

Jan. 17, 1939.

C. T. McGLONE

2,143,994

RANGE STRUCTURE

Filed May 19, 1936

3 Sheets-Sheet 1

FIG. 1

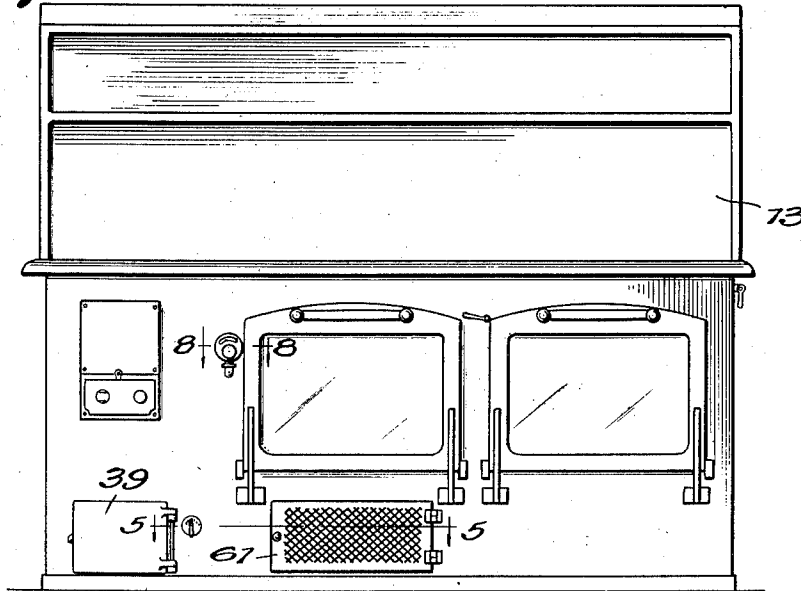


FIG. 5

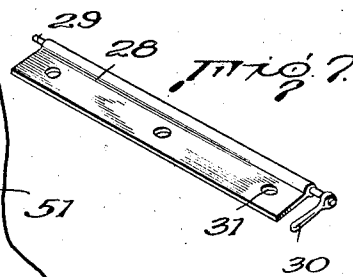
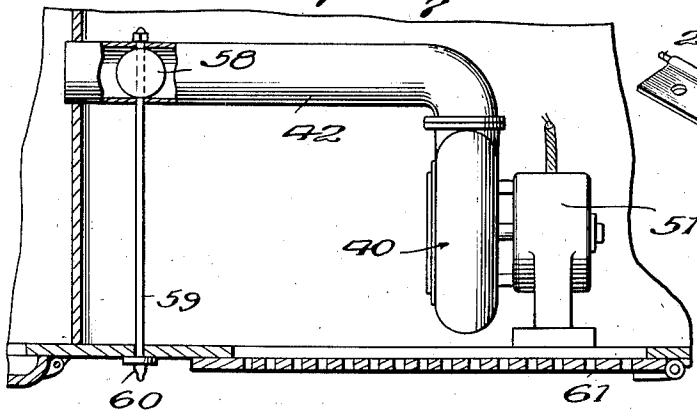


FIG. 6

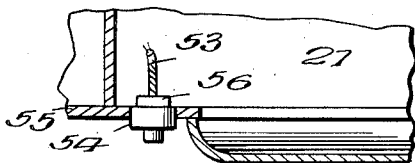
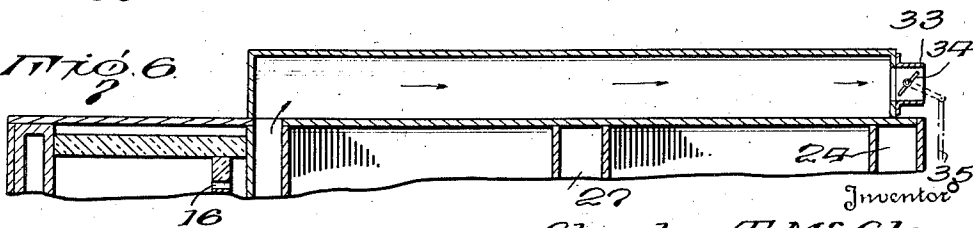


FIG. 8

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FIG. 2.

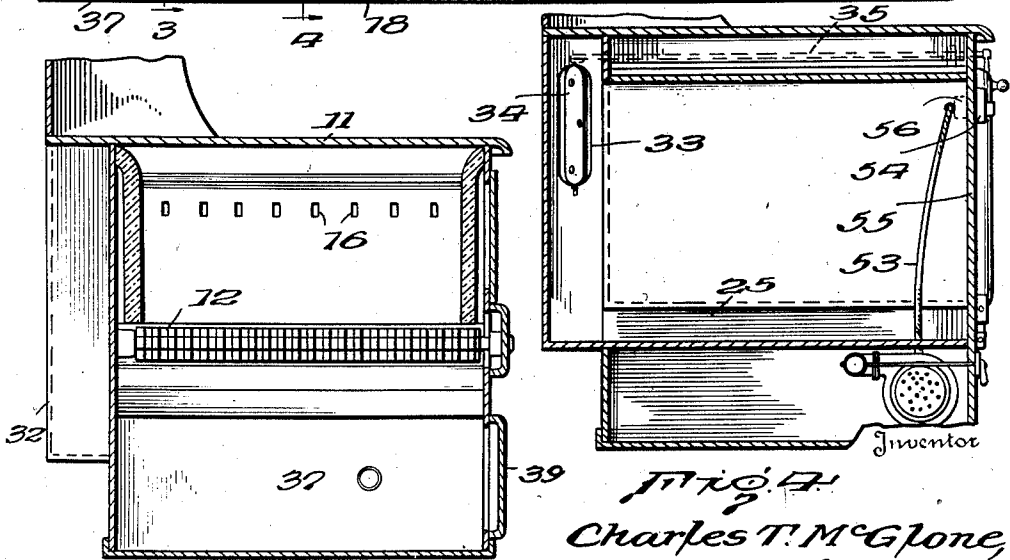
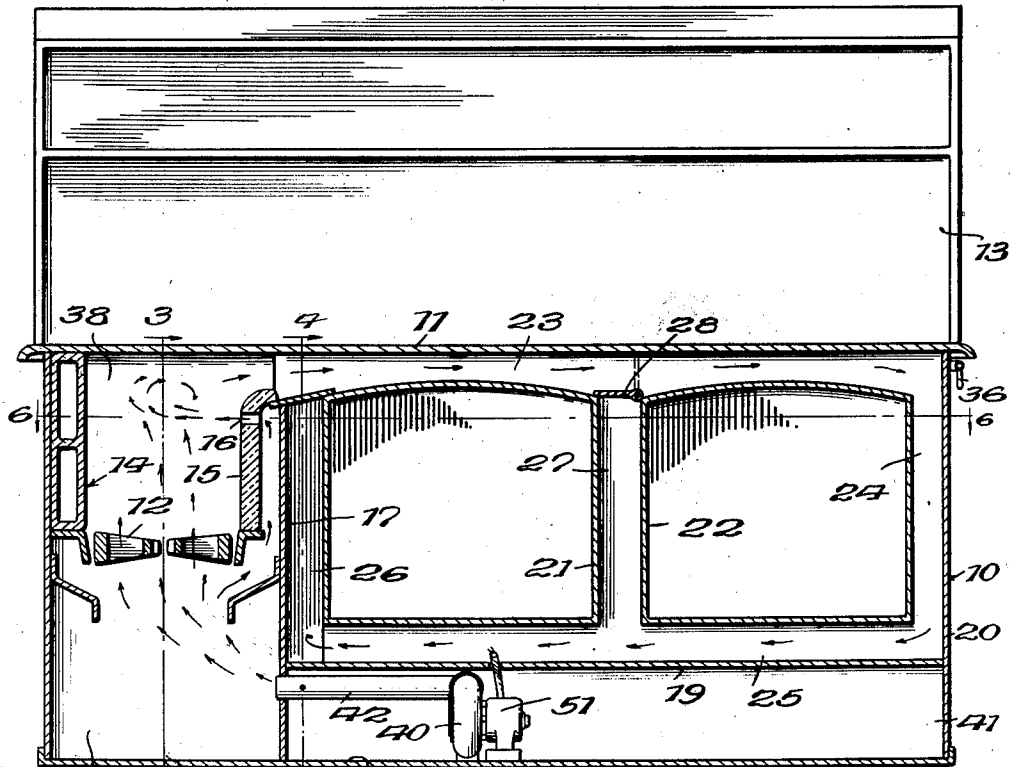


FIG. 3.

FIG. 4.
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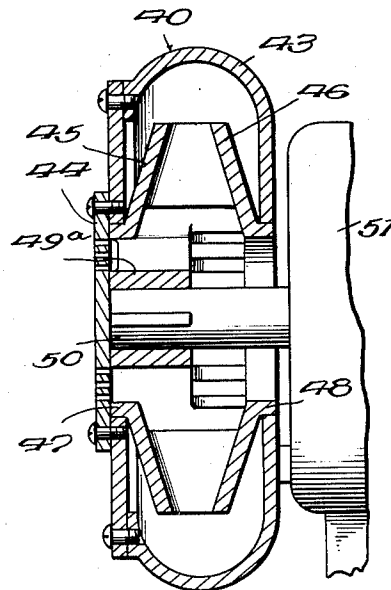
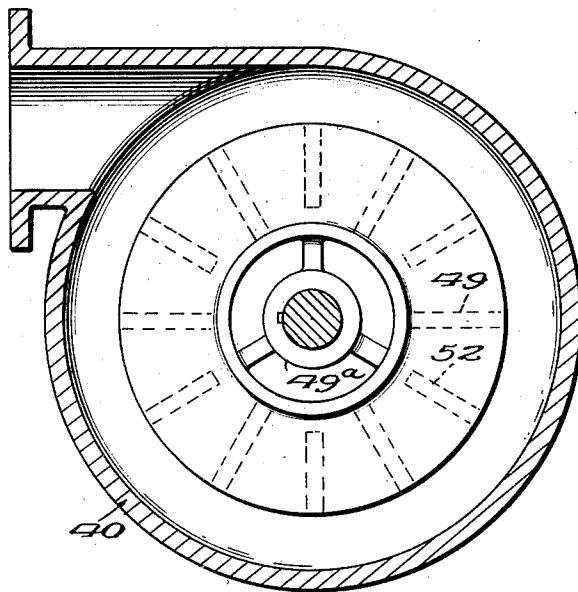
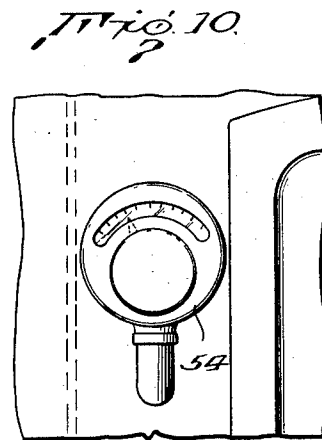
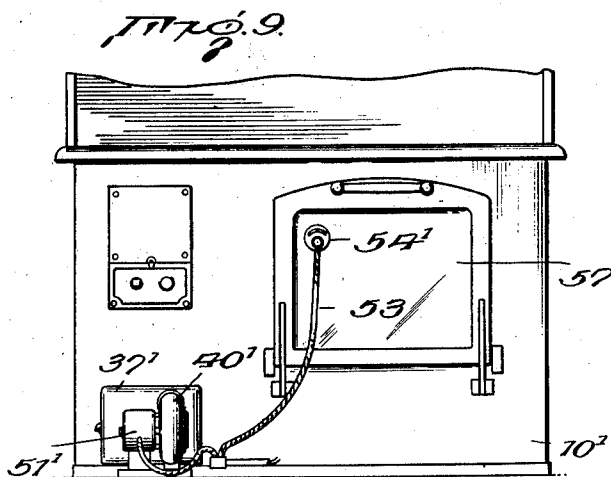
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RANGE STRUCTURE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,143,994

RANGE STRUCTURE

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Application May 19, 1936, Serial No. 80,592

7 Claims. (Cl. 126—1)

This invention relates to heating devices, and more particularly to an improved range and means for maintaining a predetermined temperature interiorly thereof and on the cooking surface thereof, and is a continuation in part of my co-pending application on Range structures, Serial No. 26,475, filed June 13, 1935.

An object of this invention is to provide in a range structure means for quickly heating the cooking surface thereof and maintaining such heat at a predetermined temperature.

Another object of this invention is to provide in a range structure means whereby practically complete combustion of the fuel is attained, so that a low grade of fuel may be used, thus very materially reducing the operating costs of the range.

A further object of this invention is to provide a range structure and means for obtaining the desired heat from a relatively low grade fuel which is controlled in a novel manner so that the heat generated by the fuel will be retained within the range until it has been dissipated.

A still further object of this invention is to provide a means which may be used in the form of an attachment for a range structure for obtaining a turbulent movement within the combustion chamber of the range so that the particles of combustion will not be quickly drawn out through the smoke pipe.

Still another object of this invention is the provision of an improved type of blower or fan structure which will assist in the creation of a turbulent movement within the firebox or combustion chamber of the range.

Other objects of the invention will be apparent from the following description of the present preferred form of the invention taken in connection with the accompanying drawings, wherein:

Figure 1 is a detail front elevation of a range structure constructed according to an embodiment of this invention.

Figure 2 is a vertical section taken longitudinally through the range.

Figure 3 is a vertical section taken on the line 3—3 of Fig. 2.

Figure 4 is a vertical section taken on the line 4—4 of Fig. 2.

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 1.

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Fig. 2.

Figure 7 is a perspective view of one of the baffles within the range.

Figure 8 is a sectional view taken on the line 8—8 of Fig. 1.

Figure 9 is a detail front elevation, partly broken away, of a modified form of this invention.

Figure 10 is a fragmentary enlarged front elevation of the thermal control.

Figure 11 is a vertical sectional view taken through the center of the blower.

Figure 12 is a vertical section taken transversely through the fan or blower.

Referring to the drawings, wherein like symbols refer to like parts throughout the several views, the numeral 10 designates generally an outer casing of suitable size, which is provided with an upstanding warming shelf structure 13. The wall of the casing 10 may be constructed of suitable heat retaining material, and a cooking top 11 extends substantially over the entire length of the casing 10.

A grate structure 12 is mounted within the casing 10 adjacent one end, and is disposed above a combined ash chamber and air pressure chamber. A firebox 14 of jacketed construction is disposed above the grate 13, and the inner vertical wall 15 of this firebox 14 is provided with a plurality of spaced apart air openings 16. An inner wall 17 extends from the bottom 18 and terminates at a point spaced downwardly from the top 11. This inner wall 17 is spaced from the wall 15 of the firebox so that air may freely pass therebetween.

An inner bottom wall 19 extends horizontally of the casing, being secured at one end to the inner vertical wall or partition 17, and at the other end to an end wall 20. A plurality of ovens 21 and 22 are disposed within the casing 10 and supported in downwardly spaced relation to the top 11 so as to provide an upper heating duct 23. The oven 22 is spaced from the end wall 20 and thereby provides a duct 24 which communicates with the upper duct 23. The bottom of the oven 22 is also spaced from the inner bottom 19 and thereby provides a lower heating duct 25 which communicates at one end with the lower end of the duct 24.

The oven 21 is disposed in upwardly spaced relation to the inner bottom 19 so that the hot gases in the duct 25 may freely pass beneath this oven and enter a vertical duct 26 which is disposed between the wall 17 and the adjacent wall of the oven 21. An intermediate duct 27 is disposed between the two ovens 21 and 22 and communicates at its upper end with the duct 23 and at its lower end with the duct 25.

A baffle 28 is rockably mounted on a shaft 29 having a handle 30 at one end, and this baffle 28 may be provided with openings 31 so as to eliminate any dead space between the two ovens 21 and 22 when the baffle 28 is disposed in the position shown in full lines in Fig. 2. This baffle 28 permits cutting off the oven 22 and also shortening of the heated portion of the top 11.

A rear flue 32 extends along the rear of the casing 10, and has an outlet 33 which is controlled by a damper 34 operated by a damper rod 35 which extends forwardly and is provided with a handle 36 for operation thereof. A suitable smoke pipe or carry-off pipe may be connected to the nipple or outlet 33.

The air pressure and ash chamber 37 which is disposed below the combustion chamber 38 is provided with a door 39 which is preferably imperforate and is normally held in tightly locked position. The usual draft controlling members are eliminated from this air chamber 37.

A fan or blower structure, generally designated as 40 is mounted in the chamber 41 between the inner bottom 19 and the bottom 18, and an air duct or pipe 42 is connected at one end to the blower 40 and at the other end to the inner wall 17 within the air chamber 37. The blower 40 comprises a housing 43 having a perforate plate 44 secured to one side thereof and disposed axially thereof, air being freely admitted to the housing 43 through the perforations of this plate 44.

The blade structure for the blower 40 comprises a pair of opposed spaced apart truncated members 45 and 46 having annular flanges 47 and 48, respectively. Radial blades 49 are positioned between the bases of the truncated members 45 and 46 and are secured to a hub 49a which is fastened to a drive shaft 50 carried by a motor 51. Intermediate blades 52 are disposed between the blades 49 and are shorter in length than the blades 49, their inner ends being disposed farther away from the hub 49a than the blades 49. By providing a reduced discharge orifice between the fan blades at the periphery of the fan structure the air is given a rotary or turbulent motion which continues within the pipe 42 and within the air chamber 37.

The motor 51, which is an electric motor, is connected as by a conductor 53 to a thermal switch 54 which is mounted on the front wall 55 of the casing 10 and which is provided with a projecting portion 56 extending into the interior of the oven 21. The switch 54 may be connected to a suitable source of electric current supply.

In Figure 9 there is shown a modified form of this invention wherein the blower 40' is connected to the air chamber door 37'. The motor 51' is connected as by a conductor 53' to a thermal switch 54' which is secured directly to the door 57 of the oven. In this form the blower means is used as an attachment for a range structure 10'.

In the use and operation of this device, the fuel may be placed in the firebox 14 above the grate 12, and during the starting of the fire the damper 34 is opened. The thermal switch 54 is then set for the desired temperature within the oven 21, which will also provide the desired temperature on the top 11. After the fire has been started the damper 34 is closed so as to cut off the uptake of the gases.

The air from the blower 40 will pass into the air chamber 37 in a turbulent stream, and a portion of this air will pass upwardly through the

fuel while another portion of the air will pass upwardly between the inner wall 15 of the grate 14 and the partition 17. This latter air will then enter the combustion chamber 38 in a horizontal movement counter to the movement of the rising gases so that additional air is mixed with the hot gases which are retained within the combustion chamber a sufficient length of time to insure substantially complete combustion. The hot gases will then pass horizontally through the duct 23, heating the top 23 and the top of the ovens 21 and 22. Assuming that the baffle 28 is closed, the gases will then pass downwardly through the duct 24, and then return along the bottom duct 25. The hot gases in the duct 25 will heat the bottoms of the ovens 21 and 22 and will then enter the duct 26 and pass back through the flue 32. The flue 32 will effect a heating of the rear portion of the top 11, the temperature of the rear portion of the top 11 being lower than that portion of the top 11 overlying the duct 23 so that articles may be kept warm when resting on the rear portion of the top 11. The damper 34 is provided with the usual gas passages so that a reduced quantity of gas may pass therethrough when the damper 34 is closed.

Where it is desired to cut off the oven 22 the baffle 28 may be raised so that the gases in the duct 23 will pass downwardly through the duct 27 into the bottom duct 25. In the event that the air pressure within the air chamber 37 is too high so that the gases will be forced out through the top plates of the top 11, the pressure may be reduced by means of a damper 58 mounted in the pipe and secured to a rod 59 having a handle 60 disposed on the outer side of the front wall 55. Air is admitted to the chamber 41 through a perforate plate 61 which is removably secured to the front of the range adjacent the blower structure so that when desired this blower structure may be serviced without undue inconvenience.

The range structure herein disclosed has been placed in numerous hotels where quick heating is necessary, and in every instance the range structure has effected an economy in operation sufficient to supplant other types of ranges using gas, oil or electricity as a heating medium. The fuel used in this range may be a relatively low grade of anthracite or bituminous coal and in actual use it is found that an entire day's operation of the range will produce only about two handfuls of ashes. The efficient operation of the range has been attributed partly to the turbulent action of the air and gases, and also to the fact that the range is operated in a manner opposed to the normal operation, that is, in a normal range when a hot fire is desired so as to produce the desired temperature along the cooking surface, the smoke pipe damper is left open, whereas with the present range structure the damper is closed.

Furthermore, the operation of the blower is controlled by means of the thermal switch 54 which is connected to the oven 21, and in this manner the temperature of the oven 21 will regulate the temperature of the entire range. The thermal switch 54 may be of any suitable construction, it being only necessary that it operate within the temperature range required.

It is apparent that various changes may be made, especially in the details of construction, within the scope of the claims appended hereto.

What is claimed is:

1. A range comprising an outer casing, an oven disposed in the casing, a duct extending about

said oven, a grate in the casing, a firebox in the casing above said grate and provided with air openings above said grate disposed in a position to provide a counter current within the upper portion of the firebox, electrically operated air pressure means below the grate, and thermally responsive means projecting into the oven and connected to said air pressure means for regulating said air pressure means dependent upon the temperature of said oven.

2. In a range having an oven, a grate, a combustion chamber above said grate, and a chamber below said grate; a blower connected to said latter chamber, an electric operating means for said blower, and a thermally responsive member connected to said operating means and projecting into said oven whereby to regulate said operating means dependent upon the temperature of the oven.

3. A range structure comprising an outer casing, a cooking top carried by said casing, an oven within the outer casing and having the walls thereof spaced from the walls of the outer casing and the cooking top to provide a duct thereabout, an inner wall within the casing spaced from the adjacent wall of the oven, an outlet duct carried by the casing, a damper within said outlet duct, a grate supported within the casing between the inner wall and the adjacent outer wall of the outer casing, a pressure chamber below said grate, a combustion chamber above the grate communicating with said duct at the top of the oven and below said cooking top, a firebox extending above said grate having an inner wall thereof spaced from said first-named inner wall whereby to provide an air passage communicating at its lower end with said pressure chamber, said firebox having openings in the inner wall thereof communicating with said air passage and with the combustion chamber, the air from said pressure chamber rising vertically through said grate and firebox and then passing horizontally beneath said cooking top, the air from said air passage discharging horizontally into said com-

bustion chamber in a direction counter to the movement of air and gases beneath said cooking top whereby to effect a swirling motion of air and gases within the combustion chamber, means for discharging air under pressure into the pressure chamber, and thermally responsive means for said latter means.

4. In combination, a range structure having an oven, a grate, a combustion chamber above the grate and a chamber below the grate; means for discharging air under pressure into the chamber below the grate, and thermally responsive means carried by the oven and connected to said first means whereby to control said first means by the temperature of said oven.

5. In combination, a range structure including an oven, a grate and a chamber above and below said grate; an electrically operated blower discharging air into the chamber below said grate, a thermally responsive means projecting partly into said oven and partly exteriorly of said oven, and means connecting said thermal means with said blower whereby the operation of said blower is dependent upon oven temperature.

6. In combination, a range structure comprising an oven, a duct extending about said oven, a grate, a firebox extending above the grate, a combustion chamber communicating with said firebox and with one end of said duct, said firebox having openings in the inner wall thereof, an air chamber below the grate, a duct communicating with said air chamber and with said air openings, an electrically operated blower discharging into said air chamber, a thermally responsive means projecting partly into said oven and partly exteriorly of said oven, and means connecting said thermal means with said blower.

7. In combination, a range including a combustion chamber and an oven, a blower in communication with the combustion chamber, and a thermostat carried by the range oven and connected to the blower for controlling the operation of the latter by the oven temperature.

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