Dec. 10, 1940. J. L. BREESE 2,224,534

COOKING RANGE

Filed Jan. 7, 1938 2 Sheets-Sheet 1

Fig. 1

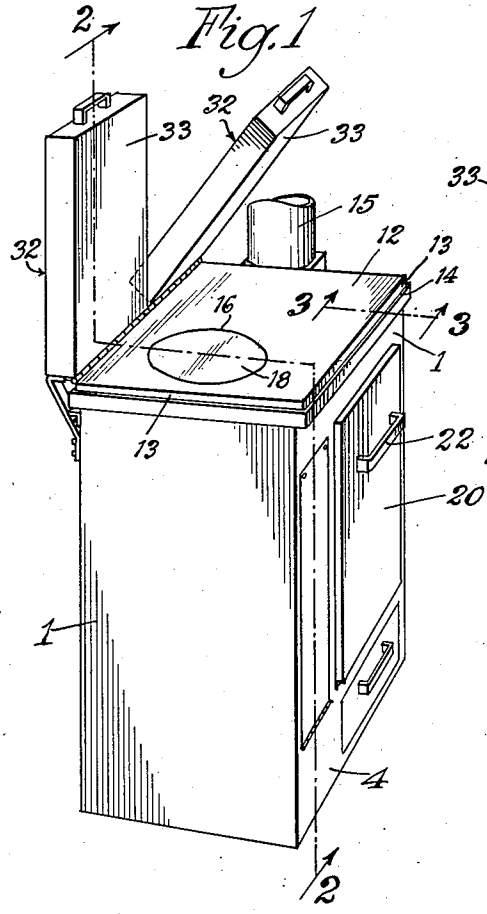


Fig. 2

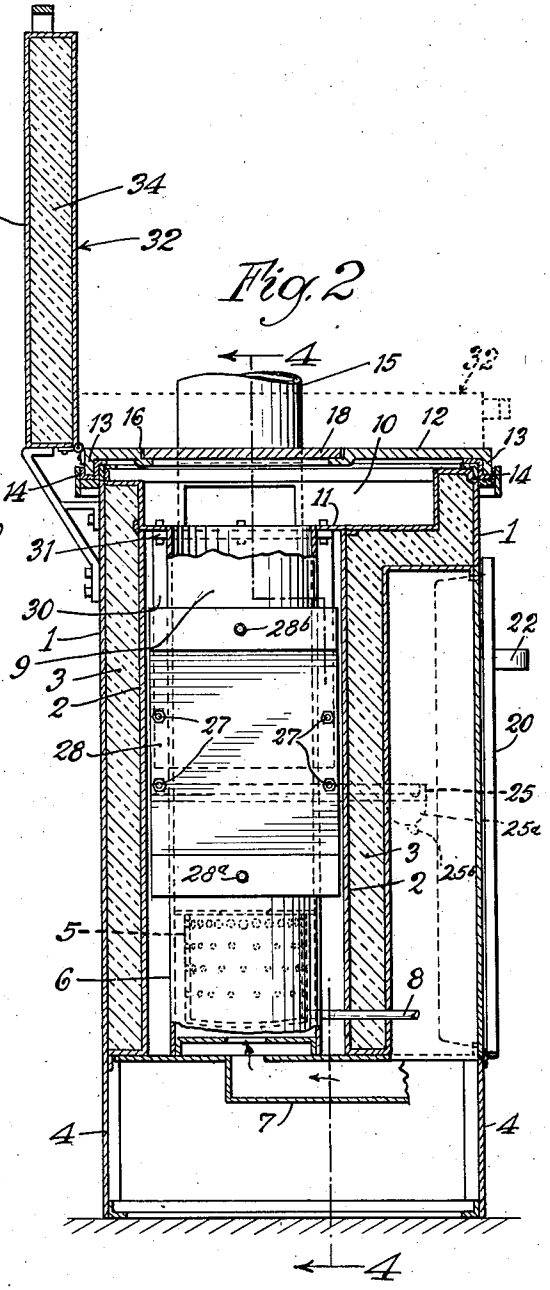
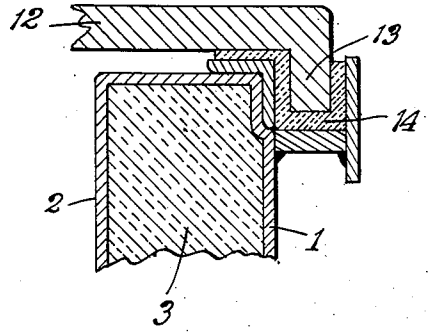


Fig. 3



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Dec. 10, 1940. J. L. BREESE 2,224,534

COOKING RANGE

Filed Jan. 7, 1938 2 Sheets-Sheet 2

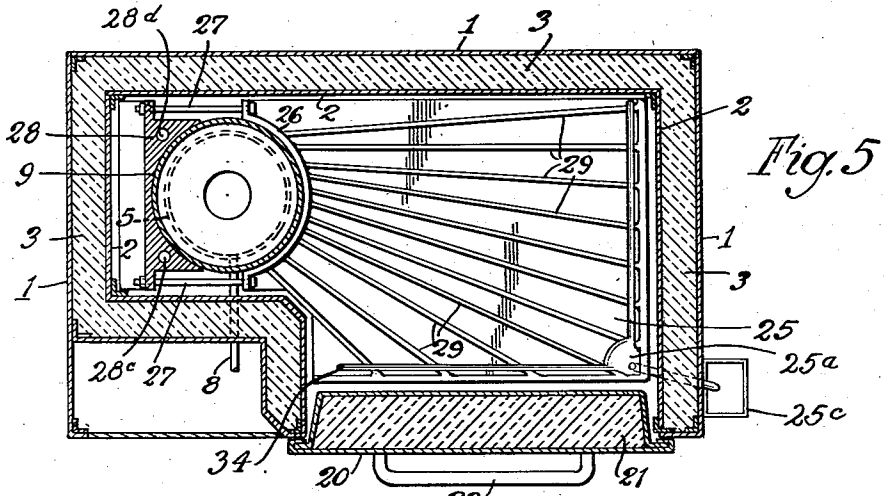


Fig. 5

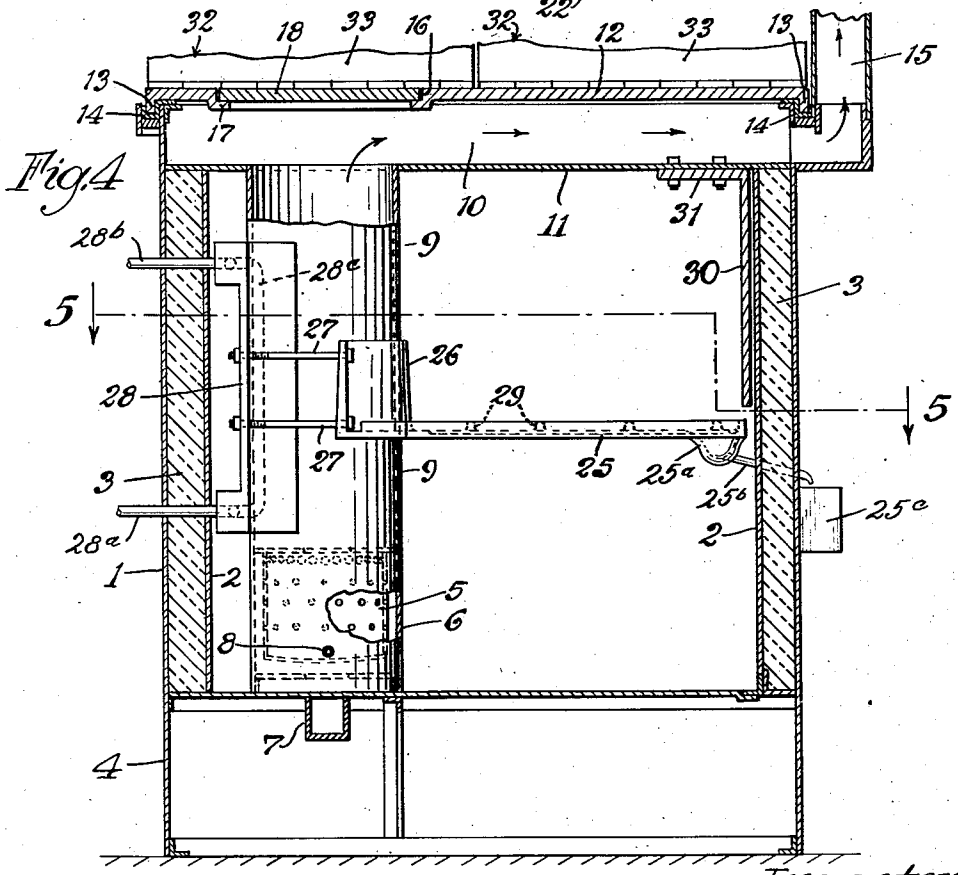


Fig. 4

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Patented Dec. 10, 1940 2,224,534

UNITED STATES PATENT OFFICE

2,224,534

COOKING RANGE

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Application January 7, 1938, Serial No. 183,857

2 Claims. (Cl. 126—14)

My invention relates to cooking ranges and more particularly to those of the type in which conducted heat is utilized to maintain a constant operative temperature in the range with the consumption of a minimum amount of fuel.

One of the primary objects of my invention is to utilize the heat from a suitable burner unit so that a maximum temperature per unit of fuel is obtained in the desired parts of the range.

Another object of my invention is to provide a range of the above character with a cooking space or oven which is heated from a plurality of sides, whereby it attains a high temperature, the maximum amount of direct heat from the fire and flue gases of a burner being utilized without using a revertible flue.

In conjunction with this non-revertible flue feature I wish to point out its importance with respect to hydro-carbon burners of the type herein disclosed. It is peculiar with fuel oils and the like that the combustion characteristic of the fuel is a function of the ratio of air to fuel. If there is a deficiency of air per unit of liquid fuel the latter continues to be totally consumed, but a heavy carbon residue is formed and the heat obtained is decreased, thus if the exhaust passages are revertible so that the free flow of products of combustion is inhibited, the inflow of air to the combustion chamber is reduced with the result that since the input of fuel oil remains constant, carbon is formed due to the reduction of amount of the air supplied and the efficiency of the burner is detrimentally affected. For this reason it is of considerable importance that the regulated amount of incoming air remain constant under an even draft as compared for instance to a coal burning unit wherein the combustion of the coal is in proportion to the amount of available air.

Another object of my invention is to provide a heat conducting element for the oven which is so constructed and mounted that its surface attains a high enough temperature to broil and cook in addition to its oven heating ability.

Still another object of my invention is to provide a range wherein the combustion chamber thereof is associated in a novel manner with the cooking elements of the stove to increase the efficiency of the latter.

Still another object of my invention is the provision of means to remove accumulated grease from the broiling or cooking element to a point outside of the high temperature zone of the range.

Still another object of my invention is to provide a novel construction for securing a waterback and the broiling element to the burner unit in a cheap, convenient and efficient manner.

Still another object of my invention is to provide a range wherein the radiant heat of combustion is transformed into conducted heat at cooking temperatures.

Still another object of my invention is to provide a range wherein the heat conducting elements for the oven are associated with those parts receiving heat directly from the burner unit, in a manner to most efficiently utilize such heat by conduction and to reduce the possibility of heat losses between the direct flame and the elements which actually heat the oven.

Yet another object of my invention is to heat a maximum area of the oven wall without the use of a revertible flue where soot may lodge.

Other objects and advantages will become apparent from the following description and accompanying drawings, in which

Fig. 1 is a perspective of the range;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2; and

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

It is to be understood that the embodiment shown herein is for illustrative purposes only and may be modified and changed without departing from the spirit and scope of the invention as set out in the appended claims.

Like parts are indicated by like symbols throughout the specification and drawings.

I illustrate a stove body or housing which may include outer wall portions 1 and inner wall portions 2, the space between being filled with any suitable heat and cold insulating material such as rock wool, or the like. Any suitable supporting base 4 may be air contained or may be, if desired, wholly or partially filled with insulating material.

Positioned within the stove body I illustrate any suitable burner or heater unit herein indicated as a device for burning a liquid hydrocarbon. I illustrate for example an inner apertured wall 5, an outer wall 6, an air conduit 7 adapted to deliver air to the space therebetween, and an oil inlet 8. The details of the burner unit do not of themselves form any part of the present invention, but it will be understood that I may employ, and herein show, a burner for liquid hydrocar-

bons from which constant effective combustion may be obtained at a relatively low fuel input.

A suitable cylindrical member or stack 9, the lower portion of which serves as a combustion chamber and the upper portion of which conducts flue gases away from the burner, extends upwardly of the burner and the hot flue gases flow upwardly through this member to a transverse passage 10, herein shown as having a lower wall 11, and an upper wall 12 of substantially greater thickness. It will be noted that the upper wall 12 may be formed with a circumferential downwardly extending border flange 13, which may be received in any suitable backing 14 of a heat and cold insulating substance.

The heated flue gases and the like flow through member 9 and passage 10 and are taken off by the upwardly extending flue 15. The wall 12 may be of metal of substantial thickness and of course, like the wall of the upper portion of member 9, is directly subjected to the generally constant flow of heated gases therebeneath. A suitable aperture 16 may be provided having bottom flange 17 for retaining a hot plate 18 whereby access to the top of the chamber 9 may be had. The lower, combustion chamber portion of the member 9, as will be understood, attains a very high temperature due to the existence of the open flame of the burner therein.

The space within the stove forms an oven which may be closed for example by any suitable door 20, this door preferably being double and including an interior 21 filled with rock wool or any other suitable insulating substance, and having a suitable handle 22 for the manipulation thereof.

I illustrate the oven space within the door as divided in two parts by a horizontal intermediate heat conducting element 25, herein shown as a single casting having a portion 26 conforming to and engaging the exterior of the member 9 over a substantial area with heat conducting contact. The portion 26 may be secured to the member 9 by suitable bolts 27 the opposite ends of which are anchored in a waterback 28.

When the portion 26 of the heating element 25 and the waterback are placed in position around the member 9 with the bolts 27 connecting them, it is merely necessary to adjust these bolts to compress the stack between the heat conducting surfaces to obtain an efficient heat conducting junction between the wall of cylinder 9 and the waterback and portion 26 of the element 25. This waterback, like the portion 26, engages the member 9 with an efficient heat conducting surface, consequently, when the burner is in operation the waterback becomes heated by conduction of the radiant heat through the wall of member 9. It is contemplated that a water storage tank, not here shown, will be positioned remote from the range proper. Suitable conduits 28*a* and 28*b* lead to and from the tank and connect with ducts 28*c* and 28*d* which extend through the waterback. Thus it will be seen that when the waterback becomes heated by conduction from the member 9, water circulating through the tank, conduits 28*a* and 28*b* and ducts 28*c* and 28*d* becomes heated and eventually the water in said tank attains and is maintained at an elevated temperature.

It is desirable that the partition 25, portion 26 and waterback 28 be constructed, cast in the present embodiment, from a metal having efficient heat conducting qualities. In the case of the partition 25 I may, for example, employ an aluminum casting having radially extending fins 29. The result is that the radiant combustion heat and the heat of the flue gases not only heat the walls of the member 9 which are exposed to the oven space, but also the castings 25—26 and 28. Thus heat is conducted by the member 25 throughout the bottom of the upper oven space and throughout the top of the lower oven space. As the top of the upper oven space is formed by the plate or wall 11, it is also directly subjected to a heated surface from above. I provide preferably a second heat conveying plate 30, which may include a flange 31 which can be directly bolted to the plate 11 and which thus serves further to conduct heat about the upper oven area. It will thus be evident that the entire oven space may be adequately and constantly heated as long as combustion is maintained within the pot 5. The upper oven space will be considerably hotter than the lower and may be employed as a searing or initial oven, while the lower space is satisfactory for lower temperature cooking. Furthermore, I find that the element 25, being in heat conducting engagement with the chamber 9 becomes very hot and is well adapted for searing and broiling meat and the like. Contact between the hot metallic surface and the meat is prevented by the fins 29 upon which the cooking surface of the meat rests. The grease which results from the searing or broiling operation collects in the grooves between the fins, these grooves sloping downwardly toward the edge of the element 25 around which a trough 34 extends. Since the element 25 must necessarily attain a high temperature to sear or broil, and since the atmosphere of the oven attains a high temperature, it is desirable that some means be provided for removing the melted grease from contact with any part of the element 25 to prevent its burning, smoking, and imparting an objectionable flavor to the meat. It will be readily understood that the efficiency of my improved range will be increased by securing another heat conducting element to the wall of chamber 9 or to the element 25, to radiate conducted heat from the back wall of the oven.

For removing the grease from the heated zone of the range there is disclosed herein a sump 25*a* at the lowest point of the edge of the element 25 and trough 34. A grease outlet located at the bottom of the sump connects with a pipe 25*b* which extends through the insulation and has its outlet over a receiving pan 25*c* hooked onto the outside of the range. This pipe having contact with the element 25 is maintained at a sufficiently high temperature to be free of residual, clogging grease at all times. It will be understood that the grooves between the fins 29 and the trough 34 all slope to direct grease into the sump 25*a*. By the present construction I have provided a construction wherein the heating agency is at the lower surface of the meat and one in which the accumulated grease resulting from the cooking is carried away to prevent burning, smoking, igniting, and contamination of the meat. Furthermore, the heating element or pan is kept relatively free from disagreeable accumulations of grease and this lends to the general cleanliness of the range.

It is to be particularly noted that with the above construction I have utilized as efficiently as possible the radiant heat of the burner flame for heating two sides of an oven, and the conducted heat to heat the remaining walls by conduction without deflecting the gases out of their

natural course of escapement, that is, upwardly and transversely to the draft of the flue 15. This advantage is attained herein by first constructing the gas passage in a manner to efficiently eliminate formation of carbon, then utilizing the combustion chamber wall and a maximum portion of the passage so constructed as oven wall and supplementing the heating function of the combustion chamber wall and this passage by providing heating elements as oven walls, these heating elements being connected as directly and efficiently as possible with the combustion chamber wall and the passage wall to reduce the possibility of heat losses between the burner flame and the portions of the heating elements in the oven space to a minimum.

It is to be noted that the main heating element 25 is connected to the stack 9 at a point which is in the vicinity of the flame and thus very hot. Furthermore it extends directly into the oven space and in such a manner that it heats both upper and lower oven spaces, thus eliminating the use of a second burner to heat the two ovens. Thus it will be seen that I have conducted the direct heat of the burner flame to a maximum portion of the oven wall below the burner but have allowed the combustion gases to continually rise.

In order to further prevent heat losses, I may, if desirable, employ insulated hinged cover members 32, each one of which includes an outer shell 33 with a filling 34 of rock wool or the like, whereby heat losses from the stove member 12 may be prevented when the stove is not in use.

A practical employment of my cook stove is to maintain at least a minimum combustion in the fire pot 5 so that there is a constant upward flow of the hot flue gases which heat the surfaces of the member 9 by radiation and conduction, the plate 25 by conduction, the plate 11 by conduction, and the plate 12 by conduction. When so employed, the stove is constantly ready for use. As the fire pot type of liquid hydrocarbon burner is highly efficient and employs cheap fuel in relatively small quantities, it may actually be cheaper to keep the stove constantly heated than to let it go out. However, I may employ any suitable control means for the hydrocarbon passage 8 and may operate the stove intermittently or control it according to the desire of the user for the particular problem involved. In any event, the employment of a thoroughly insulated stove body and the prevention of heat losses by the employment of the hinged covers 32 together with the other features as above described, provides a stove which is highly efficient, which is constantly ready for use, and which employs a minimum of fuel and therefore is a maximum economy.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. As an article of manufacture, a broiler plate unit for attachment in a range or the like by engagement in heat conducting relationship with a heated portion of the range, said unit being formed from a heat conducting material and having a cooking element and a mounting member, said mounting member including an element extending substantially normal to the cooking element and having an abutment contact surface of substantially greater area than that of the cross section of said cooking element and shaped to conform to the configuration of the heated portion of the range to which it is attached, and means on said mounting member for securing a tight, heat conducting abutment engagement between the surface of said mounting element and the heated portion of the range.

2. As an article of manufacture, a broiler plate unit for attachment in a range or the like by engagement in heat conducting relationship with a heated portion of the range, said unit being formed from a heat conducting material and having a cooking element and a mounting member, said cooking element comprising a heat conducting plate having a peripheral groove, said groove being constructed to slope when the plate is in a substantially horizontal position, a sump at the lowermost point of the slope and an outlet in said sump for delivering away grease accumulated during the cooking process, said mounting member including an element extending substantially normal to the cooking element and having an abutment contact surface shaped to conform to the configuration of the heated portion of the range to which it is attached and means on said mounting member for securing a tight, heat conducting abutment engagement between the surface of said mounting element and the surface of the heated portion of the range.

JAMES L. BREESE.