

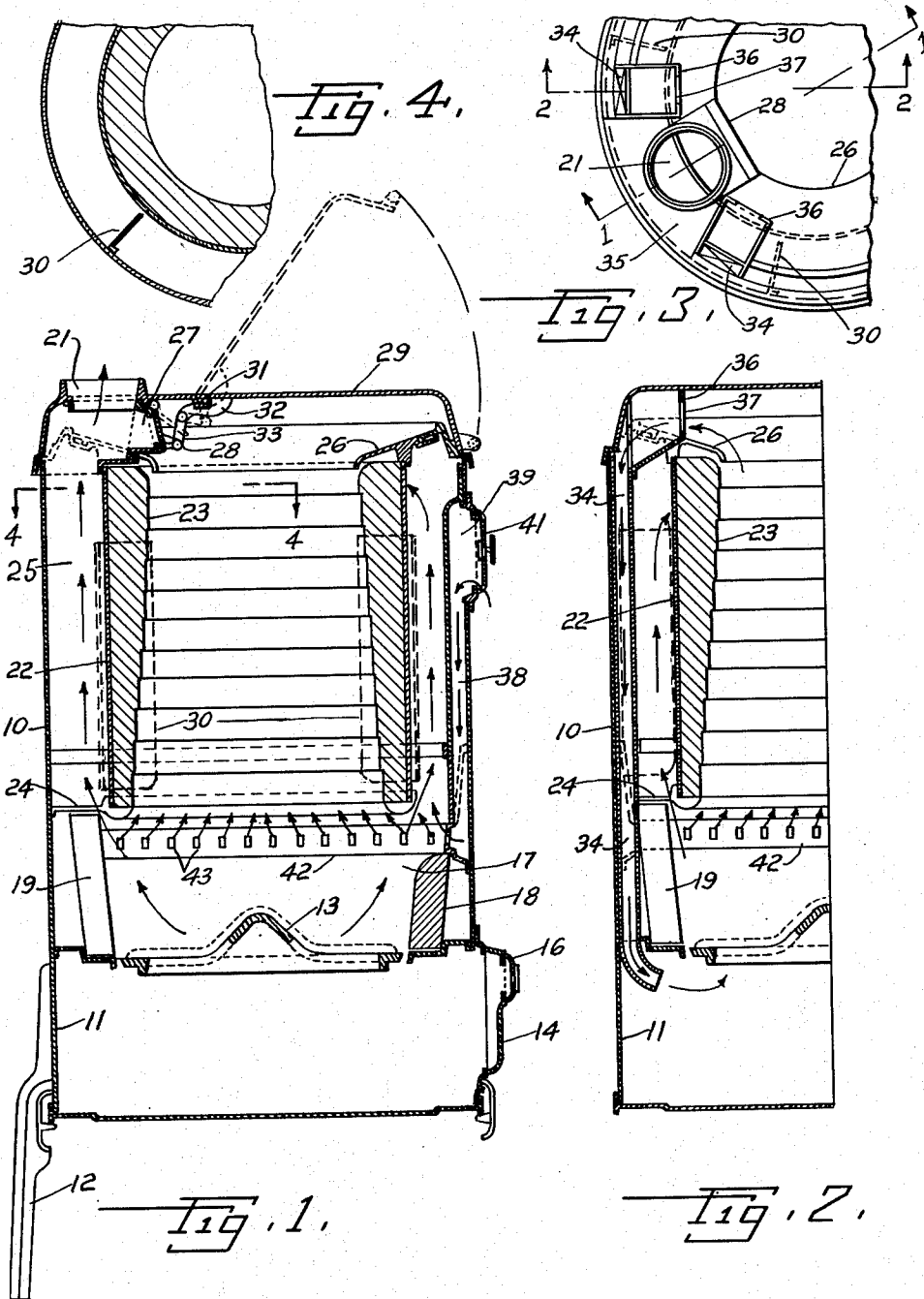
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F. T. AGRICOLA ET AL

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HEATING STOVE

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INVENTORS
FREDERICK T. AGRICOLA AND
HARRY H. FLEER.
BY *Henry A. Jennings*
ATTORNEY

UNITED STATES PATENT OFFICE

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HEATING STOVE

Frederick T. Agricola, Gadsden, Ala., and Harry H. Fleece, Quincy, Ill.; said Agricola assignor to Agricola Furnace Company, a corporation of Alabama

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This invention relates to heating stoves, more particularly to heaters designed for the burning of bituminous coal, and has for an object the provision of apparatus of the character designated which shall include a magazine holding a relatively large quantity of coal which feeds by gravity automatically into the fire pot of the heater at a controllable rate providing an even combustion of coal and uniform heating over a relatively long period of time.

Another object of our invention is to provide a heater of the magazine type adapted for the burning of soft coal, in which means are provided for burning the gases roasted out of the coal in the magazine before it reaches the active combustion zone in the heater.

A still further object of our invention is the provision of a magazine type heater adapted for the burning of bituminous coal in which the magazine is effectively sealed against the admission of air which would cause combustion of the fuel in the magazine, but which is provided with means for conveying gases roasted out of the coal in the magazine to the combustion zone of the heater.

Another object of our invention is the provision of a heater of the magazine type which shall include means for preheating the air for combustion, in combination with a distributing means to supply the preheated air evenly around the zone of combustion in the heater.

Still another object of our invention is the provision of a heater of the magazine type in which the hot gases of combustion pass freely to the smoke outlet in contact with the outer shell of the heater around the magazine whereby to provide maximum efficiency in heating the room in which the apparatus is located, and in which the magazine is insulated against excessive heating whereby to prevent excessive coking and hanging of the coal in the magazine.

These and other features of our invention are illustrated in the accompanying drawing forming a part of this application, in which

Fig. 1 is a sectional elevation of the heater taken along the line 1—1 of Fig. 3;

Fig. 2 is a partial sectional elevation taken along the line 2—2 of Fig. 1, and showing the means for conveying the gases roasted out of the coal to the combustion zone of the heater;

Fig. 3 is a partial sectional plan view of the heater; and

Fig. 4 is a sectional view drawn to a smaller scale and taken along the line 4—4 of Fig. 1.

Referring to the drawing for a better understanding of our invention, our improved heater

includes an outer casing or shell 10 which embodies at its lower end an ash pit 11. The heater is supported on suitable legs 12, only one of which is shown. A grate 13 of any suitable design is positioned above the ash pit 11. Access to the ash pit is had through a relatively large door 14 in which is positioned a smaller draft door 16. The combustion chamber or fire pot of the roaster is shown at 17 and is lined around the front and sides with fire brick 18. To the rear it is lined with relatively longer fire brick 19. The hot gases of combustion from the fire pot 17 follow the direction of the longer arrows shown in the drawing and escape out the top through a smoke outlet 21.

Positioned within the shell 10 above the fire pot 17 and spaced from the outer shell to allow for the free passage of the hot gases to the smoke outlet 21, is a magazine 22. As shown, the magazine 22 forms, with the outer shell 10, an annular chamber 25 for the passage of the combustion gases, and thus provides for the efficient radiation of heat from the heater. Positioned in the annular chamber 25 are a plurality of vertical vanes 30 which are secured to the outer shell 10, as shown, and extend inwardly as shown nearly to the magazine 22, stopping short of the magazine only a sufficient amount to preclude warping due to unequal expansion and contraction of the parts. The vanes 30 extend from the lower end of the magazine, nearly to the top to prevent short circuiting of the gases of combustion on their way to the smoke outlet 21, and to insure uniform heating of the outer shell of the stove. The magazine 22 is preferably made of heavy gauge sheet metal and is lined with fire brick or other suitable refractory 23 to insulate the magazine from the hot gases around it. The lining 23 is preferably thicker at the top than at the bottom, and is stepped, as shown, to provide abrupt changes in diameter in the gradually widening magazine to prevent coking and hanging of the fuel in the magazine.

The magazine 22 is supported at the bottom by a suitable number of brackets 24 secured to the outer shell 10. At the top, a shelf 26 extending around the upper end of the magazine above the upper ends of the vanes 30 connects the upper end to the outer shell 10 and seals the upper end of the annular chamber 25 against the admission of air or the gases of combustion. The shelf 26 is provided with an opening 35 to allow the gases of combustion to pass outwardly through the smoke outlet 21, and a door 27 having a damper 28 therein spans the space across in front of the smoke outlet, and controls connection between

the upper end of the magazine 22 and the smoke outlet 21.

The upper end of the heater is provided with a cover 29 hingedly mounted at 31 to permit it to be swung open to the position shown in dotted lines, for feeding coal into the magazine 22. On the underside of the cover 29 is secured a bracket 32 having connected thereto a link 33 which in turn is connected at its lower end to the damper 28 so that when the cover 29 is down, the damper 28 is closed. When the cover is raised to the dotted line position, the damper 28 is opened so that any smoke or dust in the magazine 22 may pass directly to the smoke outlet 21. This is important especially when feeding fuel into the heater.

On each side of the smoke outlet 21 we provide a conduit 34 which extends downwardly into the ash pit 11. At the upper end of each of the conduits 34 we provide a casting 36 secured to the top and back wall of the heater, which gives access to the interior of the magazine through an opening 37. The conduits 34 thus provide free communication between the upper end of the magazine 22 and the ash pit 11, whereby any gases roasted out of the fuel in the magazine may pass into the ash pit 11 and thence upwardly through the fuel bed and be burned.

At the front of the heater we provide a conduit 38 which opens outwardly at 39 in the upper part of the heater and to which a controlled amount of air for combustion may be admitted through a bell damper 41. The lower end of the conduit 38 terminates in a distributing manifold 42 having a multiplicity of suitable openings 43 therein extending around the fire pot. By reference to Figs. 1 and 2, it will be seen that the manifold 42 stops short of the relatively long fire brick 19, and that the conduits 34 pass downwardly into the ash pit 11 behind the fire brick 19. This detail of construction provides ample room for housing the conduits 34 without interfering with the proper combustion of the fuel in the fire pot 17. Air for combustion is admitted through the damper 41 and, as the conduit 38 is surrounded on three sides by the hot gases of combustion, the air for combustion is preheated before it is distributed out through the openings 43 in the manifold 42. In the operation of our improved heater, the major portion of the air for combustion is admitted through the damper 41, the damper door 16 being employed for the admission of air only when starting a fire.

From the foregoing description, the operation of our improved heater should be readily understood. In starting a fire, kindling and fuel are placed on the grate 13, the damper door 16 is opened to admit air for starting the fire, and the kindling is ignited. The magazine 22 may then be filled with coal and the cover 29 closed, as shown in Fig. 1. The damper 41 is then opened and the damper 16 closed. Air for combustion passes downwardly to the distributor 42, being preheated in the conduit 38, and the hot gases of combustion pass from the lower end of the magazine 22 into the annular chamber 25, thence upwardly between the vanes 30 to the upper end of the magazine 22 and out through the smoke outlet 21. The heat in the combustion chamber 17 naturally causes the volatile gases in the coal in the magazine 22 to be roasted out, and these gases pass downwardly through the conduits 34 to the ash pit 11, and thence upwardly through the grate 13 to commingle with the air and be burned in the combustion chamber. We thus

burn completely the combustible gases in the coal and avoid the making of smoke, which is so objectionable in burning soft coal. The rate of combustion, of course, is controlled by the amount of air admitted through the damper 41. It is intended that the heater be so designed that the magazine will hold sufficient coal that it will require refilling only once in twenty-four hours in cold weather.

From the foregoing it will be apparent that we have devised an improved magazine type heater which is simple of design and construction, and which is adapted for the efficient burning of the combustible components of bituminous coal.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and we desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What we claim is:

1. In a heater of the character described, an outer shell, a fuel magazine in the upper part of the shell and forming therewith an annular chamber for the circulation of the gases of combustion, means closing communication between the upper end of the magazine and the annular chamber, a fire pot beneath the magazine disposed in spaced relation to the magazine to discharge the gases of combustion into the annular chamber, an air conduit opening through the upper end of the shell and extending downwardly through the annular chamber to terminate in the upper end of the fire pot, said conduit comprising the sole normal supply means for primary air, a ring manifold connected to the lower end of the air conduit and extending around the fire pot in spaced relation below the magazine, said manifold having a plurality of spaced openings opening into the upper end of the fire pot, a smoke outlet communicating with the upper end of the annular chamber, and conduits separate from the air conduit and connected with the upper end of the magazine for conveying gases roasted out of the coal to a point below the fire pot to pass upwardly through the fire and be burned.

2. In a heater of the character described, an outer shell, a fuel magazine in the upper part of the shell and spaced therefrom to form an annular chamber, a downwardly flaring refractory lining for the magazine, a fire pot beneath the magazine in spaced relation thereto to discharge the gases of combustion into the annular chamber, said shell having an outlet for the combustion gases in the upper end of the annular chamber, means to close off communication between the upper end of the magazine and the annular chamber, an ash pit beneath the fire pot, conduits extending through the annular chamber and connecting the upper end of the magazine and the ash pit, an air preheating conduit opening through the upper end of the outer casing and extending downwardly through the annular chamber to the fire pot, said conduit comprising the sole normal means for primary air and a distributing manifold connected to the lower end of the preheating conduit and extending about the upper end of the fire pot in spaced relation to the magazine and having a multiplicity of orifices opening into the fire pot.

FREDERICK T. AGRICOLA.
HARRY H. FLEER.