

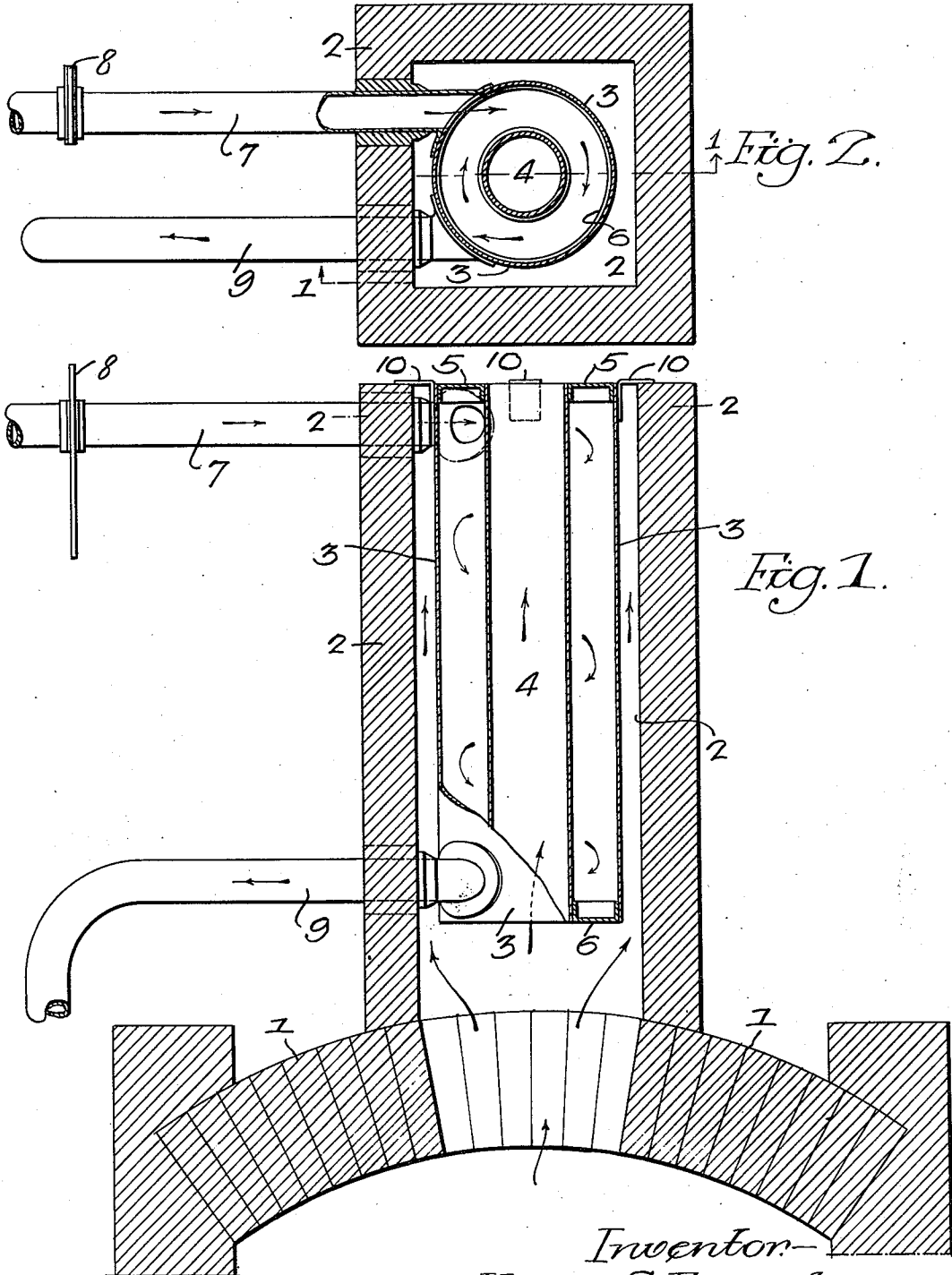
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H. S. FARQUHAR

AIR HEATER FOR FUEL BURNERS

Filed April 19, 1923



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UNITED STATES PATENT OFFICE.

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AIR HEATER FOR FUEL BURNERS.

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To all whom it may concern:

Be it known that I, HENRY S. FARQUHAR, a citizen of the United States, residing in Wayne, Radnor Township, Delaware County, Pennsylvania, have invented certain Improvements in Air Heaters for Fuel Burners, of which the following is a specification.

My invention relates to certain improvements in air heaters for fuel burners located in the flue of a furnace.

The object of my invention is to design the preheating apparatus so that the air will travel in a helical path therethrough, causing the air to impinge upon the outer surface of the preheater, which quickly increases the temperature of the air.

In the accompanying drawings:

Fig. 1 is a vertical sectional view of the upper portion of an oil burning furnace, showing the air heater partly in section on the line 1—1, Fig. 2; and Fig. 2 is a sectional plan view on the line 2—2, Fig. 1.

1 is the upper portion of an oil furnace. 2 is the stack through which the products of combustion pass from the furnace. 3 is a cylindrical preheater, preferably made of metal. Passing through this preheater is a vertical flue 4. The preheater is less in diameter than the stack so that the products of combustion pass around the preheater, heating the outer walls to a high degree. The products of combustion also pass through the flue 4. The preheater is closed at the upper end by an annular cap plate 5 and at the lower end by an annular cap plate 6. 7 is an air pipe through which cold air passes to the upper end of the preheater. It will be noticed that this air pipe communicates with the preheater at one side of the center, as clearly shown in Fig. 2, and that it has a suitable valve 8 for controlling the amount of air passing to the preheater, which is under pressure.

Communicating with the lower end of the air heater is an outlet pipe 9 for the preheated air. This pipe leads to a burner of any of the ordinary types. This pipe also communicates with the lower end of the air heater and is arranged tangentially, so that, when cold air is admitted to the preheater under pressure, it circulates in a helical path from the upper end thereof to the lower

end, causing the air to impinge upon the inner surface of the preheater, the air being raised quickly to a high temperature, after which it passes through the burner. By providing the flue 4, the air in circulation is also heated to a high degree.

The air heater can be of any length desired and is supported in the flue, in the present instance, by brackets 10, which rest on one of the courses of the brick work of the flue, as clearly shown in Fig. 1. Other means may be used to support the air heater, if desired.

I claim:

1. The combination in a heater for preheating air for a furnace, of a stack communicating with the furnace and through which the products of combustion pass from the furnace; a preheater located in the stack and around which the products of combustion pass; an air inlet pipe communicating with one end of the preheater; and an outlet pipe communicating with the other end thereof, said pipes being arranged tangentially to the preheater so that air, under pressure, admitted to the preheater passes through it in a helical path.

2. The combination in a furnace, of a stack; a cylindrical preheater located in the stack; an inlet pipe communicating with the upper end of the preheater for the air under pressure; an outlet pipe at the lower end of the preheater for heated air, the two pipes communicating with the preheater and being arranged tangentially in respect thereto, so that the air passing down through the preheater travels in a helical path and impinges upon the inner surface of the walls of the preheater.

3. The combination in a furnace, of a stack; a cylindrical preheater located in the stack, said preheater being less in diameter than the stack so as to provide a passage around the preheater for the products of combustion; an inlet pipe communicating with one end of the preheater; an outlet pipe communicating with the other end thereof, said pipes being arranged tangentially in respect thereto so as to cause air under pressure to travel in a helical path and impinge upon the inner surface of the preheater in its passage to the outlet pipe.

4. The combination of a furnace; a stack

communicating therewith; a preheater located in the stack, said preheater being less in diameter than the stack; a flue extending longitudinally through the preheater; an
5 inlet pipe communicating with the upper end of the preheater; an outlet pipe communicating with the lower end thereof; and a valve
for regulating the flow of air under pressure to the preheater, said pipes being arranged tangentially in respect to the preheater so as
to cause the air in circulation to travel in a
10 helical path through the preheater.

HENRY S. FARQUHAR.