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(54) Improvements relating to air heaters.

(57) An air heater comprising an outer shell (10), an air heating space (11) provided within said shell (10), a furnace (12) within said shell (10), an exhaust flue (22), means (18, 14, 20, 21) placing said furnace (12) in communication with said exhaust flue (22), means (14*a*) to fire said furnace (12) and means (25) to feed air to be heated through said air heating space (11).

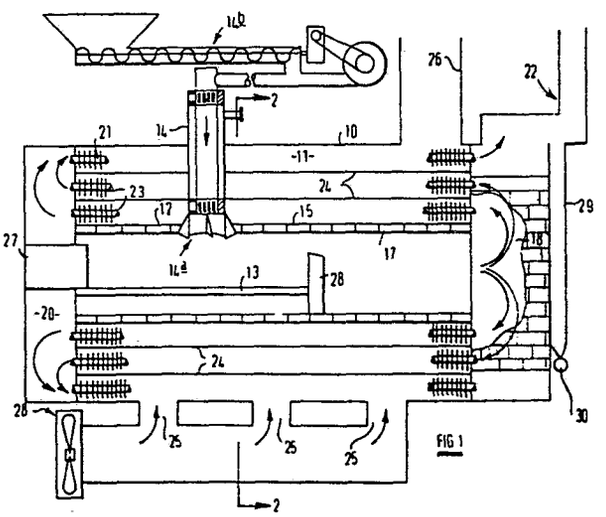

FIG 1

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Title: Improvements relating to air heaters.

This invention relates to an air heater.

An object of the invention is to provide a new and improved air heater.

According to the invention we provide an air heater comprising an outer shell defining an air heating space, a furnace within the shell in communication with an exhaust flue, means to fire the furnace and means to feed air to be heated through said air heating space.

The means to fire the furnace may comprise a grate for solid fuel within the furnace and means to feed fuel to the grate.

Preferably at least one pass of smoke tubes are provided within the shell in heat exchange relationship with the air heating space.

Preferably two passes of such smoke tubes are provided one pass extending from a first smoke box, at the rear of the heater and in communication with the furnace, to a second smoke box at the front of the heater and the second pass extending from the second smoke box to the exhaust flue.

Preferably baffles are provided within the air heating space to cause the air to follow a tortuous path therein.

Preferably means are provided to feed fuel downwardly through the shell and air space to the furnace onto the grate and said means may comprise a fuel feed tube extending downwardly through the shell, air heating space and the roof of the furnace.

Solid fuel feed means may be provided within the tube.

A grit arrestor and grit refiring means may be provided.

The invention will now be described in more detail by way of example with reference to the accompanying drawings wherein:

FIGURE 1 is a diagrammatic longitudinal cross sectional view through a air heater embodying the invention;

FIGURE 2 is a section on the line 2-2 of Figure 1.

Referring to the drawings, air heater comprises an outer shell 10 within which an air heating space 11 is defined. A furnace tube 12 of cylindrical configuration is located within the shell and has a grate 13 therein for burning solid fuel which is fed downwardly onto the grate 13 through a fuel feed tube 14. The tube 14 extends downwardly through the shell 10, air space 11 and roof 15 of the furnace tube 12. Conveniently, means 14a for feeding solid fuel onto the grate 13 is provided in the tube 14 and screw conveyor/pneumatic means illustrated diagrammatically at 14b are provided to feed fuel from the grate to the tube 14.

Primary air for combustion of the fuel is fed to the underside of the grate 13 through ducts 16 and secondary air is fed through the tube 14.

Beyond the grate 13 the furnace tube 12 continues as a combustion tube 17 and communicates with a first smoke box 18 at the rear of the heater from which a first pass of smoke tubes 19 extend towards the front of the heater where a second smoke box 20 is located from which a second pass of smoke tubes 21 extend to an exhaust flue 22.

The smoke tubes 19 and 21 are finned as indicated at 23 to improve the heat transfer characteristics between the smoke tubes and the air to be heated in the space 11. In addition part-cylindrical baffles 24 are provided within the shell 10 to provide a tortuous path for air to be heated which is fed into the interior of the shell through three inlet ducts 25 and which follows the path indicated by the arrows in Figure 2 and which exits from a single exit duct 26 located adjacent the rear of the heater so that longitudinal as well as circumferential flow of air to be heated occurs. A blower 28 is provided to feed the air through the space 11 along the above described path.

The heater is provided with a conventional grit arresting means 29 at the rear thereof and a grit refiring means 30 together with appropriate control means whereby the grit is reintroduced into the furnace adjacent the front end thereof.

If desired the heater may be fired with a liquid or gaseous fuel and the burner for such fuel is conveniently provided on a door 27 provided at the front of the heater.

The detailed construction of the heater follows conventional practice, for example, the grate 13 is provided with conventional end wall 28 and more detailed discussion of the construction of the heater is not considered necessary.

CLAIMS:

1. An air heater comprising an outer shell, an air heating space provided within said shell, a furnace within said shell, an exhaust flue, means placing said furnace in communication with said exhaust flue, means to fire said furnace and means to feed air to be heated through said air heating space.

2. An air heater according to Claim 1 wherein said means to fire the furnace comprises a grate for solid fuel within the furnace and means to feed fuel to the grate.

3. An air heater according to Claim 2 wherein means are provided to feed fuel downwardly through said shell and air space into said furnace and onto said grate.

4. An air heater according to Claim 3 wherein said means comprises a fuel feed tube extending downwardly through said shell, air heating space and said roof of the furnace.

5. An air heater according to Claim 4 wherein a solid fuel feed means is provided within said tube.

6. An air heater according to Claim 5 wherein a grit arrestor and grit refiring means are provided.

7. An air heater according to Claim 1 wherein at least one pass of smoke tubes are provided within the shell in heat exchange relationship with the air heating space.

8. An air heater according to Claim 7 wherein said at least one pass of smoke tubes are finned.

9. An air heater according to Claim 7 wherein two passes of said smoke tubes are provided, one pass extending from a first smoke box at the rear of said heater and in communication with said furnace, to a second smoke box, at the front of said heater, and the second pass extending from said second smoke box to said exhaust flue.

10. An air heater according to Claim 1 wherein baffles are provided within said air heating space to cause the air to follow a tortuous path therein.

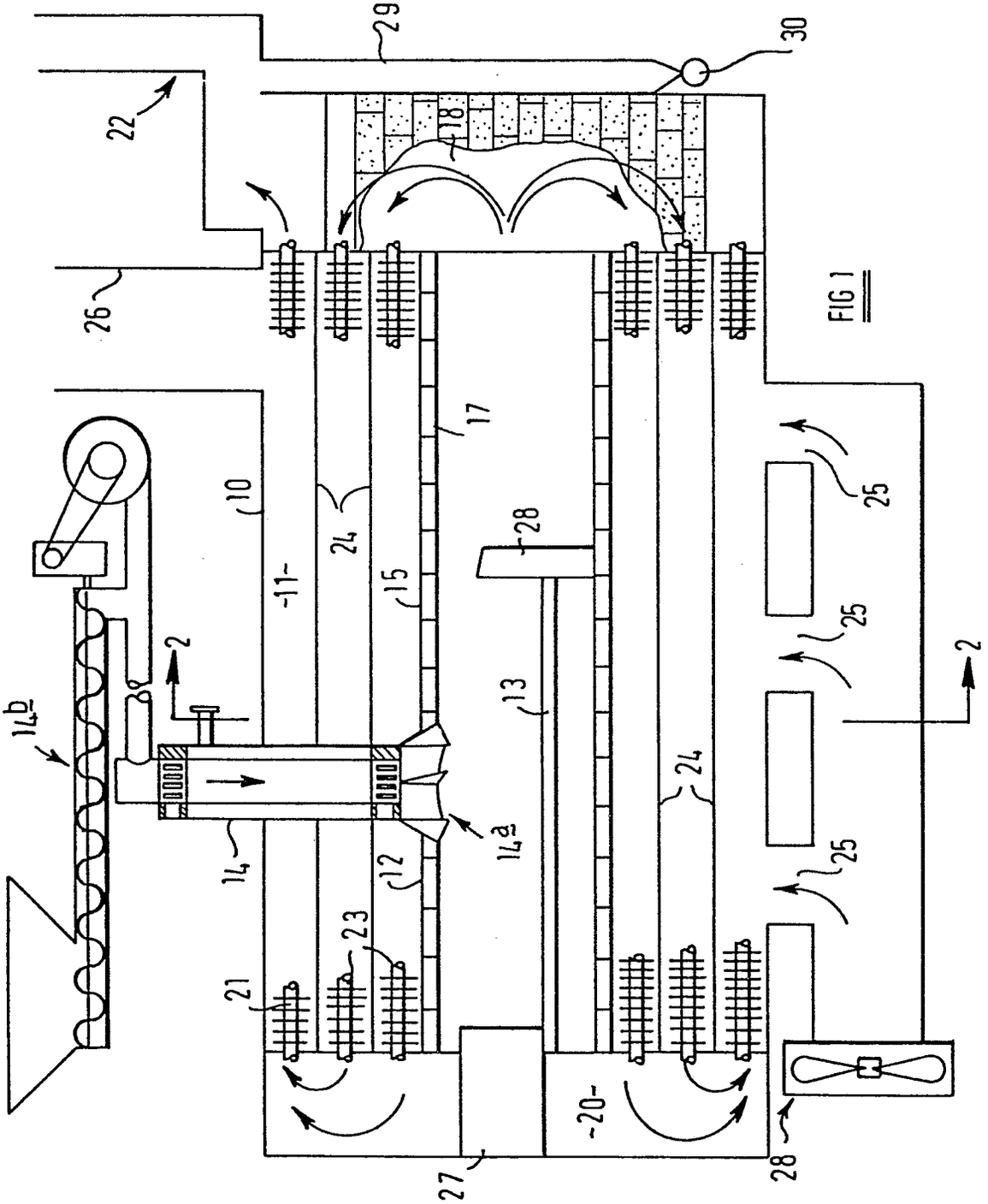

FIG 1

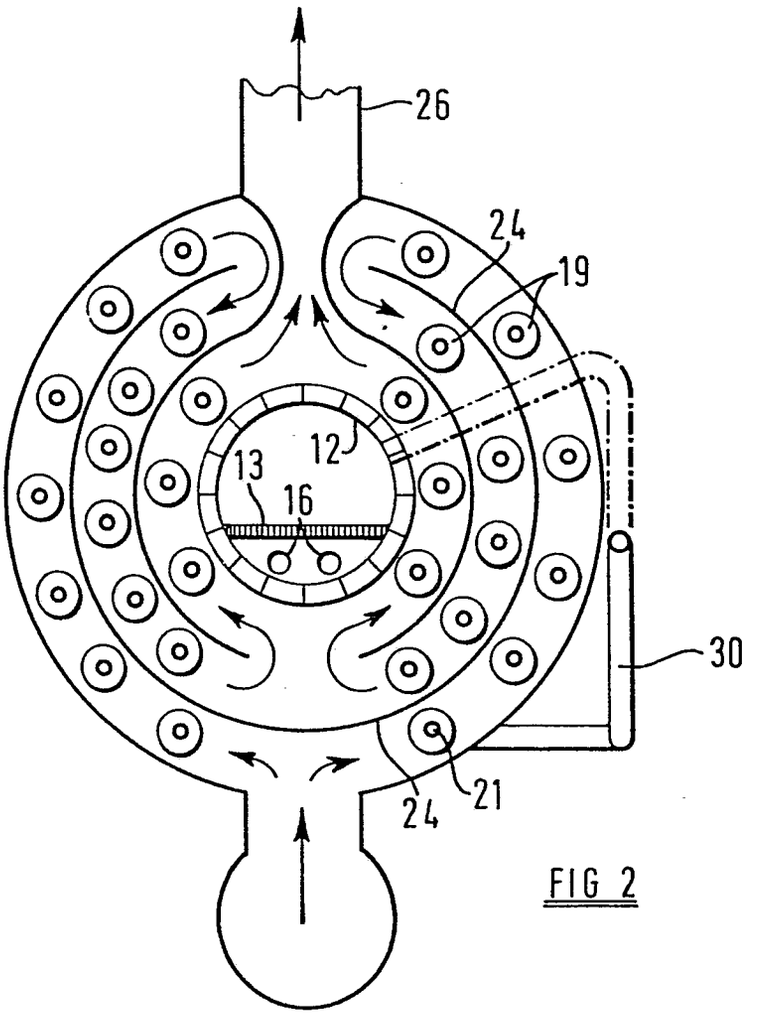

FIG 2