

July 9, 1935.

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2,007,679

## COMBINATION GAS AND COAL RANGE

Filed March 29, 1933

2 Sheets-Sheet 1

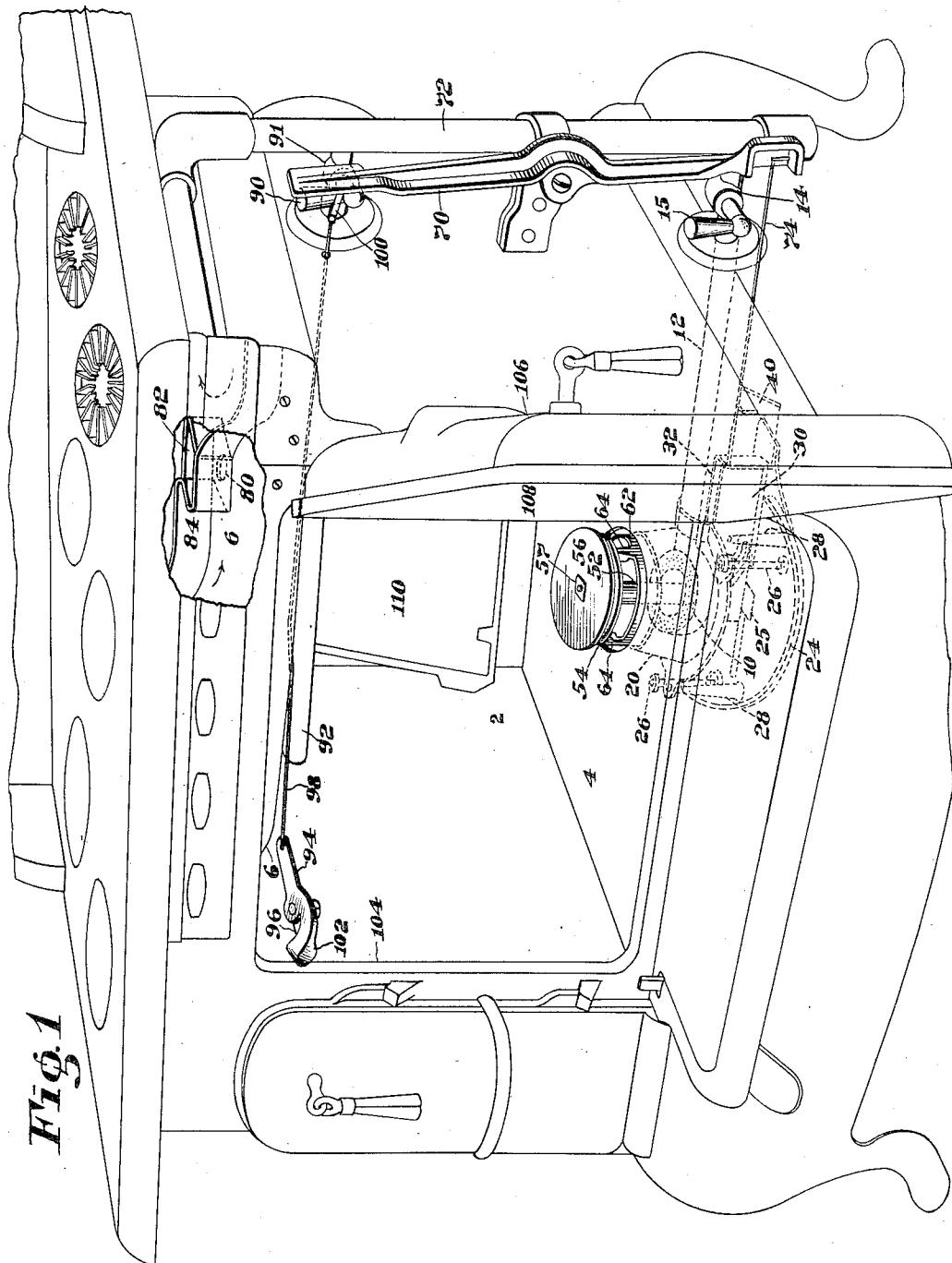


Fig. 1

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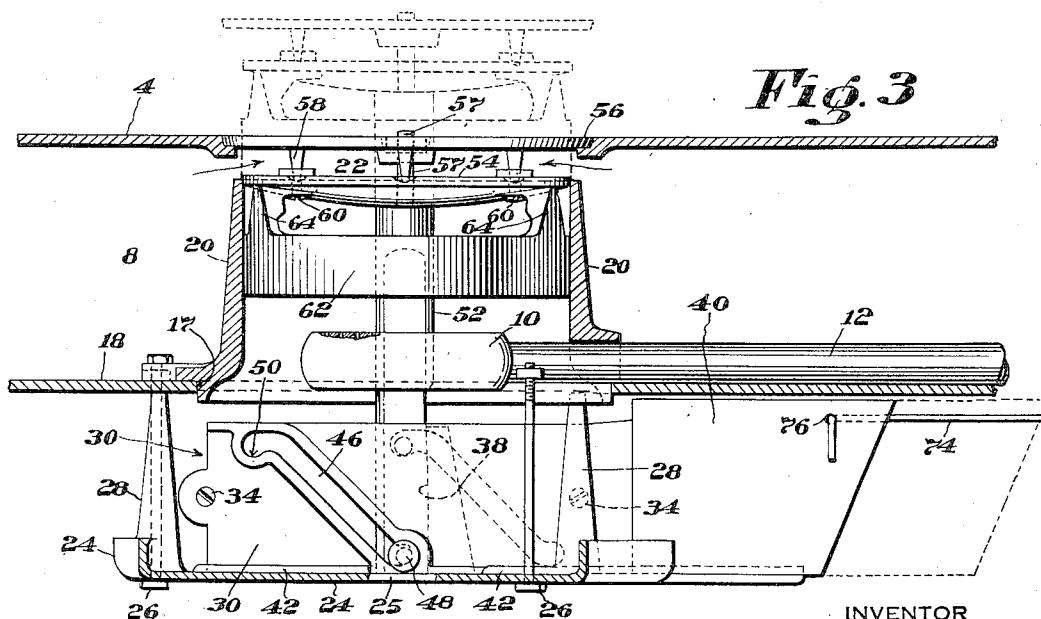
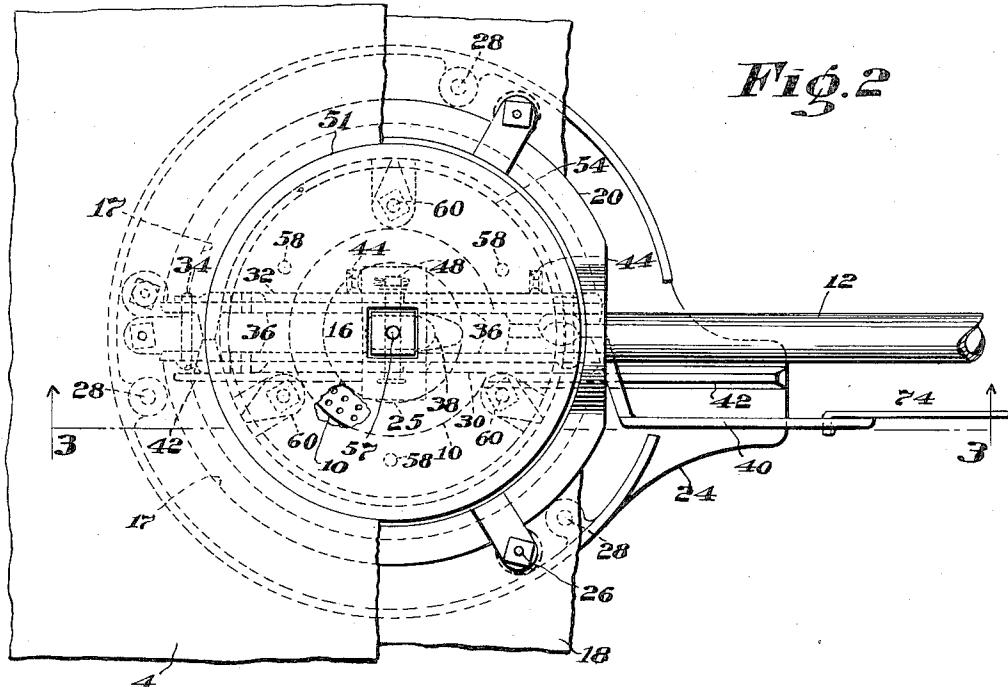
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## COMBINATION GAS AND COAL RANGE

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,007,679

## COMBINATION GAS AND COAL RANGE

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Application March 29, 1933, Serial No. 663,359

10 Claims. (Cl. 126—36)

My invention relates to improvements in combination gas and coal ranges, and particularly in the oven construction thereof. Present stove constructions designed to allow interchangeable heating of a single oven by coal or gas, sacrifice the efficiency of their coal oven heating in order to provide successful gas combustion and adequate heating of the oven by the gas burner.

10 The efficiency of oven heating by coal varies according to the area of oven floor which is exposed to the circulation of the products of coal combustion. In the usual range for oven heating by coal alone, a flue is consequently provided beneath the entire oven floor to allow an even and 15 thorough heating of the oven by conduction through every portion of the oven floor.

Oven heating by gas is accomplished not by conduction through the oven floor, but by direct passage of the products of gas combustion into 20 the oven.

Heretofore, in combining the two types of heating for a single oven, the products of gas combustion usually have been guided into the oven from a burner, located beneath the stove 25 for proper combustion, by rising through a tubular pipe or passageway through the coal flue underlying the oven. The wall surrounding this passageway prevents the escape of the products 30 of gas combustion into the coal flue, and conversely prevents circulation of the products of coal combustion into the passageway and contact 35 of the said products with the portion of the oven floor at the top of the passageway, usually centrally of the oven floor.

Not only is a thorough and even heating by 40 coal prevented by lack of full circulation, but relatively cold air, circulating in the passageway from below during coal operation, contacts the oven floor at the top of the passageway. Such a cold spot is a detriment to efficient coal heating.

For this reason, it has been common to provide two separate ovens, one for each type of heating, in order to insure maximum exposure of one oven floor to the products of coal combustion, and 45 proper ventilation and adequate exposure to the other oven for the gas burner.

The object of my invention, therefore, is to provide a single oven range which allows thorough, even and efficient heating of the same 50 oven by either gas or coal as required.

This is accomplished by retaining the benefits 55 of the flue arrangement of the ordinary coal range during coal operation, and by providing a novel method of creating a direct passageway for products of gas combustion from a perfectly ventilated

gas burner, through the flue into the oven, when gas heating is required. During coal operation, my construction provides a coal flue which allows the circulating products of coal combustion to contact substantially every portion of the oven floor to provide an even conduction of heat through every portion thereof. My gas burner is located underneath this flue, directly accessible to the outside atmosphere assuring complete and rapid combustion, and, when gas heating is desired, is placed in communication with the oven by mechanically lifting portions of the flue bottom and oven floor directly over the gas burner so that the flue bottom portion is moved to a level above the plane of the oven bottom. The 15 products of gas combustion thus rise through the resultant openings and are deflected into the oven by a convex under side of said flue bottom portion. To prevent the escape of the products of gas combustion into the surrounding section 20 of the underlying coal flue during gas operation, I provide a suitable cut-off positioned by the same movement which raises the above mentioned portions of the flue bottom and oven floor. I further provide an open vent in the oven ceiling which connects with the stove chimney and serves to insure circulation through the oven. During gas operation, this allows a steady draft from beneath the stove, carrying the products of 25 gas combustion into the oven from which they pass out through the vent into the chimney flue. These combined advantages insure a steady replenishment of products of gas combustion in the oven, to produce most successful gas heating.

Together with these improvements I provide a safety device which is operative in conjunction with the operation of the oven conversion means, all of which will be more readily understood and whose benefits more readily appear by reference 30 to the accompanying drawings:—

Fig. 1 is a perspective view of my stove with part of the front broken away and in readiness for gas oven heating;

Fig. 2 is a plan of the conversion apparatus in coal heating arrangement; and

Fig. 3 is a section along the line 3—3 of Fig. 2 showing in dotted lines the arrangement for gas heating.

Referring now to Fig. 1, I show a coal range with a single oven 2, oven bottom 4 and oven ceiling 6. Underlying the oven bottom 4 is the coal flue 8 which is connected with the coal fire pot by a continuous flue as in usual coal range construction.

50 Fixedly positioned beneath the oven is the gas

burner 10 of suitable size and construction, supplied with fuel through the pipe 12 and valve 14. This burner 10 is of an annular construction to present an opening 16 therethrough for a purpose 5 to be hereinafter shown. As so placed the burner 10 is in direct contact with the outside atmosphere by reason of a circular opening 17 in the flue bottom 18 and is separated from the flue 8 by a circular hollow collar 20 bolted to the flue 10 bottom 18 and completely encircling the opening 17. As shown clearly in Fig. 3, this collar is of a height less than the distance from the flue bottom 18 to the oven floor 4, thus leaving the space 22 between the top of the collar and the oven. 15 From the flue bottom 18 is suspended a circular plate 24 attached to the bottom 18 in my stove by bolts 26 and firmly positioned by three tapering pins 28, only two of which are shown in Fig. 3 which press against the stove bottom 18. 20 Slidably mounted on this plate are two bars 30 and 32 fastened together at the ends by bolts 34 to leave the elongated opening 36 into which projects a vertical pin 38, integral with the plate 24. 25 The bar 30 has an integral extension 40, the whole piece 30, 32 and 40 being guided in its horizontal sliding movement by flanges 42, 42 and guides 44. In each of the bars 30, 32 are bevel slots 46, 46 shaped to enclose a pin 48 and 30 to provide a dwell 50.

Pivotedly connected with the pin 48 between the bars 30, 32 is a shaft 52 freely movable through the opening 16 in the burner 10, and piercing a plate 54 which has a convex bottom 35 and is of a dimension equal to the inner circumference of the collar 20, thus forming a closure therewith. The shaft 52 is also rigidly fastened to a cap 56 by the smaller bolt extension 57, the cap 56 being of a slightly larger diameter than plate 40 54 and forming a part of the oven bottom 4 by being seated therein in the same plane. The cap 56 and plate 54 are kept space separated and parallel by three narrow pins 58, 58, 58.

Suspended from plate 54 by bolts 60, 60, 60, 45 is a member comprising an annular band 62 of a diameter equal to the plate 54. As plainly shown in Fig. 3, the band 62 is space separated from the plate 54 except by the three connecting parts 64, 64, 64.

50 Referring now to Fig. 1, on the side of the stove is the lever 70 pivotally connected on a bracket on the gas lead pipe 72. At its lower extremity is fastened a small rod 74 which runs freely through the stove side and is fastened to the extension 40 in any suitable manner such as by twisting through the hole 76.

Fig. 3 shows the stove in coal operative position. It will be seen that the circulation of the products of coal combustion through the flue 8 60 is continued between the oven bottom cap 56 and the plate 54 without escape below due to the closure by the co-operation of the plate 54 and the collar 20. The three narrow pins 58 and the shaft extension 57 are the only obstruction, thus 65 allowing complete circulation beneath substantially all of the oven floor.

To prepare the stove for gas operation, the lower end of lever 70 is pulled away from the stove, thus sliding the extension 40 and plates 70 30, 32 horizontally on the plate 24. The pin 48 comes against the stop 38 and is forced to roll along the bevel slots 46, 46 until it comes to rest in the dwell 50 as shown by the dotted lines in Fig. 3. As a consequence of this movement of 75 the pin 48, the shaft 52 with the plate 54 and

cap 56 have been raised to the position shown by the dotted lines and the band 62 extends from the collar top 20 to the opening in the oven bottom 4 left by the raising of the cap 56. The gas burner is thus exposed to the oven and the products of gas combustion rise and are dispersed by the convex bottom of the plate 54 through the space between the plate 54 and the band 62 into the oven. In thus fully describing my mechanical means for raising the cylinder, I disclose my preferred construction.

As a further aid to proper combustion in the gas burner 10, and to allow circulation of the products of gas combustion through and escape from the oven, I provide a vent 80, shown in Fig. 1, located in the back oven ceiling and communicating with the outgoing coal flue over the top of the angle piece 82 which is of less height than the partition 84 upon which rests the upper flue top (not shown). The angle piece 82, while allowing escape of gases from the oven through the vent to the chimney, thus prevents the backing down of the products of coal combustion during coal operation. More perfect under-draft is obtained by providing the plate 24 with openings 20 or an opening such as 25.

My safety device consists of a lever 70 so positioned that when the stove is in readiness for coal operation the lower end of the lever will contact the valve handle 15 thus preventing opening of the valve 14 without moving the lower end of the lever away. After the latter operation, the stove is ready for gas heating operation (as shown in Fig. 1), and the upper part of lever 70 contacts the valve handle 90 thereby preventing opening of the valve 91 controlling the flow of fuel to the boiler burner 92. Both valve handles 90 and 15 are shown in closed position in Fig. 1. It thus appears that both valve handles may not be opened simultaneously nor remain open simultaneously.

To insure proper ventilation for the broiler burner 92, I provide means for preventing flow of fuel thereto until and except when the oven door is open. 94 is a lever pivoted on a suitable 45 member 96 integral with the inner oven side. This lever 94 is connected at one end by the rod 98 to the valve handle 90 such as by a pivoted metallic loop 100. Thus, when the valve handle 90 is moved outwardly and downwardly to open 50 the valve 91, the rod 98 is moved horizontally, the enlarged end 102 of the lever 94 is moved against the oven door side 104, overlapping said edge on its outer side, so as to prevent closing the oven door 106. When the valve 91 is closed the lever 55 94 is in a position so that its end 102 projects into the inside concavity 108 of the oven door 106, when the door is closed. Thus before pulling down the valve handle 90 the oven door must be open.

My stove is also provided with a folding baffle plate 110 shown in Fig. 1 in folded position. This plate is of usual construction to provide, when unfolded, a flat surface over the plate 56, which projects upwardly into the oven during gas operation.

This is the preferred construction for my stove but other means for removing both or either of the sections of the flue bottom and oven floor may be provided. The height of the collar 20 may 70 be varied at will, but practice has shown that with the burner properly located, the preferred construction as shown affords sufficient flue space 22, and minimizes the degree of raising necessary to elevate the flue bottom 54 above the plane of 75

the oven bottom 4. In speaking of a combination gas and coal range, I do not mean to limit myself, for the use of oil or other fuel as a substitute for coal is contemplated.

5 I claim:

1. In a combination gas and coal range, an oven, a floor for said oven, a flue bottom spaced from said oven floor to form a flue for products of coal combustion, a gas burner under said flue, and means operative to convert a section of said flue into a vertical passageway from said burner through said oven floor for operation by gas.

10 2. In a combination gas and coal range, an oven, a floor for said oven, a flue bottom spaced from said oven floor to form a flue for products of coal combustion, a gas burner under said flue bottom, and means for raising conjunctly a portion of said oven floor, a portion of said flue bottom to expose said oven to said burner, and a 15 member to provide a barrier to passage of the products of gas combustion of said burner into the surrounding section of said flue.

20 3. In a range, an oven, a floor for said oven, a flue bottom spaced from said oven floor to form a flue for products of coal combustion, a gas burner for said oven, and means operative to remove a portion of said flue bottom and a portion of said oven floor, to convert a section of said flue into a passageway for products of gas combustion through said flue, and through the 25 resultant opening in said oven floor into said oven.

30 4. In a combination gas and coal range, an oven, a stove bottom spaced below the floor of said oven to provide a coal flue adapted to expose substantially the entire floor of said oven to the products of coal combustion circulating in said flue during operation by coal, a gas burner under said flue, and means operative to raise a portion of said oven floor and a portion of the bottom of said flue conjunctly, said portion of the flue bottom in raised position being above the 35 plane of the oven bottom.

35 5. A range of the construction as claimed in claim 4, with means operative to prevent escape of the products of combustion of said burner into the surrounding section of the underlying flue during gas operation.

40 6. In a combination gas and coal range, an oven, a coal flue underlying the entire floor of said oven, and a gas burner for said oven; a portion of said oven floor being removable, a smaller portion of the bottom of said flue being removable, an annular member attached to and spaced 45 below said flue bottom portion; means to raise said portions conjunctly; said member in ele-

5 vated position extending longitudinally of its axis from the resultant opening in said flue bottom to the resultant opening in said floor, said gas burner being positioned under and axially of said annular member.

10 7. In a combination gas and coal range, an oven, a stove bottom below and spaced from the floor of said oven, to provide a flue for the products of coal combustion between said bottom and said floor, an opening in said oven floor, a smaller opening in said stove bottom, a gas burner placed under said openings; in coal operation said openings being closed by spaced plates; means to raise said plates conjunctly, in raised position said lower plate being above the plane of the oven bottom; and, in gas operation, having an annular member positioned to cut off passage of the products of gas combustion into the surrounding section of the underlying flue.

15 8. In a combination coal and gas range, an oven, a gas burner for said oven, and a coal flue intermediate said burner and said oven; an assembly comprising two spaced plates and an annular member, the upper of which plates is a portion of the floor of said oven and the lower of which co-operates with the top of a collar to make a complete bottom for said flue above said burner; said member being within said collar, spaced below said second plate and of a height substantially equal to the distance 20 between the collar top and the oven floor, and means for raising said assembly, the top of said member, in elevated position, connecting with the resultant opening in the oven floor.

25 9. In a combination gas and coal range, an oven, a floor for said oven, a flue bottom spaced from said oven floor to form a flue for products of coal combustion, a gas burner under said flue bottom, and means to raise a portion of said flue bottom and a portion of said oven floor to provide a passageway for products of gas combustion from said burner through said floor into 30 said oven during operation by gas.

35 10. In a combination gas and coal range, an oven, a coal flue underlying the entire floor of said oven, and a gas burner for said oven; a portion of said oven floor being removable, a smaller portion of the bottom of said flue being removable, an annular member spaced below said flue bottom portion; means to raise said portions conjunctly; said member in elevated position extending longitudinally of its axis from the resultant opening in said flue bottom to the resultant opening in said floor, said gas burner being positioned axially of said annular member.

40 50 55 JOSEPH E. GLYNN.