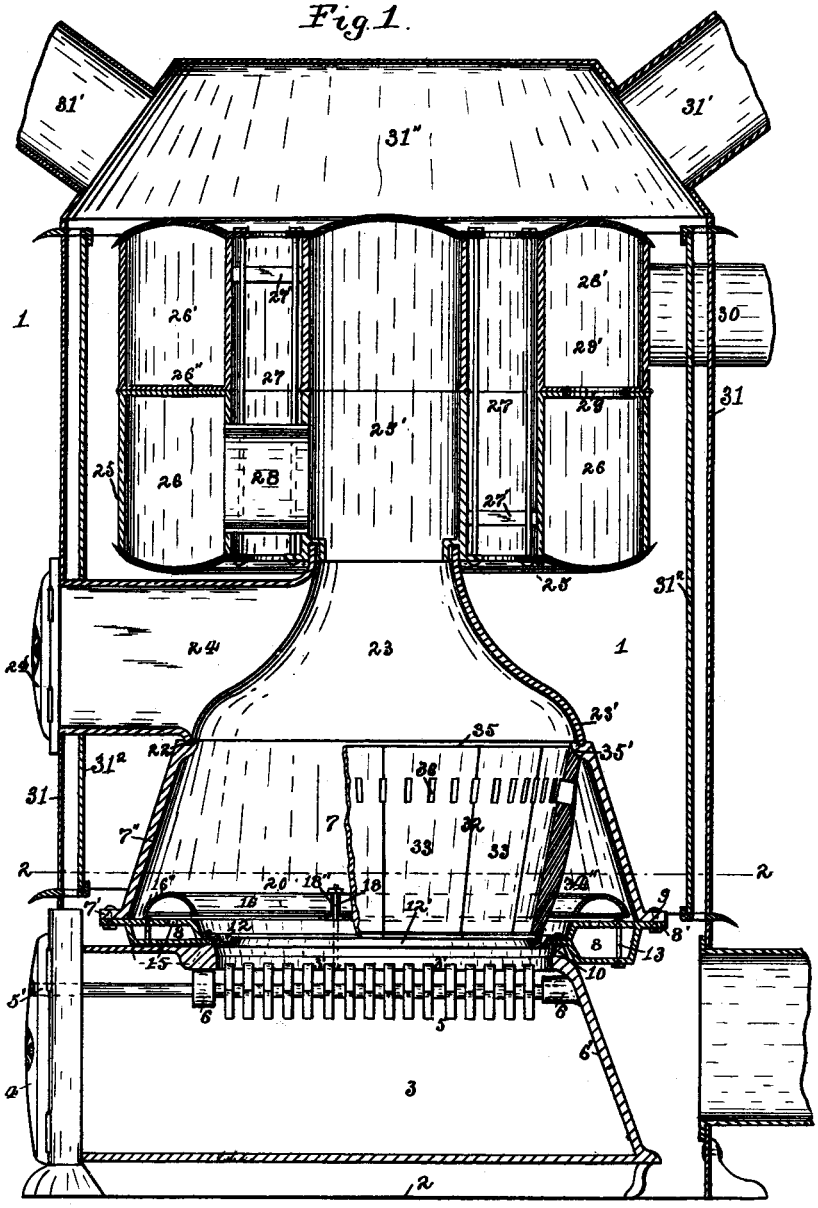
J. P. SCHAFFER.

HOT AIR FURNACE.

(Application filed Nov. 19, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



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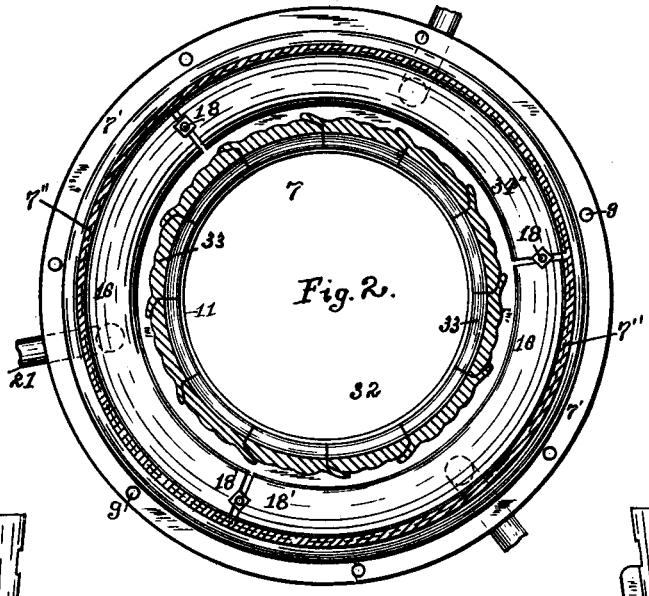

Fig. 2.

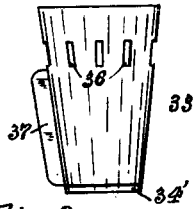

Fig. 6.

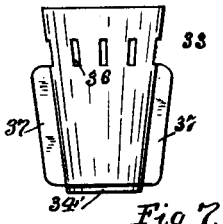

Fig. 7.

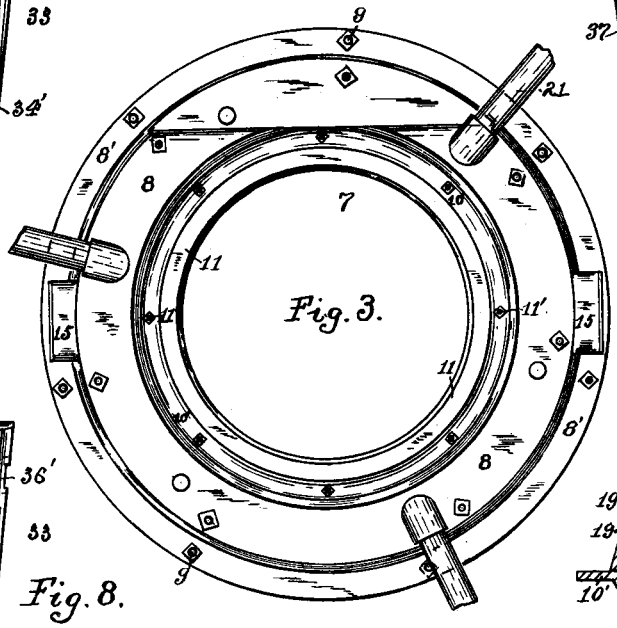

Fig. 3.

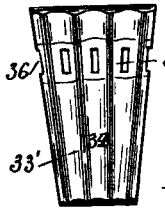

Fig. 8.

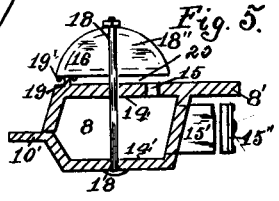

Fig. 5.

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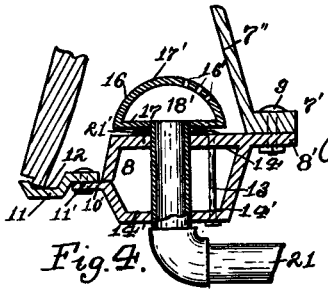

Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN P. SCHAFFER, OF PITTSBURG, PENNSYLVANIA.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 675,978, dated June 11, 1901.

Application filed November 19, 1900. Serial No. 36,935. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. SCHAFFER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Hot-Air Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to hot-air furnaces.

The object of my invention is to provide a hot-air furnace which can be used with gas or coal as a fuel when desired and one in which the change can be made from one to the other easily and quickly without any inconvenience and by the user of such furnace or any unskilled person, as well as one which will protect the gas-burner from injury when coal, coke, &c., are used as fuel.

My invention consists, generally stated, in the novel arrangement, construction, and combination of parts, as hereinafter more particularly set forth and described, and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct and use the furnace, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a vertical central section of my improved hot-air furnace. Fig. 2 is a cross-section thereof on the line 2 2, Fig. 1. Fig. 3 is a bottom view of the fire-chamber looking in the direction of the arrow. Figs. 4 and 5 are enlarged detail sectional views, and Figs. 6, 7, and 8 are views of the different forms of plates used.

As illustrated in the drawings, 1 represents my improved hot-air furnace, which is provided with the bottom or base 2, above which is the ash-pit 3, having a door 4 connected therewith, and within the ash-pit 3 are the grate-bars 5, which are supported therein below the opening 3′ by bearings 6, formed on the walls 6′, so as to rock or revolve by means of suitable means applied to the ends 5′ of said bars 5, which extend through the door 4. Above the ash-pit 3 is the fire-chamber 7, which has an air-chamber 8 secured below the same around the ash-pit 3 by means of bolts 9, which pass through flanges 7′ and 8′ on said fire-chamber and air-chamber, respectively. Extending out from the air-chamber 8 is a flange 10′, which fits over and rests upon an annular rim 10, formed on the ash-pit walls 6′, around the opening 3′ therein, and secured to this flange 10′ by bolts 11′ is a circular plate 11, which has an opening 12′ formed in the same above the opening 3′ in the ash-pit 3 and is also provided with an annular seat 12 in the upper face thereof.

The air-chamber 8 has bolts 13 passing through the same and connecting the upper and lower faces 14 and 14′ thereof for strengthening the same, and air-openings 15 are formed in such upper face 14 for the passage of the air, which is fed to said air-chamber 8 from the exterior of the furnace 1 through the supply-passage 15′ and is controlled by a suitable register 15″, as desired. Supported above the upper face 14 of the air-chamber 8 and within the fire-chamber 7 is the circular gas-burner 16, which is preferably formed semicircular in cross-section, so as to form the bottom or base 17 and circular top 17′, within which and on the outside, adjacent to the walls 7″ of the fire-chamber, are the perforations 16′ for the emission of gas therefrom. The burner 16 is preferably formed in segmental sections 18′, which are secured at their ends 18″ by means of bolts 18, which pass between such ends through the air-chamber 8 and are connected to the lower face 14′ thereof. The burner 16 rests upon lugs 19, formed on the upper face 14 of said air-chamber 8, which come in contact with lugs 19′, formed on the base 17 of said burner 16, so as to form an air-space 20 between such chamber 8 and said burner 16, and gas-supply pipes 21 lead from a suitable common supply to each one of the segmental sections 18′ of said burner 16 through the faces 14 and 14′ of the air-chamber 8 and, through a collar 21′ between the said upper face 14 and the base 17 of the section 18′, are connected to said base 17 of such sections 18′. Formed on top of the walls 7″ of the fire-chamber 7 is an annular seat 22, which is adapted to support the walls 23′ of the charging-chamber 23, which has a charging-passage 24 formed thereon, provided with suitable charging-door 24′. Fitting around the upper end of the charging-chamber 23 is the drum 25, which is provided with the central passage 25′ and the outer circular smoke-passages 26 26′, formed by the hori-

zontal partition 26″, while between the passage 25 and the passages 26 26′ is the annular circulating-passage 27, which has the supports 27′ therein for connecting such passages 25, 26, and 26′ together. Formed between the passages 25 and 26, through the passage 27, is the pipe 28, and an opening 29 is formed in the partition 26″, adjacent to which is the vertical partition 29′, which is formed in said passage 26′ between such opening 29 and the escape-pipe 30, leading from said passage 26′ out through a casing 31 to a chimney or open air, as desired. The casings 31 and 31² extend around the working parts of the furnace 1, so as to confine the heated air radiated from such furnace, and is provided with the hot-air pipes 31′, which lead from the casing-chamber 31″ to the different rooms or apartments desired to be heated.

When coal, coke, or other fuel than gas is used in the furnace 1, a magazine 32, composed of a series of segmental plates 33, is placed around and within the fire-chamber 7, these plates being corrugated, as at 33′, on their rear faces 34, and are provided with a flange 34′ at their lower ends for fitting within the annular seat 12 in the circular plate 11, secured to the flange 10′ on the air-chamber 8 over the grate-bars 5. The plates 33 extend outwardly at an incline, and their upper ends 35 rest against a flange 35′, formed around the seat 22 on the upper end of the fire-chamber walls 7″, so as to form the hot-air chamber 34″, and the plates are provided with a series of air-openings 36, which extend through the same and open into a recess 36′ formed on the rear faces 34 of said plates 33. In order to place the plates 33 within the chamber 7, some of the segmental plates 33 forming the magazine 32 are provided with a single flange 37 on one side, which is adapted to fit back of and support the next succeeding plate 33 when in place within the fire-chamber 7, and one of the said plates 33 is provided with two such flanges 37, which are adapted to fit back of and support the last segmental plate 33, without a flange, inserted within the chamber 7 to form the magazine 32, on which such flanges 37 are dispensed with.

The use and operation of my improved hot-air furnace is as follows: When it is desired to use the furnace 1 with gas as a fuel, the segmental plates 33, forming the magazine 32, are not used within the fire-chamber 7 of the furnace, and the gas enters through the supply-pipes 21 from the main supply to the burner 16, and when lighted the flames pass out through the perforations 16′ in said burner 16 and into said fire-chamber 7, the air being fed to said flames from the air-chamber 8, which is supplied through the passage 15′ from the exterior of the furnace through the register 15″ and passes from said chamber 8 out through the openings 15 therein into the space 20 and thence around said burner 16 to the flames therefrom to form combustion therewith in the fire-chamber 7. The products of combustion pass through the fire-chamber 7, charging-chamber 23, and up into the central passage 25′ of the drum 25, from which they pass through the pipe 28 into the passage 26 and, passing around the same, enter the passage 26′ through the opening 29 in the partition 26″, where they strike and are deflected by the vertical partition 29′ in the passage 26′, so as to pass around such passage and escape out of the escape-pipe 30, leading therefrom, through the casing 31 to the chimney or other point of discharge. When it is desired to use coal, coke, or other like fuel, all that is necessary is to place the segmental plates 33 within the fire-chamber 7 to form the magazine 32, which can be done by inserting the plates through the charging-opening 24′, passage 24, and chamber 23 into such chamber 7, the plates containing the single flange 37 thereon being inserted first, so that the flange on one plate fits behind the next succeeding plate and the flange 34′ at the lower end of each plate 33 fits within the recess 12 in the circular plate 11 on the air-chamber 8, and the upper ends 35 of such plates rest against the flange 35 on the walls 7″ of the chamber 7. After all the plates 33 containing the single flange 37 thereon have been thus inserted in place the plate 33 containing the two flanges 37 is inserted in like manner, so that the plate 33 without any such flanges 37 can be inserted to place to form the completed magazine 32, this last plate resting upon one of the flanges of the previously-inserted plate and on the flange of the first-inserted plate. In this case the coal, coke, or other fuel used is inserted or charged into the magazine 32 within the fire-chamber 7 through the charging-door 24′, charging-passage 24, and charging-chamber 23, and such charge rests upon the grate-bars 5 within the ash-pit 3. After the fire has been started the flames and products of combustion from such charge or fuel will pass up from said magazine 32 through the charging-chamber 23 into the central passage 25′ and into the drum 25 and, passing around the same, will pass out through the escape-pipe 30 to the chimney or other point of discharge, as before described, while hot air will be fed to such fuel and flames within the magazine 32 from the air-chamber 8, such air being supplied from the exterior of the furnace 1 through the passage 15 and register 15″ and, passing out the openings 15′ in said chamber 8 into the space 20, will enter the hot-air chamber 34″ and will be deflected by the burner 16 against the walls 7″ of the chamber 7 and, becoming heated by entering said chamber 34″ and by contact with such walls, will be drawn upward and pass through the air-openings 36 in the plates 33 into the magazine 32 and into the flames and fuel therein. In either case where gas or coal, coke, &c., is used as a fuel the heated hot air radiated or generated by the furnace will pass around the furnace within

the casing-chamber 31″, up through the circulating-passage 27, around the drum 25, and pass from said chamber 31″ out through the pipes 31′ into the rooms or apartments to be heated.

It will be evident that when it is desired to use gas as a fuel instead of coal or coke all that is necessary is to remove the fuel, ashes, &c., from the magazine 32 by means of the grate-bars 5 and take out the plates 33, composing said magazine, through the chamber 23, passage 24, and door 24′, which can be accomplished by first removing the flangeless plate 33 from the fire-chamber 8, when the other plates 33 can be easily and readily removed from said chamber, and after this is done the gas can be turned on into the burner 16 and the air supplied thereto from the air-chamber 8, before described.

It will be obvious that my improved fire-pot construction can be applied to a stove, and, if desired, the gas-burner can be removed entirely from the stove or furnace when the fuel-magazine is used, and various other modifications in the construction and design of the various parts of my improved hot-air furnace may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

It will thus be seen that my improved furnace is cheap and simple in its construction and operation, and by its use such furnace can be easily and rapidly changed from one using gas as a fuel to one using coal, coke, or other such fuel, and vice versa, when desired, by the use of the portable and removable magazine, and such changes can be made by a person using the furnace or any unskilled person at will. By the use of the magazine within the furnace for coal, coke, &c., as a fuel the gas-burner is protected from injury from the fuel, and a hot blast of air is provided through such magazine from the air-chamber, which would enable said furnace to be capable of great heat-radiating power, and such air would also materially aid in combustion when used in connection with gas as a fuel.

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

1. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, and a gas-burner situated within said chamber.

2. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, said fire-pot being provided with openings therein, and a gas-burner situated within said chamber.

3. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, said fire-pot being formed of a series of plates, and a gas-burner situated within said chamber.

4. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, said fire-pot being formed of a series of corrugated plates, and a gas-burner situated within said chamber.

5. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, said fire-pot being provided with openings therein, a gas-burner within said chamber, and means for supplying air to said fire-pot through said openings.

6. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, said fire-pot provided with openings therein, a gas-burner within said chamber, and an air-chamber connected to said gas-burner chamber and adapted to supply air to the fire-pot through the openings therein from the gas-burner chamber.

7. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, said fire-pot provided with openings therein, a gas-burner within said chamber, and an air-chamber connected to said gas-burner chamber having openings therein for supplying air to the fire-pot through openings therein from the gas-burner chamber.

8. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, a gas-burner within said chamber, and a series of plates forming said fire-pot, some of said plates being provided with flanges for holding the next succeeding plate in place, and one of said plates being flangeless for permitting the easy withdrawal of said plates.

9. In a stove or furnace, the combination of a removable fire-pot spaced from the side of the stove or furnace and forming therewith a gas-burner chamber, said fire-pot being formed of a series of plates adapted to rest upon a flange or support and against the walls of the stove or furnace, and a gas-burner situated within said chamber.

In testimony whereof I, the said JOHN P. SCHAFFER, have hereunto set my hand.

JOHN P. SCHAFFER.

Witnesses:
H. M. WOLFARTH,
J. N. COOKE.