E. V. COULSTON.

STOVE STRUCTURE.

APPLICATION FILED MAR. 6, 1911.

1,032,816.

Patented July 16, 1912.

3 SHEETS—SHEET 1

Fig. 1.

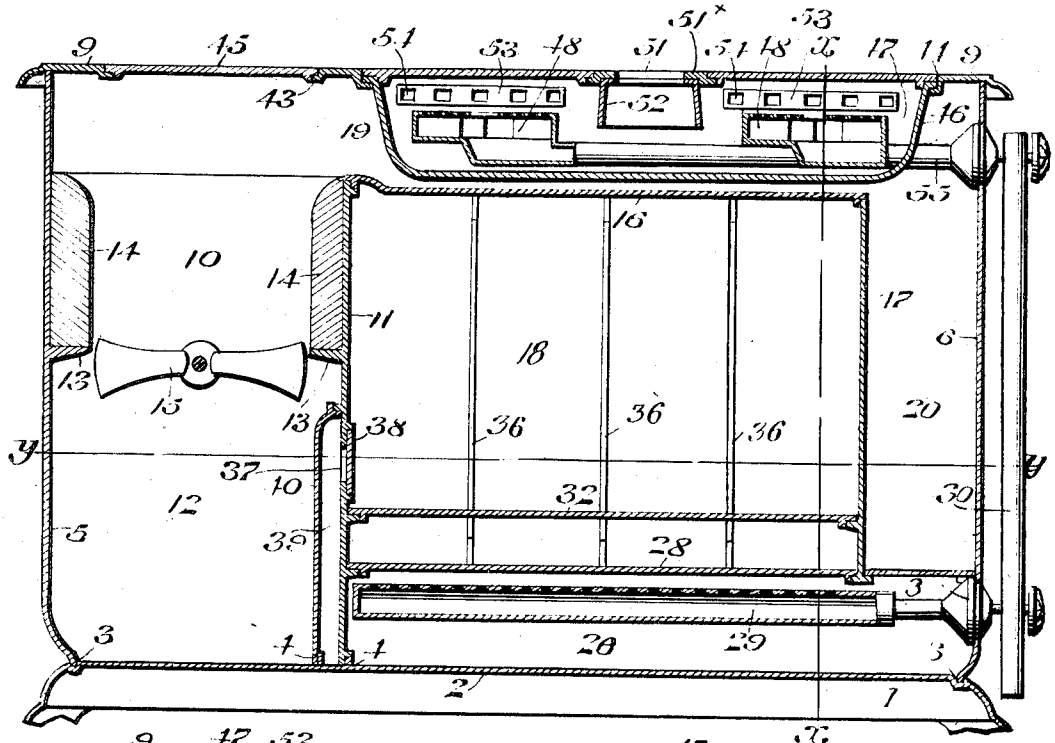
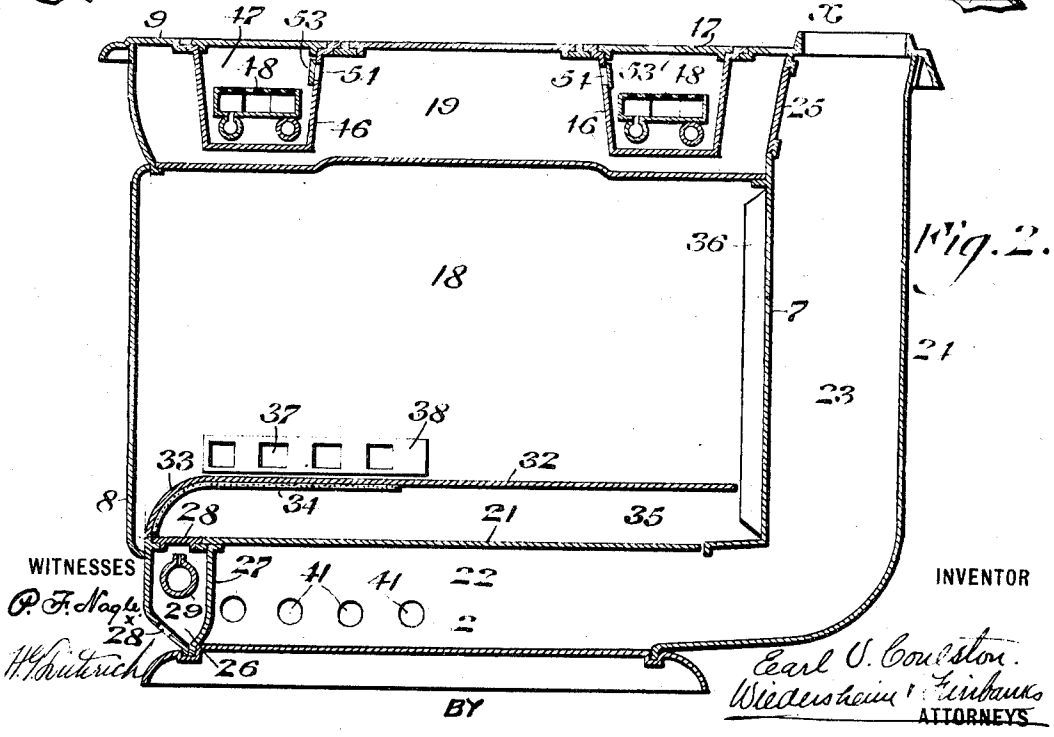


Fig. 2.



WITNESSES

P. F. Nagle

W. Fruterich

INVENTOR

Earl V. Coulston.

BY

Wiedenheim & Fairbanks

ATTORNEYS

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3 SHEETS—SHEET 2.

Fig. 3

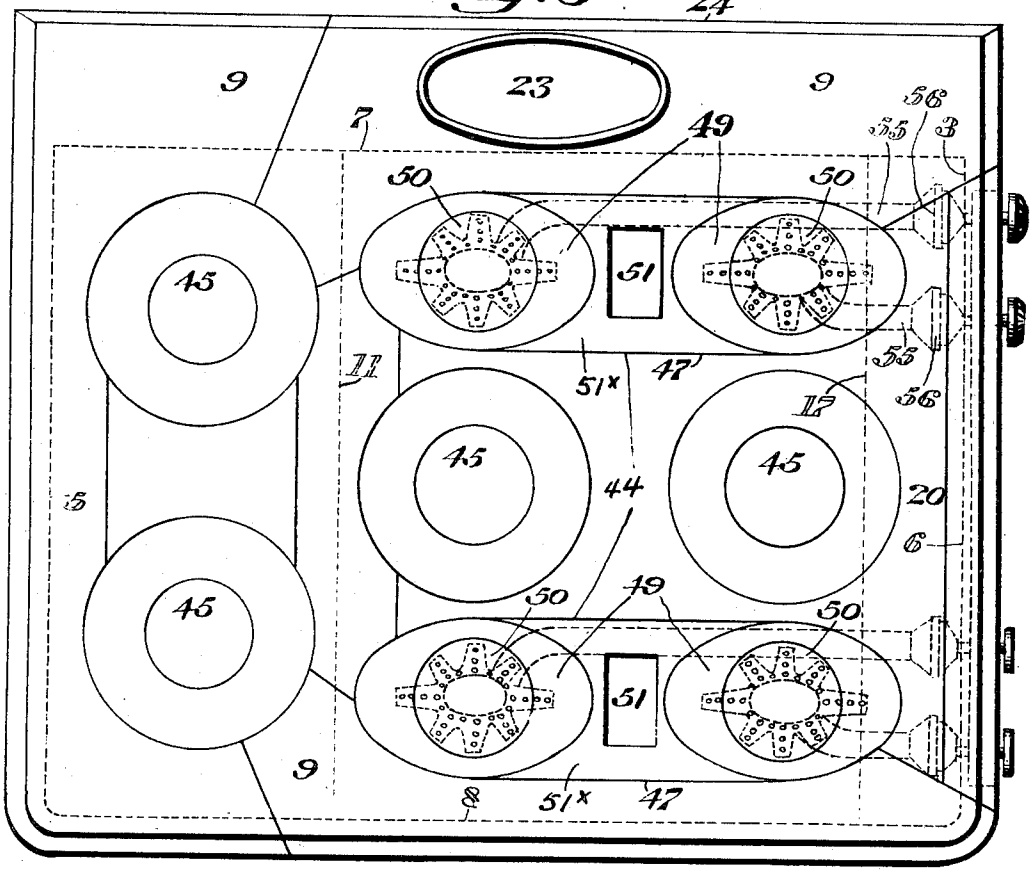


Fig. 4.

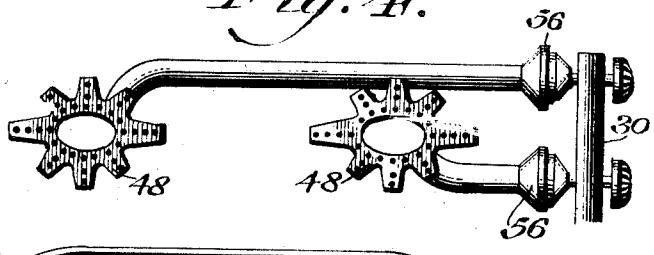
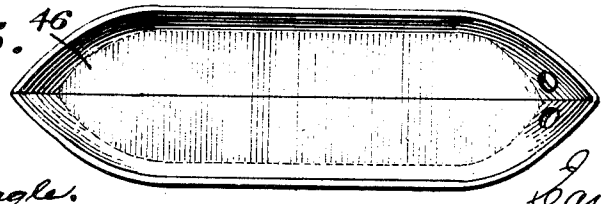


Fig. 5.



WITNESSES

P. F. Nagle.

H. G. Dieterich

BY

INVENTOR

Earl V. Coulston.

Wiedersheim & Fairbairn

ATTORNEYS

E. V. COULSTON.

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3 SHEETS—SHEET 3.

Fig. 6.

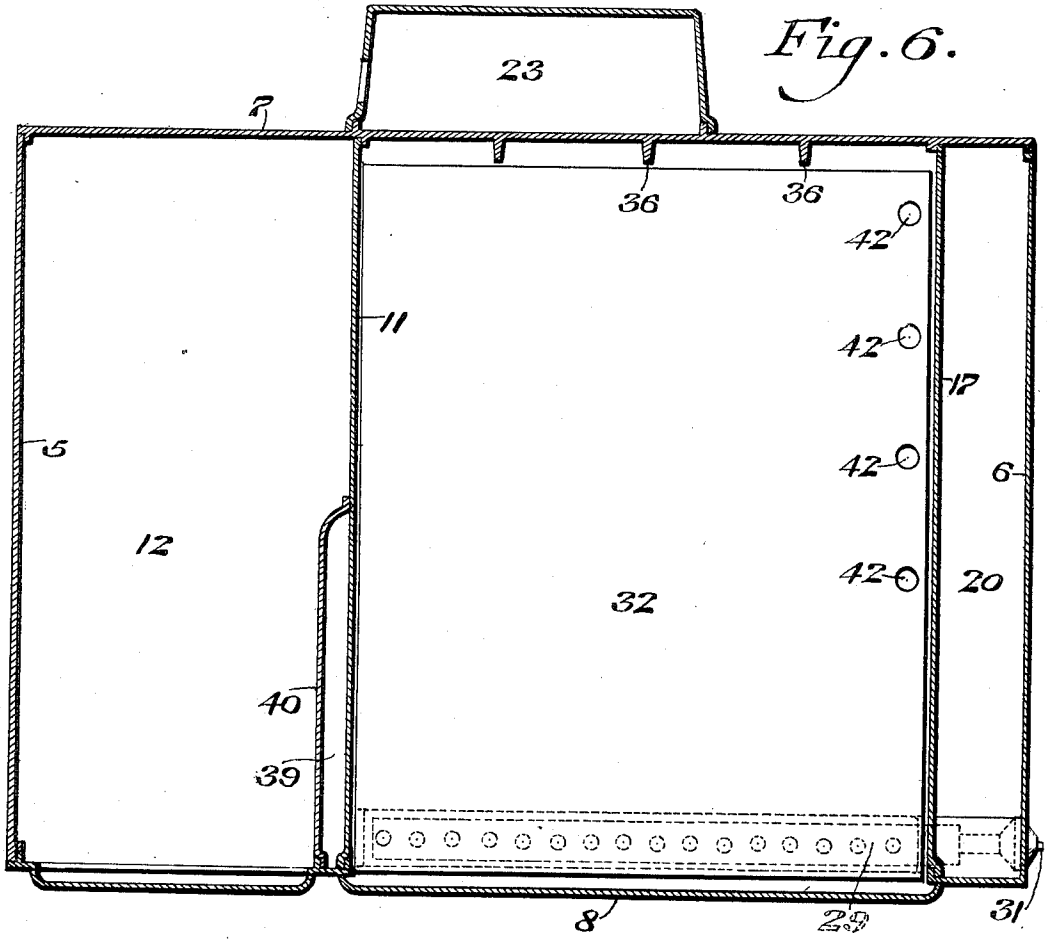
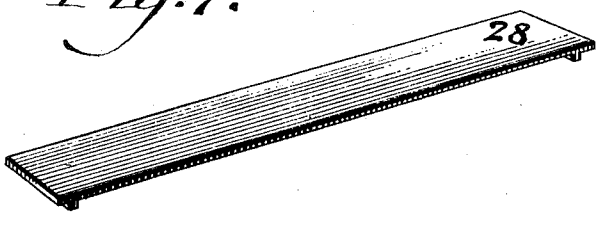


Fig. 7.



WITNESSES

P. F. Nagle.

H. G. Dieterich

BY

INVENTOR

Earl V. Coulston

Wiedersheim & Fairbanks

ATTORNEYS

UNITED STATES PATENT OFFICE.

EARL V. COULSTON, OF CLEVELAND, OHIO.

STOVE STRUCTURE.

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Application filed March 6, 1911. Serial No. 612,443.

To all whom it may concern:

Be it known that I, EARL V. COULSTON, a citizen of the United States, residing in the city of Cleveland, in the county of Cuyahoga, State of Ohio, have invented a new and useful Stove Structure, of which the following is a specification.

This invention relates to an improvement in stoves or ranges for cooking and baking and has for an object to provide a range with a single oven and which may be used either as a coal burning range or a gas range.

It has for a further object to provide a range wherein very little moving or changing of the parts is needed to transform the range from a solid fuel burner to a gas fuel burner or vice versa, and furthermore the various adjuncts forming the novel features of my range are so disposed, when in operative position, as to avoid interference with the successful operation of the stove with either fuel and when the range is used as a coal or other solid fuel burner it is not necessary to remove any of the gas burners to effect proper operation.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof, which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a sectional front elevation of a range embodying my invention. Fig. 2 represents a section on line *x*—*x* Fig. 1. Fig. 3 represents a plan of the top of my novel range. Fig. 4 represents a detail of the gas burner apparatus. Fig. 5 represents a plan of one of the gas burner casings. Fig. 6 represents a section on line *y*—*y*, Fig. 1. Fig. 7 is a perspective of the closure plate hereinafter specifically referred to.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings: 1 designates the base of my novel stove or range the same, in the present instance, having integral therewith the bottom plate 2 provided preferably with grooved portions 3 and flanges 4 with which suitable parts coöperate for the proper assembling of the device.

5 and 6 designate the side walls for the range, while 7 and 8 designate the rear and front walls, respectively, of the same, the front wall 8 having the usual doors to oven, ash pit, etc. The respective walls are preferably seated in the grooved portions 3 of the bottom plate 2 in order that a close joint may be formed between the several parts.

9 designates the top of the range which is suitably fitted for engagement with the walls and forms with the walls and bottom 2, a complete range casing.

10 designates a combustion chamber or fire box for solid fuel, the same being formed by the end wall 5 and a partition 11 transversely disposed within the outer casing, while below the combustion chamber 10 is the usual ash pit 12, as will be readily understood. In the present instance, I have provided the front wall 5 and the partition 11 with inwardly projecting flanges or lugs 13, for the purpose of forming a suitable support for the fire box lining 14, it being noted that these flanges 13 extend in close proximity to the grate 15, which latter may be of any suitable or conventional form. It will be noted that the partition 11 is spaced from the top plate 9 and has seated thereon a plate 16 which, together with the end plate 17 the bottom oven plate 21 and side 7 and front wall 8 forms the oven 18 of the range. The plate 16 being spaced from the top 9 forms a passage 19 leading to the other end of the range, where it communicates with a second passage 20 formed between the wall 6 and the side plate 17 and extending downwardly to the bottom 2. Attention is here directed to the fact that the oven structure is spaced from the bottom 2 and its oven bottom 21 forms, with the said bottom 2, a passage 22 which is a continuation of the aforesaid passages 19 and 20.

23 designates a flue having communication with the passage 22, the same being formed between the rear plate 7 and the outer wall 24, as will be apparent.

25 designates a damper located between

the flue 23 and the passage-way 19 whereby the products of combustion may be directly delivered into the flue structure for the purpose of producing the required draft when starting a coal or like fire, it of course being understood that this damper is closed when the fire is well under way and the products then pass by a circuitous path around the oven 18 to the flue 23.

26 designates a chamber for housing and protecting a gas burner, said chamber being formed by the front wall 8, a partition 27 and a detachable plate 28, the latter forming a closure at one end of the oven bottom 21 and used when the range is burning coal. When the range is to be used with gas the closure plate 28 is removed to allow the heat to pass through the oven to the point of exit.

28× designates openings in wall 8 to admit air for the support of combustion in chamber 26.

29 designates a gas burner extending in the present instance substantially the length of the chamber 26 and having communication with a suitable gas supply pipe 30, said burner being controlled by any suitable type of valve 31.

32 designates a baffle structure suitably spaced from the oven bottom 21 and preferably having a curved portion 33 above the gas compartment 26 and secured to which is a suitable lining 34 of asbestos, this baffle being the actual bottom of the oven when gas is used and forming the space 35 through which the hot products are conveyed to the rear of the interior of the oven. The baffle plate 32 preferably terminates adjacent the side wall 7 so that a space is provided to permit the products of combustion to pass freely from the channel 35 to the oven proper and it will be noted that ribs 36 are formed on this rear wall 7 to form abutments for the plate 32 and also to provide passages directing the products to the interior of the oven 18. Exits for these gas products from the oven 18 are provided by the openings 37 in the partition 11, which are controlled by means of a register 38, the same being open during the gas operation of the range but closed when coal or solid fuel is used. It will thus be apparent that the baffle plate 32 causes the products of combustion to pass substantially from one side of the oven casing to the other, returning within the oven, thereby forming a tortuous path by means of which the full value of the heat units of the products is abstracted. Attention is directed particularly to this feature, as thereby the products pass along the channel formed between the baffle plate 32 and the oven bottom 21 to one side of the oven and then are diffused through the oven and directed to an exit substantially above the burner. The products passing through the openings 37 enter the flue space 39 formed by the plate 40 from which they are delivered through ports 41 into passage way 22 and thus led to the flue 23. Additional ports 42 Fig. 6 may be provided in the baffle plate 32 at a point approximately opposite the openings 37 in partition 11 to surely admit some of the hot products to all portions of oven 18 and thus insure an equality of heat therein. The top 9 of the range is preferably provided with a plurality of openings 43 and 44 therein, the former of which are preferably circular and allow access to the fire box or combustion chamber 10, it being understood that suitable lids 45 are provided as closures. The openings 44, in the present instance, are substantially elliptical in contour and each has secured therein a casing 46 forming a chamber 47 in which a plurality of gas burners 48 are located.

49 designates suitable lids for closing the respective elliptical openings and the same are preferably provided with suitable openings to permit access to the burners, which openings are closed by the lids 50.

51 designates openings in each cross piece 51×, between the lids 49 for the purpose of admitting air to the burner chambers 47 and, as here shown, I have provided adjacent each opening depending members 52, which direct the air downwardly and permit it to pass properly beneath and through the burners.

53 designates suitable registers controlling ports 54, leading to the passage way 19, the said ports 54 permitting the products to pass by way of passages 20 and 22 to the flue 23. Suitable conduits 55 conduct the gas from the supply pipe 30 to the gas burners 48 and of course, suitable valves 56 are provided to control the flow of gas.

In the operation of the range with coal or like fuel, the registers 53 are closed, as is also the register or damper 38, while the baffle plate 32 is removed and the plate 28 seated in place over the gas burner chamber 26. It will of course be understood at this time that all the gas valves are closed. With the range in this condition the fire is started in the fire box 10 in the usual way, the damper 25 being opened to produce a strong draft for starting purposes, and after the fire is well under way, the damper 25 is closed thereby deflecting the products of combustion through the passages 19, 20 and 22 to the flue 23, thus subjecting the oven on all sides but one to heat and getting the full value of the products of combustion so that the oven is quickly and highly heated for baking, roasting, or other similar purposes. The several lids 45 may of course be removed and cooking utensils used in their place, as is customary. It will be noted that

the casings 46 forming the gas chambers 47 are long and narrow and placed "endways" so as not to obstruct the free flow of the products along the passage 19 and I have in Fig. 5 shown the preferred form of this casing which has tapered ends, well adapted for the purpose intended. The entire construction avoids angular turns or recesses which would cause eddies and consequent obstruction to the draft and aside from casings 46, there are no obstructions in the flues but those common to coal stoves.

In order to operate the range with the top gas burners 48, the ports 54 are opened by shifting the registers 53 and the air port 51 is also open so that the draft produced by the chimney to which the range is attached by the usual stove pipe, will "draw" in sufficient air through this opening to support combustion at the burners and the gas products from these lighted burners pass through the openings 54 to the passage 19 and thence around the oven to the flue 23. It will be noted that the gas burners 48 are supported above the bottom of the casing 46 in order to permit air to properly pass under and through the burners. This feature of permitting the gas products to pass around the oven is an important one, as thereby a large heating surface is provided and the full value of the heat products is taken advantage of before the same are discharged through the flue 23, thereby saving a large amount of waste heat, which ordinary gas ranges fail to do.

When it is desired to utilize the oven gas burner 29, the plate 28 is removed in order to throw the chamber 26 in direct communication with the passage 35 below the baffle plate 32 which at this time is in operative position, as shown in Fig. 2 of the drawings. The burner 29 is now lighted and the hot products of combustion are "drawn" by the chimney draft along passage 35 around the baffle 32 and through the space formed between the ribs 36 and also through openings 42, thus passing directly into the oven 18 from which egress is had by way of openings 37 which carry the products through passages 39 and 22 beneath the oven to the flue 23.

It will now be apparent that I have produced a range well adapted for the purpose intended in that coal or other solid fuel may be utilized for all culinary purposes or in place thereof the gas burners may be brought into use and perform exactly the same function. It often happens that cooking is desired quickly when the coal fire which is in the range, is in a dull condition, as early in the morning, and at such times the gas burner feature may be used effectively, with great saving of time.

In gas ranges, as heretofore constructed, the products of combustion are generally discharged directly into the atmosphere and the fumes and noxious gases are not only exceeding disagreeable, but injure the health of persons in the room. By my novel invention the gas products are not discharged into the room at all but are conducted through passages around the oven to the flue and there discharged to the exterior of the room. The advantage of this type of range is very apparent, as it can be operated with gas during the summer months, and in the cooler weather less expensive fuel, such as coal or wood, may be used. It is also apparent that the one stove will serve the purpose of two heretofore used, and it is not necessary to change from one stove to another when it is desired to use gas instead of coal, or coal instead of gas and with either fuel the device operates efficiently and satisfactorily. A further advantage in the use of this range with gas resides in the fact that the fire box may at this time be a receptacle for waste papers, rubbish, and the like, which may be burned at any time, and the heat generated by such burning assists in heating the oven and thereby reduces the amount of gas required for cooking and the like.

A peculiar advantage of this construction is that no gas burners, either at the top or at the oven, need be removed to burn coal. The burners as well as the complete coal fixtures are always in position and ready for use.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character described a cooking stove comprising a fire box, an oven, flues surrounding said oven, a front wall, with doors, inclosing said fire box, oven and flues on one side, a removable plate in bottom of said oven just inside one of the doors of the front wall, a chamber below said plate formed on one side by said front wall, said front wall having openings in communication with said chamber to admit air for the support of combustion a burner disposed in said chamber, a deflector spaced above the oven bottom forming a circulating space which communicates with said chamber and with oven space above substantially opposite, said oven having a closable vent substantially opposite the latter point of communication, and means connecting said vent with said flues.

2. In a device of the character described, a cooking stove comprising a fire box, an oven, flues surrounding said oven, a front wall, with doors, inclosing said fire box, oven and flues on one side, a chamber below said oven formed on one side by said front wall, said chamber having openings in one of its

walls to admit air for the support of combustion a burner disposed in said chamber, a deflector spaced above the oven bottom forming a circulating space which communicates with said chamber and with oven space above substantially opposite, said oven having a closable vent substantially opposite the latter point of communication, and means connecting said vent with said flues.

EARL V. COULSTON.

Witnesses:
W. R. GREEN,
S. L. EXLINE.