Feb. 24, 1925.

1,527,217

R. L. POE

GAS RANGE

Filed June 8, 1922

4 Sheets-Sheet 1

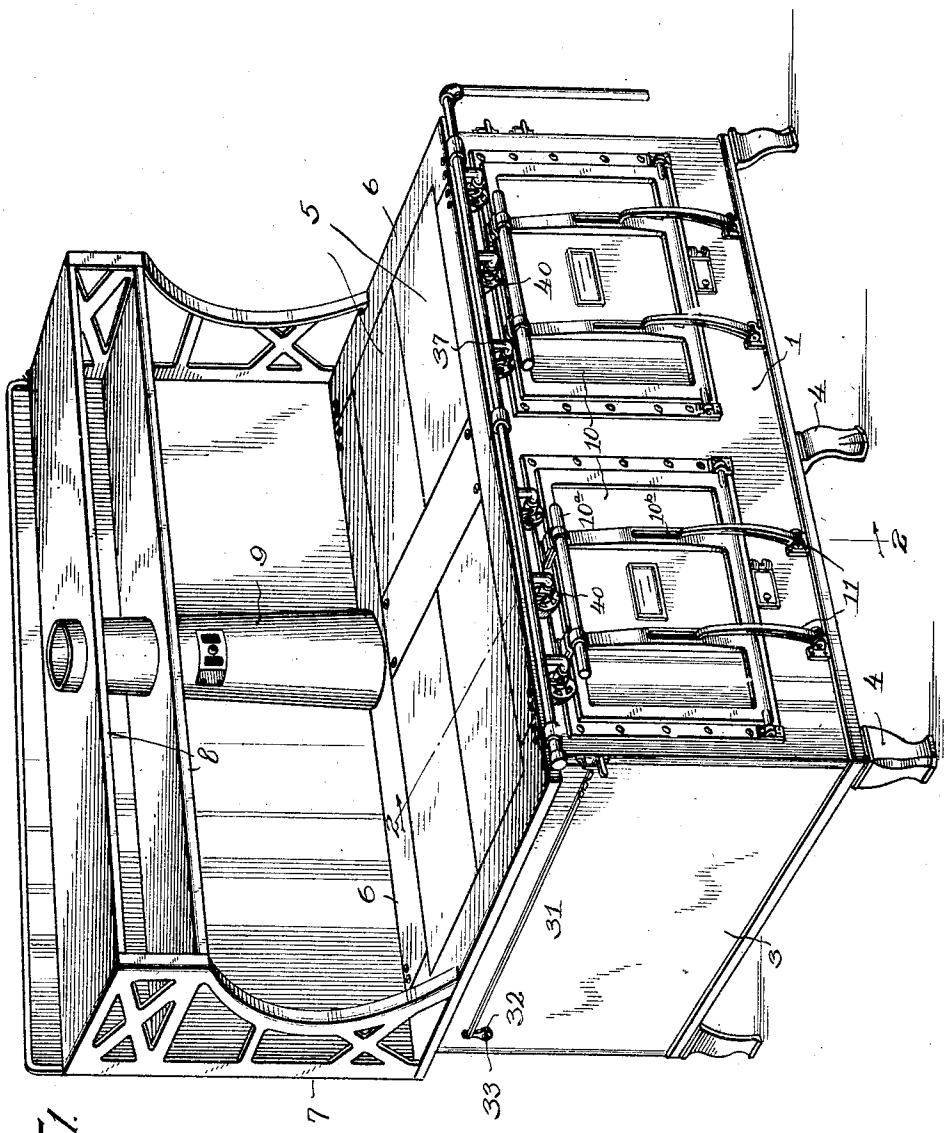


Fig. 1.

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4 Sheets-Sheet 2

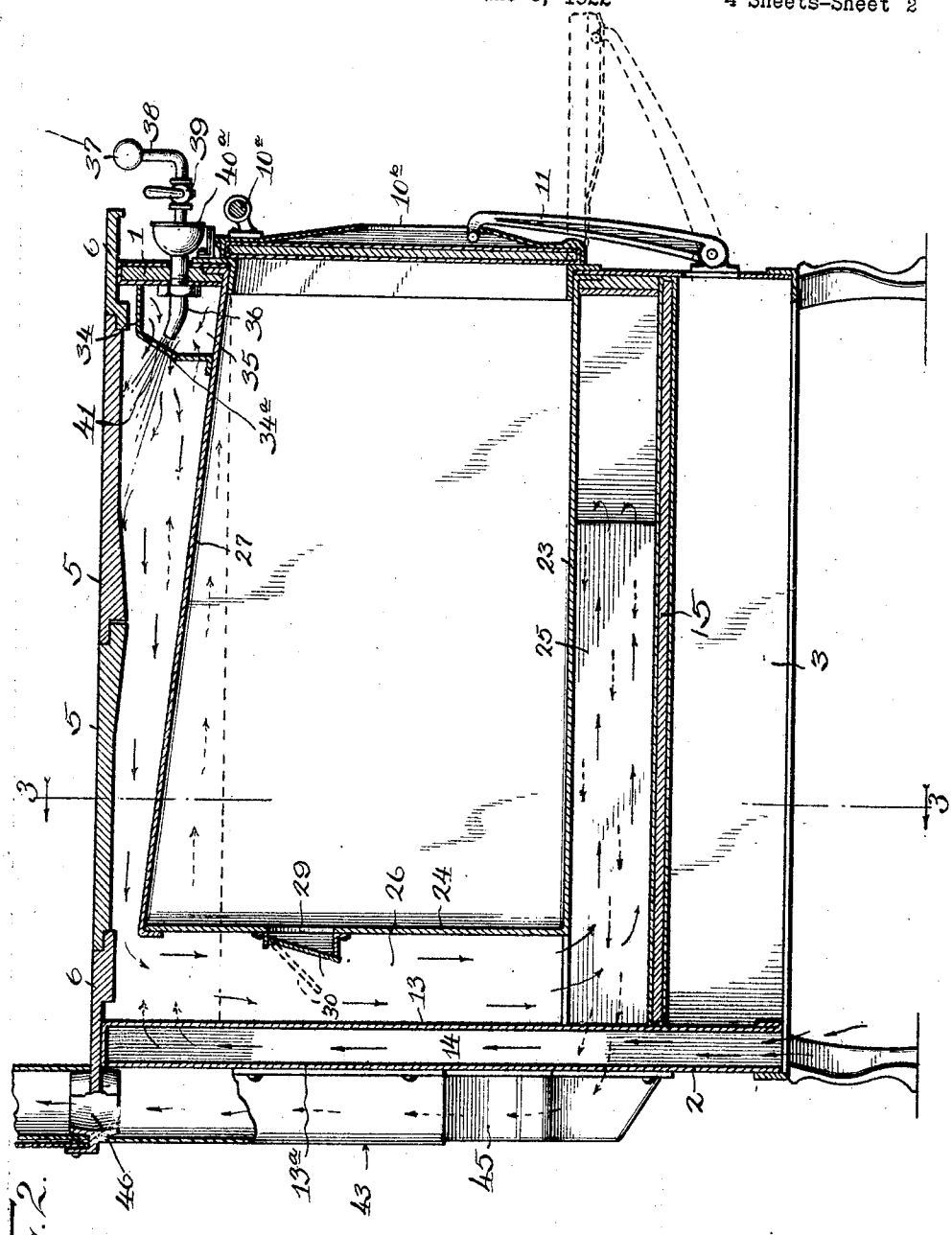


Fig. 2.

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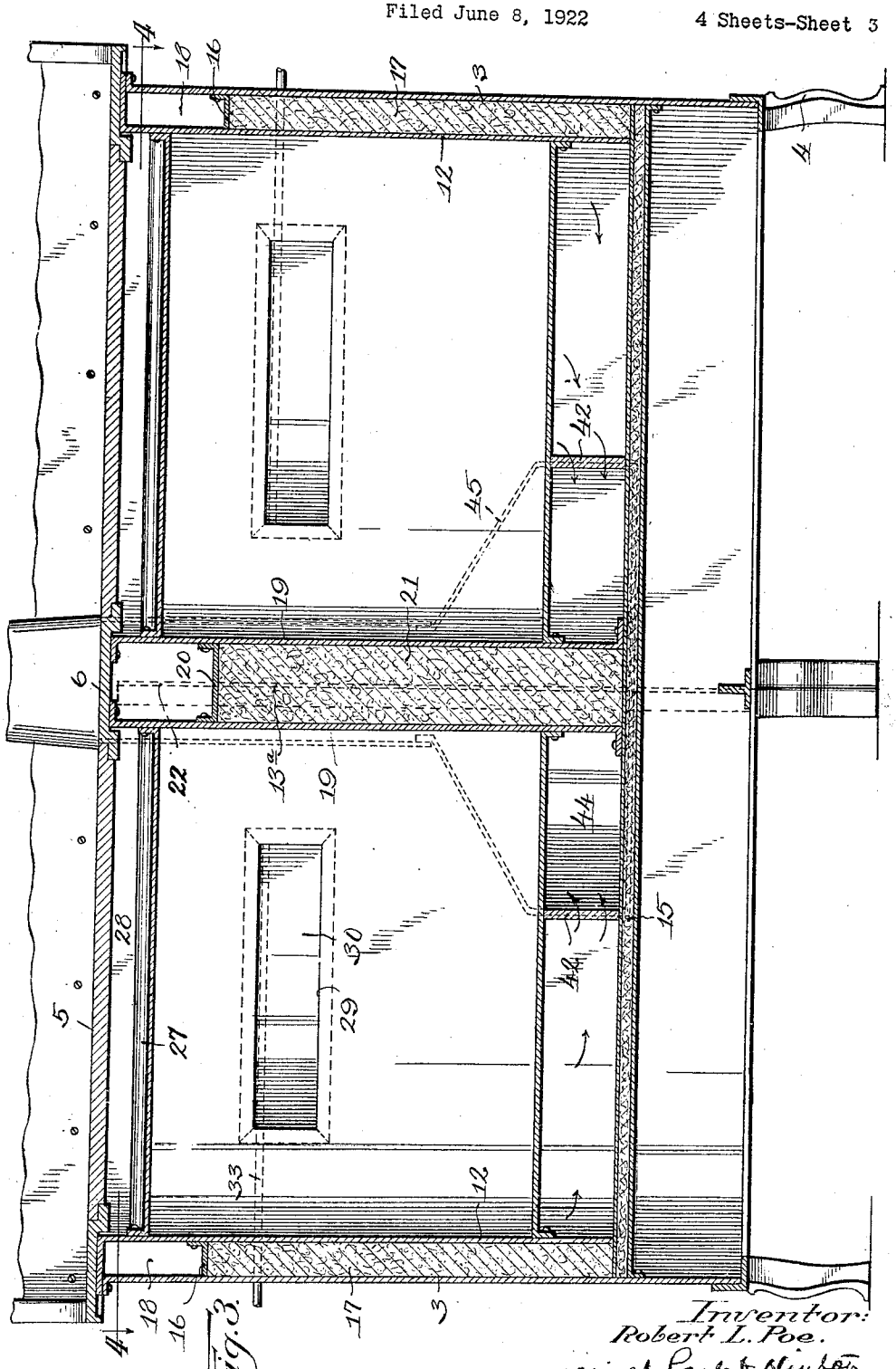


Fig. 3.

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4 Sheets-Sheet 4

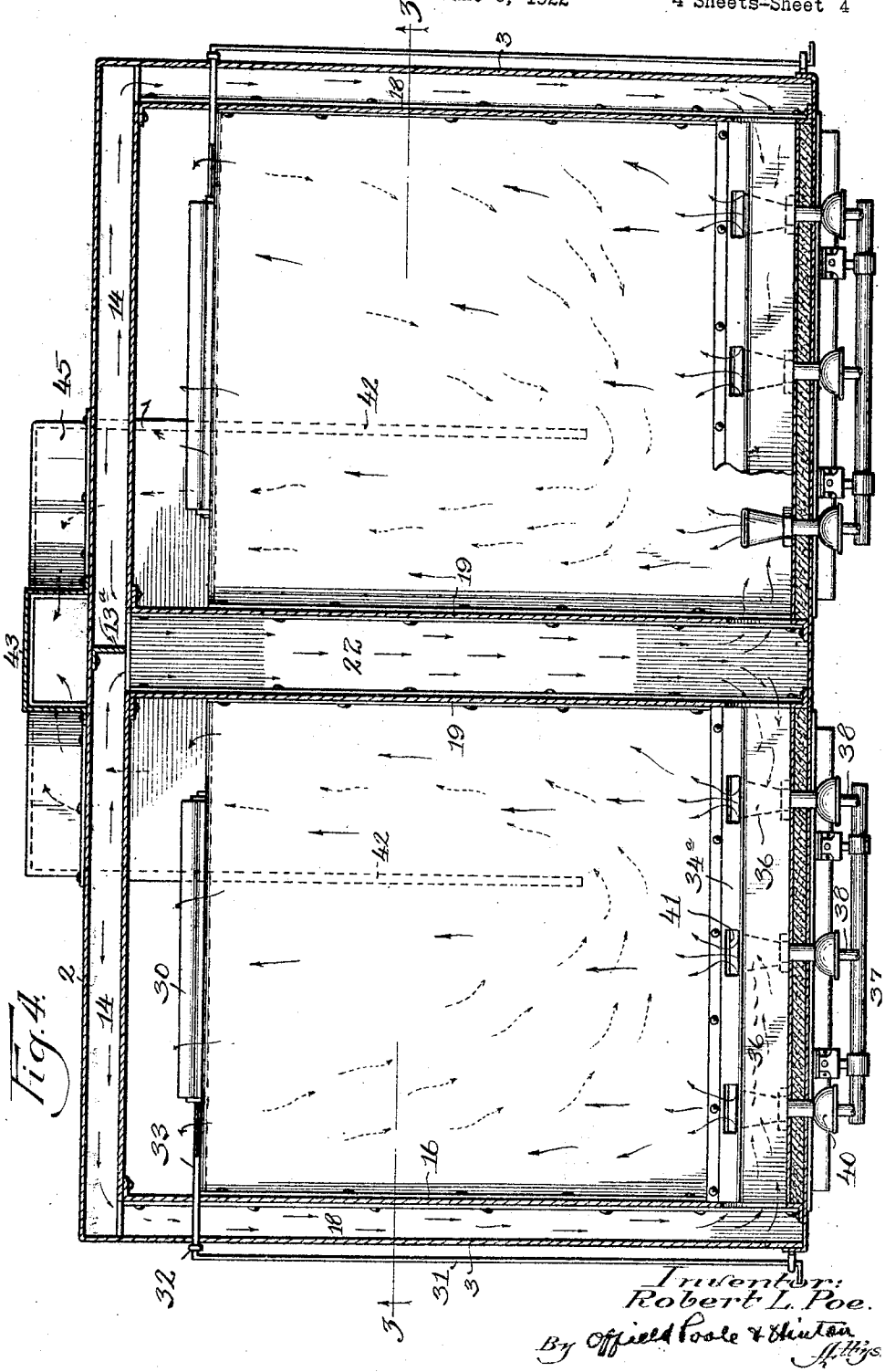


Fig. 4.

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Patented Feb. 24, 1925. 1,527,217

UNITED STATES PATENT OFFICE.

ROBERT L. POE, OF CHICAGO, ILLINOIS, ASSIGNOR TO SUPER RANGE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

GAS RANGE.

Application filed June 8, 1922. Serial No. 566,701.

To all whom it may concern:

Be it known that I, ROBERT L. POE, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gas Ranges, of which the following is a specification.

This invention relates to improvements in gas ranges for cooking purposes, and more especially to ranges designed for restaurants hotels, and other large establishments.

The object of the invention is to provide a new and novel construction for ranges calculated to promote economy in gas consumption and efficiency in operation. Other objects and advantages will be pointed out as a preferred embodiment of the invention is described, and in connection with the drawings, wherein:—

Fig. 1 is a perspective view of a gas range embodying the invention,

Fig. 2 is an enlarged cross-sectional view of the range taken on line 2, 2 of Fig. 1,

Fig. 3 is a view in vertical section taken lengthwise of the range, on line 3, 3 of Fig. 2, and

Fig. 4 is a view in horizontal section taken on line 4, 4 of Fig. 3.

In general appearance and structure the range is typical of similar devices and preferably shown as made up of two separate units to form a double range, each unit being independent of the other, although a single flue or smoke pipe serves both units. For the sake of brevity and clearness the descriptive matter will be confined largely to a single unit.

Referring first to the elements of the range coming within the sphere of common practice, the main portion or body thereof is a structure of sheet and cast metal in the form of a cubical shaped outer shell, consisting of a front wall 1, a rear wall 2, and side walls 3, 3, all supported upon legs 4 at the four corners and midway between the ends. The top wall of the range consists of removable cast metal hot plates 5, 5 setting flush within openings surrounded by marginal plates 6, 6. Erected at the back of the range is an upright single walled structure 7 supporting shelves 8, 8, used for warming purposes. At the rear center is the smoke pipe 9 through which the products of combustion are exhausted. This smoke pipe communicates with a flue at the rear of the range, hereinafter to be referred to. In the front wall 1 are large openings to the ovens, which are closed by means of downwardly swinging doors 10, 10, equipped with handles 10^a, 10^a at their upper edges. The doors are supported when swung downwardly in open position by pairs of hinged arms 11, 11 (Fig. 2) pivotally mounted on suitable brackets fastened below the doors and having sliding engagement within slots 10^b, 10^b formed in the outer wall of the doors.

Referring now to the interior of the shell or body of the range, the following construction is employed: Spaced a short distance inwardly from the end walls 3, 3 are vertical partition walls 12, 12 (Fig. 3). Similarly, an inner partition wall 13 extends throughout the height of the back wall 2 (Fig. 2), thus forming between said walls a chamber or air passage 14 extending the full width of each half or unit of the range and entirely open to the atmosphere along the bottom. A transverse partition plate 13^a (Fig. 4) divides the chamber 14 into two equal parts, each serving one of the units.

Spaced above the lower edges of the outer walls 1, 2 and 3 of the range is the bottom wall, preferably constructed of two thicknesses of sheet metal spaced apart with an intermediate layer of insulating material therebetween. This bottom wall extends the full width of the range, closing the lower ends of the spaces between the end walls 3, 3 and the adjacent partition walls 12, 12, as shown in Figs. 1 and 2. From front to rear, the bottom wall 15 extends to the partition wall 13, so that the free air passage lies beyond and to the rear (Fig. 2).

The spaces between the end walls 3, 3 and parallel partition walls 12, 12 are divided horizontally into separate chambers by a short transverse wall 16 located approximately one-fourth the distance from the top. The space below the wall 16 is filled solid with a mass of insulating material 17, whereas the space above is open and forms a horizontal duct 18 extending from front to rear, and serving a purpose hereinafter to be described.

At the central part of the range is a pair of vertical partition plates or walls 19, 19, which form the dividing wall between the two units and corresponds to the end walls

3, 3 in considering each unit separately. The walls 19, 19 are spaced apart a distance substantially twice the distance between the outer end walls 3, 3 and partition walls 12, 12, but are treated in a like manner, namely, by providing a transverse diving plate 20 at the same distance below the top as the plates 16, 16, and filling the space below with insulating material 21. Above the plate a duct 22 is formed extending from front to rear.

Within the spaces surrounded by the bottom wall 15, inner end walls 12 and 19, and the top plates 5, 5, are erected the ovens, consisting of the following parts: Spaced above the insulated bottom wall 15 is an inner wall 23 extending from the front wall 1 to the point short of the inner rear wall 13 (Fig. 2) where it joints a vertical wall 24 which in turn stops short of the top plates 5. These walls form the bottom and back walls of the oven, with free air passages or ducts 25 and 26 separating said walls from those which extend parallel thereto and form the surrounding shell. These ducts 25 and 26 form parts of the air circulating system hereinafter to be described more in detail. From the upper edge of the rear oven wall 24 and extending forwardly to the front wall of the range is the oven top wall 27 inclined downwardly from rear to front at an angle of, say, fifteen (15°) degrees to the horizontal, and thereby forming a tapered or converging chamber or passage 28 just below the top plates, and which gradually decreases in height from the front to the rear of the oven space. This passage 28 (which may also be termed the combustion zone) as well as the rear vertical duct 26 and bottom duct 25, extend the full width of the interior spaces of the range and surround three sides of the oven in the form of a continuous passage or duct. In the rear wall of the oven is a rectangular opening 29, closed by a damper 30, the latter being opened and closed by means of an endwise adjustable rod 31, extending along ends of the range from front to rear and connected with an arm 32 mounted on the end of a shaft 33 on which the damper is mounted (Figs. 1, 2 and 3).

Going back to the vertical duct 14 and horizontal ducts 18 and 22 (the former being formed between the outer and inner rear walls 2 and 13 of the range and the latter between the outer and inner end walls 3, 12, and 19, 19), the further disposition and relation of these ducts will now be described, together with the burner construction, and finally the manner of disposing of the products of combustion and excess heat through the smoke pipe 9.

Referring to Figs. 2 and 4, and following the arrows, it will be seen that the air is drawn into the vertical duct 14 along its open lower edge, passing upwardly. The upper end of the duct communicates with the horizontal ducts 18 and 22 so that the volume of air is divided, passing forwardly along the sides of the oven space within said ducts. Extending the width of the oven space and transversely of the combustion zone at its extreme forward portion is a housing 34 of sheet metal which forms with the front wall 1 and oven top wall 27, a substantially rectangular cross duct 35 (Fig. 2). This duct is open at its ends and communicates with the forward ends of the fore and aft ducts 18 and 22. Thus the air enters the cross duct from each end, as clearly shown by arrows in Fig. 4. Within the cross duct are mounted the burners 36, preferably three in number, and arranged in spaced relation through the length of said duct. These burners are mounted in horizontal position in the front wall 1, being connected with a gas supply pipe 37 through branch pipes 38, projecting through said front wall, there being provided in each branch pipe a shut-off valve 39 and an air mixing valve 40. The gas valve 39 and air valve 40 are located beneath the gas pipe 37 and the projecting edge of the top-plate 6. These parts are thus protected from injury by contact with articles being placed upon or removed from the range, and the air valve, being under the projecting edge of the top plate is protected from being clogged by grease and other substances.

The burners have preferably the form of flattened nozzles arranged horizontally, with a slight upward inclination at their tips. The ends of said burners register with ports 41 in the housing, said ports being cut in a beveled wall portion 34^a in the rearwardly facing wall of the housing 34. As clearly indicated in Fig. 2, the flame issuing from the burner is directed against the top plates 5, 5 at an obtuse angle and carried rearwardly toward the back end of the combustion zone, the gradual contraction of the latter serving to maintain the flames in contact with the hot plates throughout their entire area. The flames, however, are not confined to the combustion zone but are carried downwardly into the vertical duct 26 behind the oven. The path of the products of combustion beyond the last mentioned duct 26 will be understood from the following: Referring to Figs. 2 and 3, it will be observed that a vertical baffle plate 42 is mounted within the horizontal duct 25 underneath the oven, and extending from the rear wall 13 forwardly to a point substantially two-thirds the depth of the range. Moreover, it is positioned parallel to and at about one-third the width of the duct from the inner end partition wall 19, thus dividing said

duct into two portions, namely, a wide portion connected with the down duct 26, at the rear of the oven, and a narrower portion connecting with the side portion at the front end of the baffle plate 42, and opening at its rear end to a flue 43 through an opening 44 (Fig. 3) in the rear wall of the oven. The flue 43 consists of a vertical sheet metal duct riveted to the rear wall of the oven, having a flaring base 45 which includes the flue openings 44, 44 of each unit. The upper end of the flue communicates with the smoke pipe 9 through an adapter 46 (Fig. 2) forming a part of the top marginal plate 6.

From the foregoing description it will be seen that air at the room temperature is drawn into the outer rear duct 13, thence forwardly to the ends of the cross duct 35, along the horizontal ducts 18 and 20 on either side of the oven. The air in traveling through these ducts comes into contact with the inner partition walls which are heated to a high temperature by the flame which is conducted through the passages on the other side. In this manner the incoming air is preheated to a very high temperature, thereby promoting efficient combustion at the burners and economy in gas consumption in that the excess heat is utilized for preheating the air. Furthermore, the incoming air ducts serve as insulating spaces, the air absorbing the heat for a useful purpose, which otherwise would be radiated from the range walls as waste heat, increasing the temperature of the kitchen to the discomfort of the cooks.

The flame from the burners, as already suggested, travels rearwardly the length of the combustion zone 28 and fills the entire width thereof. Due to the convergence of said zone, the flame is directed into contact with the hot plates, maintaining them at a uniformly high temperature throughout the entire depth and width of the effective cooking area. Thus uneven temperatures and the presence of areas of reduced temperatures are eliminated, so that all of the range top may be available for use with equal effectiveness.

Passing from the combustion zone, the flame enters and passes downwardly into the vertical duct 26 at the rear of the oven, the hot gases entering the duct 25 directly beneath the oven traveling first forwardly, and thence rearwardly, as they circulate around the end of the baffle 42 before escaping to the flue 43. Manifestly, the flame and hot gases envelop the oven on top, rear and bottom, thus maintaining the temperature therein at a uniform high temperature necessary for baking and broiling. The carrying of the flames beyond the combustion zone into the rear duct 26 has an added purpose, namely, to maintain the inner rear wall 13 at a high temperature, thus promoting the preheating of the incoming air as it passes upwardly through the duct 14.

From the foregoing discussion it will be observed that a single set of burners are employed for heating the top plates 5 as well as the oven, the latter being heated by circulating the flame and hot gases around the three sides of the oven before they are discharged to the flue. Economy of gas consumption is manifestly a direct result of this arrangement inasmuch as separate oven burners are not required.

It is manifest that the structure embodying the invention may be variously modified without departing from the spirit of the invention and therefore I do not wish to be limited to the specific form shown or described except in so far as it is defined in the appended claims.

I claim as my invention—

1. In a gas range, the combination of an oven, a duct extending around said oven and having a flue outlet at one end, and a separate duct extending transversely of said first mentioned duct at the other end thereof, burners located in said cross duct and registering with openings therein, and air supply ducts leading from air inlet openings remote from said cross duct and along said first mentioned duct and communicating with the ends of said cross duct.

2. In a gas range, the combination of an oven, a duct extending around said oven and having a flue opening beneath the oven, a cross duct extending transversely at the end of said duct above the oven and having openings therein directed longitudinally of said surrounding duct, burners spaced apart within said cross duct and registering with openings therein, and an air duct located exterior to said first mentioned duct, and extending upwardly at the rear and along the sides of the oven, and communicating with the ends of said cross duct.

3. In a gas range, the combination of an oven, a duct extending along the top, down the back, and beneath the oven, and having a flue outlet at its lower end, the portion of the duct above said oven converging from front to rear, burners arranged transversely of said duct above the forward end of said oven, a housing enclosing said burners and provided with openings registering with the nozzles of said burners, and an air duct extending up the back and forwardly along said duct exterior thereto and communicating with one end of said housing.

4. In a gas range, the combination with top plates of an oven having a top wall sloping from front to rear and forming a converging combustion zone, a duct extending from the rear end of said combustion zone, down the back, and beneath the oven, and having a flue outlet at its lower end, burners arranged transversely of said combus-

tion zone at the forward end thereof, a housing enclosing said burners and provided with openings registering with said burners, and an air duct extending exterior to said first mentioned duct upwardly and forwardly along the sides of the combustion zone and communicating with the ends of said housing.

5. In a gas range, the combination of outer walls including top plates, an oven shell mounted within said outer walls, the top wall of said oven shell being inclined upwardly from front to rear and forming a combustion zone, a duct extending from the rear end of said combustion zone around the rear and bottom walls of said oven shell and entering a flue at the rear, an outer vertical duct at the rear of said first mentioned duct open along its lower end, and extending vertically, lateral ducts extending forwardly from the upper end of said outer vertical duct along the sides of said combustion zone, a cross duct at the forward end of said combustion zone and connected at its ends with said lateral ducts, and burners mounted in said cross duct and directed rearwardly through openings therein.

6. In a gas range, the combination of top plates, an oven shell having an inclined top wall spaced below said top plates and forming a combustion zone converging from front to rear, a duct extending from the rear of the combustion zone, down the back, and beneath said oven shell, and having a flue opening, a cross duct at the front end of said combustion zone, burners mounted along the front portion of said combustion zone and directed longitudinally thereof, a transverse housing enclosing said burners and provided with openings registering therewith, and a vertical air duct open along its lower edge and lying exterior to said first mentioned duct, and lateral ducts extending forwardly on either side of the comustion zone and connecting said vertical air duct with the ends of said housing.

7. In a gas range, the combination of outer walls including top plates, an oven shell mounted within said outer walls, the top wall of said oven shell being inclined upwardly from front to rear, a vertical partition wall between the outer rear wall and the rear wall of the oven shell and forming vertical ducts, the outer duct being open along its bottom and the inner duct connected with the space between said top plates and the inclined top wall of the oven shell, lateral ducts extending forwardly from the upper end of said outer vertical duct, a cross duct at the forward end of said space above the oven shell and connected at its ends with said lateral ducts, burners mounted in said cross duct and directed rearwardly and upwardly through openings therein, and a flue opening connected with said inner vertical duct.

In witness whereof, I hereunto subscribe my name this 3rd day of June, A. D., 1922.

ROBERT L. POE.