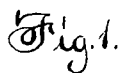


APPLICATION FILED DEC. 20, 1909.

Patented June 28, 1910.

3 SHEETS—SHEET 1.



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FURNACE.

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3 SHEETS—SHEET 2.

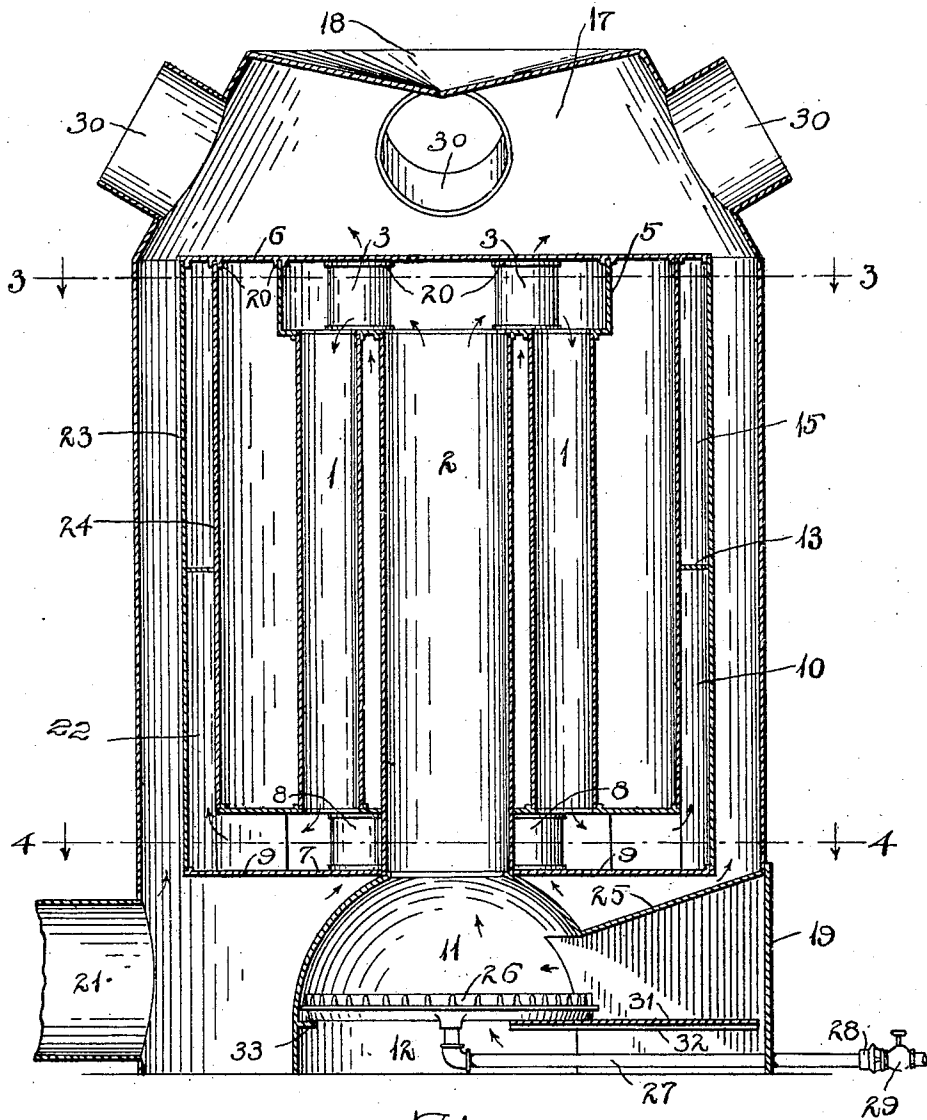


Fig. 2.

Witnesses:
Monroe S. Miller
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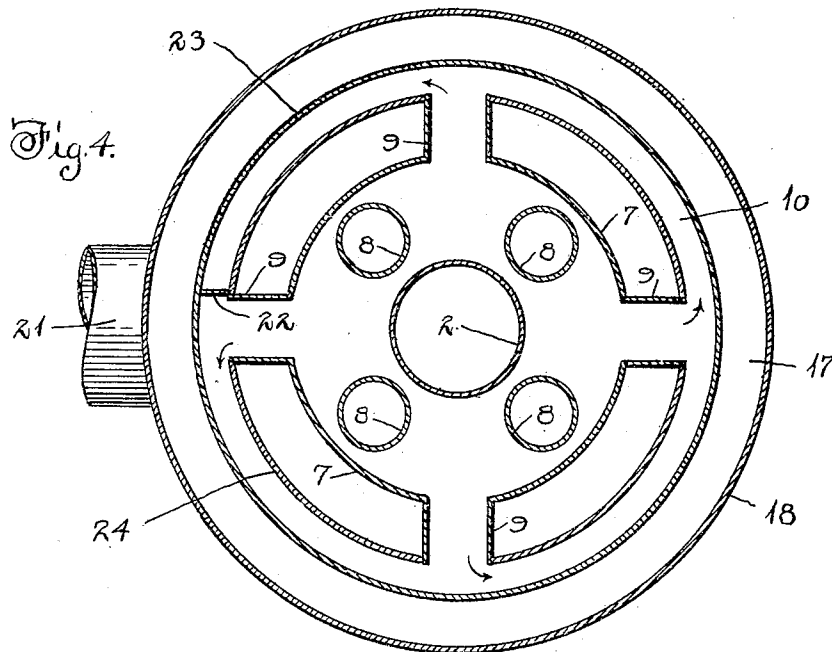
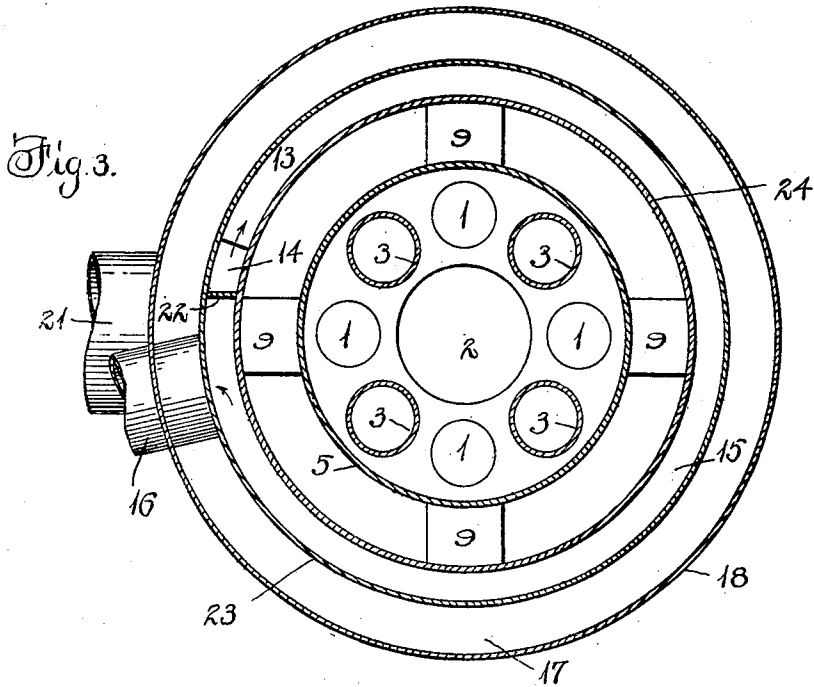
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Specification of Letters Patent.

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Application filed December 20, 1909. Serial No. 534,031.

To all whom it may concern:

Be it known that I, HENRY STRAND, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to furnaces, and is illustrated as applied to a furnace having a burner for gaseous fuel, but means for consuming other kinds of fuel may be used if desired.

The object of the invention is to provide a very large heating surface by the employment of tubes and passages through which the heated air flows, the products of combustion having a tortuous course through the chambers of the furnace, whereby a large amount of heat is conducted to the air supplied to the service pipes.

The invention is illustrated in the accompanying drawings in which—

Figure 1 is a perspective view of the furnace with parts broken away. Fig. 2 is a central vertical section. Fig. 3 is a section on the line 3—3 of Fig. 2. Fig. 4 is a section on the line 4—4 of Fig. 2.

Referring specifically to the drawings, 11 indicates a dome shaped fire chamber containing the burner 26 which rests on lugs 33 projecting from the base ring 12 of the fire box. The burner is supplied by a pipe 27 provided with a mixer 28 and a valve 29, for gaseous fuel. A coal burning grate may be substituted if desired, the burner being conveniently removable through the door 19 at the outer end of the passage formed by the casing 25 leading to the combustion chamber. Extending horizontally across said passage is a plate 31 resting on ribs 32 at the sides, the purpose of which is to divide the draft so that part will flow up under the burner and the other part across the top thereof, which facilitates the combustion of gas supplied through the burner.

The top of the dome-shaped combustion chamber 11 communicates with a central upright pipe 2 which enters a box or chamber at the top having an annular side wall 5 and a top plate 6, the upper edge of the side wall being held tightly between flanges on the underside of the top plate as indicated at 20. The overhanging part of the upper box or casing is provided with tubes 1 through which the products of combustion flow downwardly to a lower chamber indicated

at 7, and formed by top, bottom and side plates, and from this chamber extend radial passages 9 which lead into an annular space or chamber 10 between drums 23 and 24 the upper edges of which are joined to the top plate 6.

The annular space or chamber 10 is provided with a horizontal partition 13 at about the middle thereof, and with a vertical partition 22 which is located against one end of the horizontal partition 13 and adjacent to the smoke pipe 16 for the products of combustion. On the side of the partition 22 opposite to the smoke pipe 16 is an opening 14 in the horizontal partition 13. Said horizontal partition 13 in connection with the vertical partition 22 serves to check and confine the products of combustion in the space below said horizontal partition, except such as escape through the opening 14, and the smoke and gases escaping through said opening into the upper part of the annular chamber 10 must flow around between the drums to the pipe 16 through which they finally escape. The products of combustion are thus conveyed upwardly through a central pipe, thence through the box at the top thereof, thence down through the pipes 1 and through the box 7, conduits 9, and into the lower part of the annular space 10, and finally up through the opening 14, around through the upper part of said annular space and thence out to the stack. The adjacent walls of all these passages are accordingly heated.

The air flow is around and between the passages above indicated, the cold air entering through the pipe 21, at the bottom of the jacket 18, which jacket surrounds and is spaced from the drums and other parts above referred to. Part of the air flows up between the jacket and the drum 23. The other and more highly heated part flows over the outer surface of the dome 11 and thence through pipes 8 extending across the lower box 7, and so into the chamber formed by the drum 24, receiving heat from said drum and also from the pipes 1 and 2. The heated air then flows out through the pipes 3 which extend across the upper box, and thence into the chamber 17 at the top of the jacket, from which it is conveyed by the service pipes 30.

It will be seen that all sides of the conduits through which the products of combustion flow are exposed to the air to be heated, the

indirect passages giving sufficient surface to economically utilize the heat generated by the burner. The furnace will therefore be found very efficient for its intended purpose, and is capable of being cheaply constructed from sheet metal.

What I claim as new is:—

1. In a furnace, the combination of a combustion chamber, a central pipe extending upwardly therefrom, a laterally enlarged upper chamber at the top of said pipe and communicating therewith, a lower chamber around the bottom of said pipe, conduits arranged around the central pipe and spaced therefrom and from each other and connecting said chambers, inner and outer drums surrounding said pipes and forming an annular chamber communicating at its lower end with said lower chamber and provided at its upper end with an outlet flue, an outer jacket around said drums and provided with cold air supply and service pipes, and air pipes extending vertically through said upper and lower chambers and located at the spaces between said conduits.

2. In a furnace, the combination of inner and outer drums forming an annular space therebetween, a lower chamber communicating with the bottom of said space, a combustion chamber including a central vertical

pipe located within said drums and conduits forming communication between the upper end of said pipe and said lower chamber, an outlet pipe at the upper end of said space, a horizontal partition extending across said space and provided with an opening, and a vertical partition across said space, between the outlet pipe and said opening.

3. In a furnace, the combination of a combustion chamber a central flue extending upwardly therefrom, an enlarged upper chamber at the top of said flue, inner and outer drums surrounding said flue and chamber and forming an annular chamber, said inner drum being spaced from said central flue, a lower chamber communicating with said annular chamber, spaced flues connecting said upper chamber and the said lower chamber, an outer jacket, and air pipes leading into and out of the space within the inner drum, and extending vertically through said upper and lower chambers at the spaces between the flues.

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

HENRY STRAND.

Witnesses:

MONROE E. MILLER,
EDWARD M. WISE.