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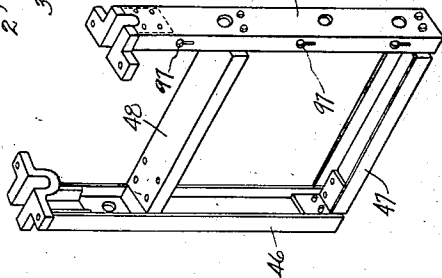
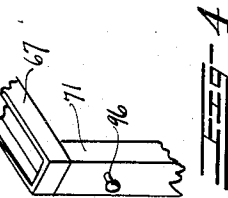
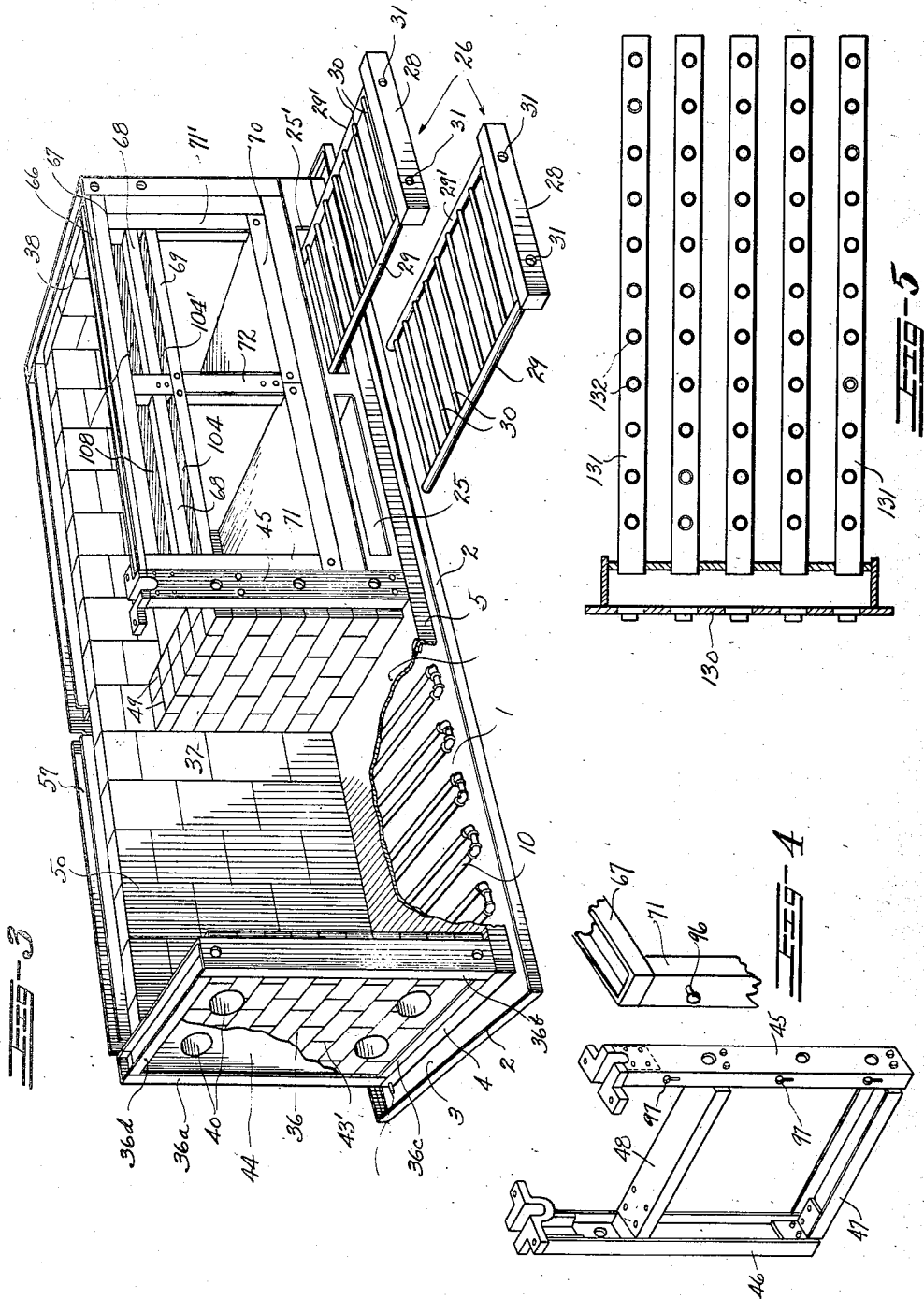
J. S. WALLACE

1,976,423

COOKING RANGE AND STEAM GENERATOR

Filed April 13, 1931

5 Sheets-Sheet 2



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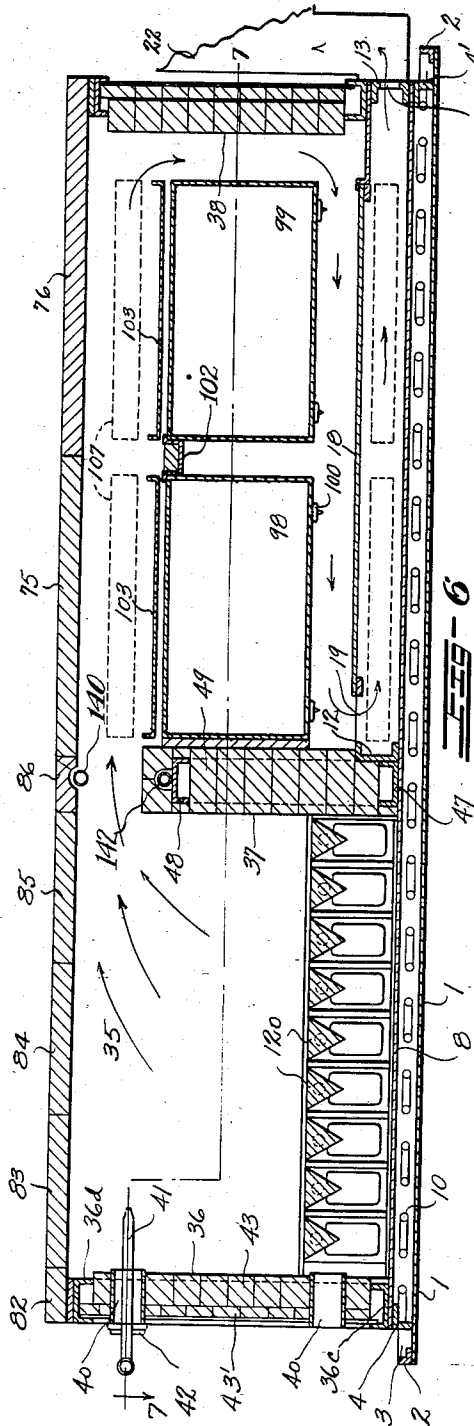
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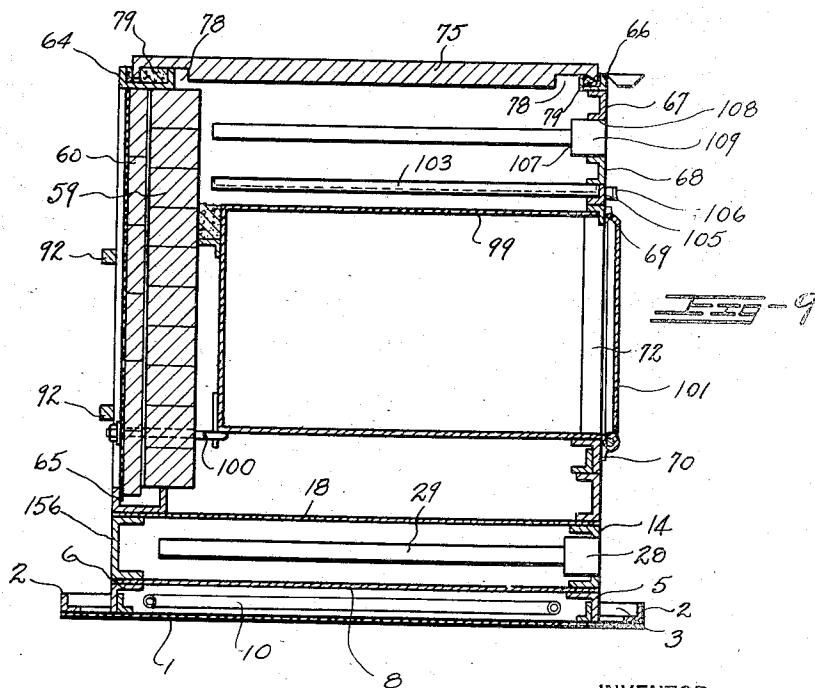
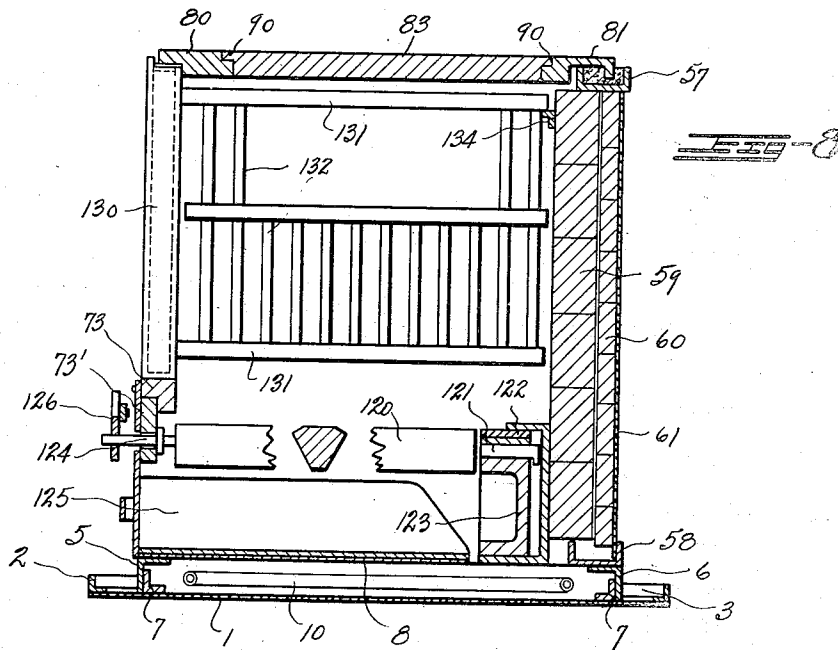
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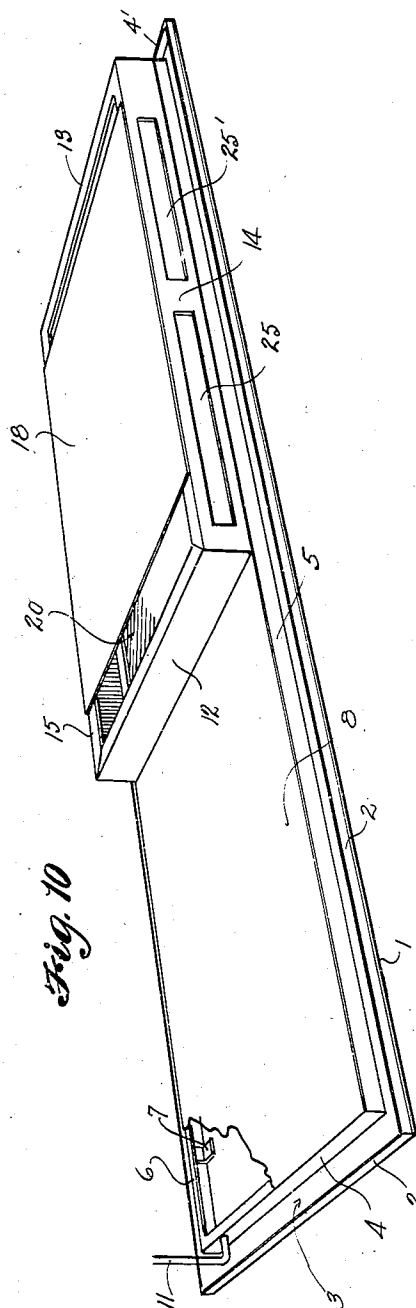


Fig. 10

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1,976,423

COOKING RANGE AND STEAM GENERATOR

John S. Wallace, St. Paul, Minn.

Application April 13, 1931, Serial No. 529,780

1 Claim. (Cl. 126—5)

This invention relates to improvements in cooking ranges and has reference in particular to ranges of a character especially adapted for use in hotels, restaurants and like places; the principal object of the invention being to provide a range of that type of construction especially suited for use where large quantities of food are prepared and where the range is continuously in use. Also, a range which will operate with maximum efficiency at a relatively small cost for all cooking purposes and also for the generation of steam and the heating of water.

It is also an object of this invention to provide a range of sectional construction, which permits of easy assembly or disassembly thereof, and makes possible the extending or shortening of the fire box or the addition or reduction of ovens to suit any specified need; also to make possible the assembling of the sections for either a right-hand, or left-hand system.

Still another object of the invention is to provide for utilizing the draft passages, and other spaces within the range for containing pipes in which water may be circulated and heated by what would ordinarily be waste heat.

It is also an object of the invention to provide a steam generating range that is insulated in a novel manner so that practically all heat will be retained within the range and the users may work without the usual discomfort due to heat. It is also an object to so dispose the insulation in the frame structure of the range that it may be assembled or disassembled with the sections.

Other objects of the invention reside in the novel details of construction of the various parts, in their combination, assembly, and use, as will hereinafter be fully described.

In accomplishing the various objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a front elevation of a steam generating range embodied by the present invention.

Fig. 2 is a back view of the range.

Fig. 3 is a perspective view of the range when partly assembled and with certain portions broken away for better illustration.

Fig. 4 is a perspective view of the frame for the partition between the fire box and ovens.

Fig. 5 is a horizontal section of one of the water boilers to be disposed in the fire box for the generation of steam.

Fig. 6 is a vertical section lengthwise of

the range; the steam boilers being removed.

Fig. 7 is a horizontal section, taken substantially on the line 7—7 in Fig. 6, particularly illustrating the various wall sections.

Fig. 8 is a vertical cross section through the furnace, or fire box, as on line 8—8 in Fig. 7.

Fig. 9 is a vertical cross section through one of the ovens.

Fig. 10 is a perspective view of the base or gutter pan with the frame of the lower water heating plates disposed thereon.

Referring more in detail to the drawings—

The present range is of what may be termed "sectional" construction, in that it is composed of separately formed sections adapted to be assembled to provide a complete range in either a right-hand or a left-hand system, likewise, sections that may be easily and readily disassembled for convenience in moving the range or for rearranging the system for the addition or subtraction of units.

In the preferred form of construction illustrated, the range proper is disposed upon a gutter pan consisting of a flat base or bottom plate 1 of sheet metal, about the edges of which angle iron bars 2 are riveted or otherwise attached so that the vertical flanges of the bars serve as the outer retaining flanges or walls of a gutter, as designated at 3; this gutter extending entirely about the range for the purpose of catching all liquid or other waste matter that may spill from the range, or which may collect upon it during the cooking operation.

Disposed symmetrically upon the plate 1 is a rectangular frame of lesser dimensions formed from inverted angle iron bars and comprising opposite end pieces 4—4' and front and rear pieces 5 and 6 that are joined securely together at their ends to provide a rigid frame structure. This frame is attached to the gutter pan or plate 1, as best shown in Fig. 10, by a plurality of straps or clips 7 and overlying the frame thus formed and riveted or welded thereto is a sheet metal top plate 8. This angle iron frame is approximately 2" high and therefore there is provided a two inch space between the plates 1 and 8. Within this space there is located a pipe coil 10, as shown in Figs. 3, 6 and 10. This I term the "insulating coil", and its purpose is to prevent any possible burning or overheating of the floor or base upon which the range is mounted. This pipe coil is composed of small water pipes, placed closely together and having their ends connected in such manner as to provide one continuous conduit, the opposite ends of which are extended to the out-

side of the frame through the end bars 4—4', where they are connected in suitable manner as by pipes 11—11a for the circulation of water therethrough. The water thus used for cooling is heated and may be put to any desired use.

Mounted upon one end of the frame which encloses the insulating coil 10 is what I have termed the "lower water plate frame". This frame, as shown best in Fig. 10, is of channel iron construction and conforms in width to the lower frame on which it rests. It comprises opposite end beams 12 and 13 and front and rear beams 14 and 15. These beams are beveled at the corners of the frame and are welded together as at 16 with the channels facing inwardly. Mounted upon this latter frame is a sheet metal top plate 18 which extends entirely across the frame but terminates at one end in spaced relation to the beam 12, thereby leaving a draft passage or outlet 19, as seen in Fig. 6.

A smoke or draft outlet 20 for the range is provided in the outer end beam 13. This communicates with a metal housing 22 fixed to the end of the range and in which a suction fan, as designated at 23, and operated by an electric motor 23a, may be employed to deliver the smoke and gas from the stove to a stack connection 24.

The front beam 14 of the lower water plate frame has cutout openings 25 and 25' lengthwise thereof, as shown in Fig. 10, and extended into the frame through these cutouts are water heating plates 26 illustrated in Fig. 3. Each of the plates comprises a hollow cast header 28, into the opposite ends of which headers the opposite side pipes 29—29' are extended. These latter pipes extend rearwardly from the header and are connected, at close intervals, with cross pipes 30. The headers, as shown in Fig. 3, are tapped as at 31 for the insertion of connecting pipes, as will presently be described, for the circulation of water within the heaters. In use the water plates are inserted within the openings 25—25' so that the pipes 29 and 30 will be wholly contained within the frame structure, and the headers 28 will seat snugly within the cutout openings to prevent any possible leakage. These pipes will be heated by the passages of the hot gases about them in passage to the outlet 20.

The main body of the range is erected upon the two frames above described. It comprises the opposite end sections or walls, a rear wall made up of a plurality of sections, a cross wall separating the furnace and oven space, a sectional top and a front construction. The fire box or furnace 35 is enclosed between the right-hand end wall 36 and the transverse partition wall 37. The oven space is that between the partition wall 37 and the left-hand end wall 38.

The opposite end walls 36 and 38 are of similar construction, each having a rigid rectangular outer frame formed by inwardly facing channels 36a and 36b at opposite sides, joined by lower and top cross beams 36c and 36d; the legs of the channels facing one another. This end wall 36 is seated flatly upon the end of the frame enclosing the insulating coil, as in Fig. 6, and likewise, the wall 38 rests flatly upon the top wall of the lower water plate frame. The wall 36 is provided near the top and bottom with tubular passages 40 through which burners 41 may be projected for delivery and burning of fuel oil within the fire box. Also these may be fitted with suitable dampers, 42.

In a preferred construction the end walls would consist of an inner lining of a suitable refractory

brick, as at 43, and an outer lining 43' of heat insulating brick. These bricks would be laid in place, then clamped and held tightly by the enclosing frame beams. Then, it is preferred to overlie the outer wall surfaces with sheet metal plates, as at 44, to give a finished appearance to the range. These plates would be held in place within the outer flanges of the frame beams.

The central partition wall embodies the frame structure illustrated in Fig. 4, which consists of front and rear vertical channel beams 45 and 46 joined rigidly by lower and upper cross channels 47 and 48; the latter being set down from the upper end of the frame. Fitted within this frame is a closed wall of refractory brick 49; all of the beams which would be exposed to the fire are enclosed within and protected by the brick. This partition frame rests flatly upon the top plate of the coil enclosing frame, and against the inner end of the water plate frame, as shown in Fig. 6.

The rear wall of the range comprises a section 50 (see Fig. 7) forming the back wall of the fire box, and two sections 51 and 52 forming the back wall of the oven containing end of the range. The wall 50 comprises a frame structure including opposite end channel bars 55 and 56 joined rigidly by top and bottom channel bars 57 and 58. This frame is filled in, as in Fig. 8, with an inner lining of refractory brick 59 and an outer lining of insulating brick 60, and a metal cover plate 61 overlies the outer lining. The section is fitted at its ends between the rear vertical beams of the end wall 36 and the partition wall, as in Fig. 7.

The two wall sections 51 and 52 are in end to end abutment and are fitted between the rear ends of the partition wall and end wall 38. Each comprises a frame structure made up of vertical end channels 62 and 63, and top and bottom channels 64 and 65. Brick linings 59 and 60 corresponding to those of the rear furnace wall, are filled within these frames to effectively protect all the frame beams against heat.

It is to be observed, by reference to Fig. 3 in particular, that the top channels of the opposite end and rear frames face upwardly, and this is so arranged as to make use of the channels to retain the top pieces in place and to provide for effectively sealing the joints to prevent smoke and flame from coming through as presently will be described.

The front of the range is fitted with a suitable frame structure for support of the ovens, water plates, and grates, presently described. The frame at the front of the oven space comprises a top channel bar 66 facing upwardly, as in Fig. 9, beneath which is an inwardly facing channel 67 and below this, in spaced relation, an inwardly facing channel 68; the space being provided for the insertion of an upper set of water heating plates presently described. Spaced below this is a cross bar 69 and across the lower part of the frame is an angle bar 70. These several horizontal members are joined by opposite end bars 71—71' and a central or dividing bar 72 which separate the oven openings.

Across the front of the fire box is a horizontal bar 73 on which the forward ends of the boilers rest, and directly beneath it are plates 73' which pivotally support the forward ends of the grates; these parts presently will be described in detail.

The top of the range is composed of a plurality of heavy iron plates, as shown in Figs. 6, 8 and 9. The oven space is covered by two flat

plates 75 and 76, laid edge to edge with their forward and rearward edges overlapping the inner flanges of the top channels of the front and rear frames. By reference to Fig. 9 it will be noted that these plates have their under sides recessed, as at 78, to receive the flanges of the supporting beams therein and a cement 79 is filled in the channel to seal the joint against leakage.

The top of the furnace portion is covered with front and rear plates 80 and 81 extending in a lengthwise direction of the range and plates 82—83, 84, 85 and 86, as seen in Fig. 6, which fill the space between them; these latter plates being flanged to seat at their ends upon opposing flanges of the plates 80 and 81, as shown at 90 in Fig. 8. Any one or all of these may be provided with lid fitted openings as in the ordinary range.

After the various sections of the range have been erected and properly assembled, they are joined and held tightly together by a plurality of tie bars 92 extended horizontally across the rear of the range as in Fig. 2. These bars are supported by clips 93 fixed to the central and opposite end frames, and each has its ends 94 turned forwardly and wedges 95 are driven in between the frames and ends 94 to wedge the sections tightly together.

At the front, the frame structure, for the ovens and upper water plates, also the grate and boiler supports, may be interlocked at their ends with the end and central partition frames in any suitable manner, such as by providing the frames with headed bolts, as at 96 in Fig. 4, and the frames with keyhole slots as at 97 into which the headed bolts may be applied. Other easily detachable connections could be provided wherever necessary to insure rigidity and safety.

Within the oven end of the range I have provided two ovens 98 and 99 supported at their rear ends by brackets or bolts 100 extended inwardly through the rear wall sections, and supported at their forward ends upon the angle iron cross beam 69, as seen in Fig. 9. Each oven is of rectangular form having its forward end open and equipped with a door 101, and having its rear wall spaced from the back wall of the range and having its bottom wall spaced from the plate 18. The end oven also is spaced from the end wall 38 and a beam 102 fills in the space between the two ovens, as in Fig. 6.

Directly above each oven is a pan 103 adapted to be withdrawn from the oven through openings 104—104' provided therefor in the front frame structure between the tops of the ovens and cross beam 68. The front ends of these pans are angle iron bars 105 which fit closely within the openings as in Fig. 9, to prevent leakage. They may have handles, 106, for moving them into and from position.

Above these pans are water heating plates 107 similar in construction to plates 26 and which are movable into and from the range through openings 108 provided therefor between the beams 67 and 68. Each of these plates has a hollow cast header 109, at the front end and these are tapped, as at 31a, to receive connecting pipes for the circulation of water therein.

Within the furnace I have provided for pivotally mounting suitable fire grates 120 supported at the rear ends by pivots 121 in bearings 122 in a supporting beam 123, and at the front by pivots 124 extended through the cross members 73' supported from the cross beam 73. Ash pans

125 are removably disposed in the space below the grates, and the latter have suitable shaking and dumping equipment as at 126.

Disposed within the furnace are three boilers of the character of construction illustrated in Figs. 5 and 8; these boilers being arranged side by side to fill the front wall space, as shown in Figs. 1 and 7. Each boiler comprises a rectangular, hollow front plate 130 into the lower and upper ends of which, inwardly directed pipes 131 are extended. Each of these pipes is closed at its rear end and opens at its forward end into the hollow plate. Between the upper and lower sets of pipes 131 are connecting water pipes 132.

When these boilers are in place they are supported upon the front beam 73 and at the rear by an angle bar 134 fixed to the inner face of the rear wall, as in Fig. 8.

The front plates of the several boilers are provided with threaded taps for connecting pipes from one to the other, and by reference to Fig. 1 it will be observed that the upper ends of several boilers are interconnected by pipes 135 and 136, and at their lower ends they are connected by pipes 137—138. A pipe 138 from a source of supply extends from rear to front of the range through end frame 36 and connects through pipe 139 with the lower end of the end boiler. Also, an outlet pipe 140 connects with the upper end of the inner boiler and this leads rearwardly beneath the top plate, as in Fig. 6, to the rear of the range for the delivery of steam to its points of use.

A supply pipe 142 from a source of water supply extends from the back to front of the range, through the central partition wall, and there connects within the front beam of this frame, with a pipe 143, which, at its opposite ends, is connected respectively by pipes 144, 145 with the adjacent water heating plates 107 and 26. These plates 107 of the upper set of heaters are connected by pipes 146, and those of the lower set by pipe 147. The end plates of the upper and lower set are then connected by pipes 148 and 149 with a delivery pipe 150 which may lead to any desired point of use.

It will be observed, by reference to Fig. 6, that heat from the furnace will effectively and efficiently heat the top of the range for cooking purposes; also, the heated gases of combustion will flow across the tops of the ovens, about the upper set of water plates 107 to effectively heat them, thence will flow downwardly between the outer end oven and wall 38, as indicated by the arrows, thence will flow toward the partition wall 37 beneath the ovens, thence downwardly through opening 19, and into the lower water heater frame and will pass about the heaters and finally through opening 20 to the stack connection. This flow of hot gases not only heats the top of the range and ovens, but also heats the water plates for the production of an abundance of hot water which is supplied to the heaters through pipe 142 and is drawn off through pipe 150.

The boilers within the furnace end of the range will operate to produce an abundance of steam, and this may be put to various uses either for heating or cooking.

It will here be mentioned that, should oil burners be used exclusively, it is not necessary to equip the furnace with the grates. However, in the instance provision is made for use either of burners or fuel such as coal.

With this particular form of construction of parts, it is possible to easily and quickly set up

a desired range construction, for either right-hand or left-hand use. Also the boiler system may be easily extended or decreased, as may also the oven section.

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

In a range of the character described, a hollow base structure, a fire box, and an oven structure

erected on the said base, said oven structure including a hollow base portion serving as a passage for hot gases and provided with an opening for connection with a stack and with openings for the insertion of pipe coils, water headers fitted in the said openings, and pipe coils within the hollow base portion and connected with the said headers.

JOHN S. WALLACE.

10		85
15		90
20		95
25		100
30		105
35		110
40		115
45		120
50		125
55		130
60		135
65		140
70		145
75		150