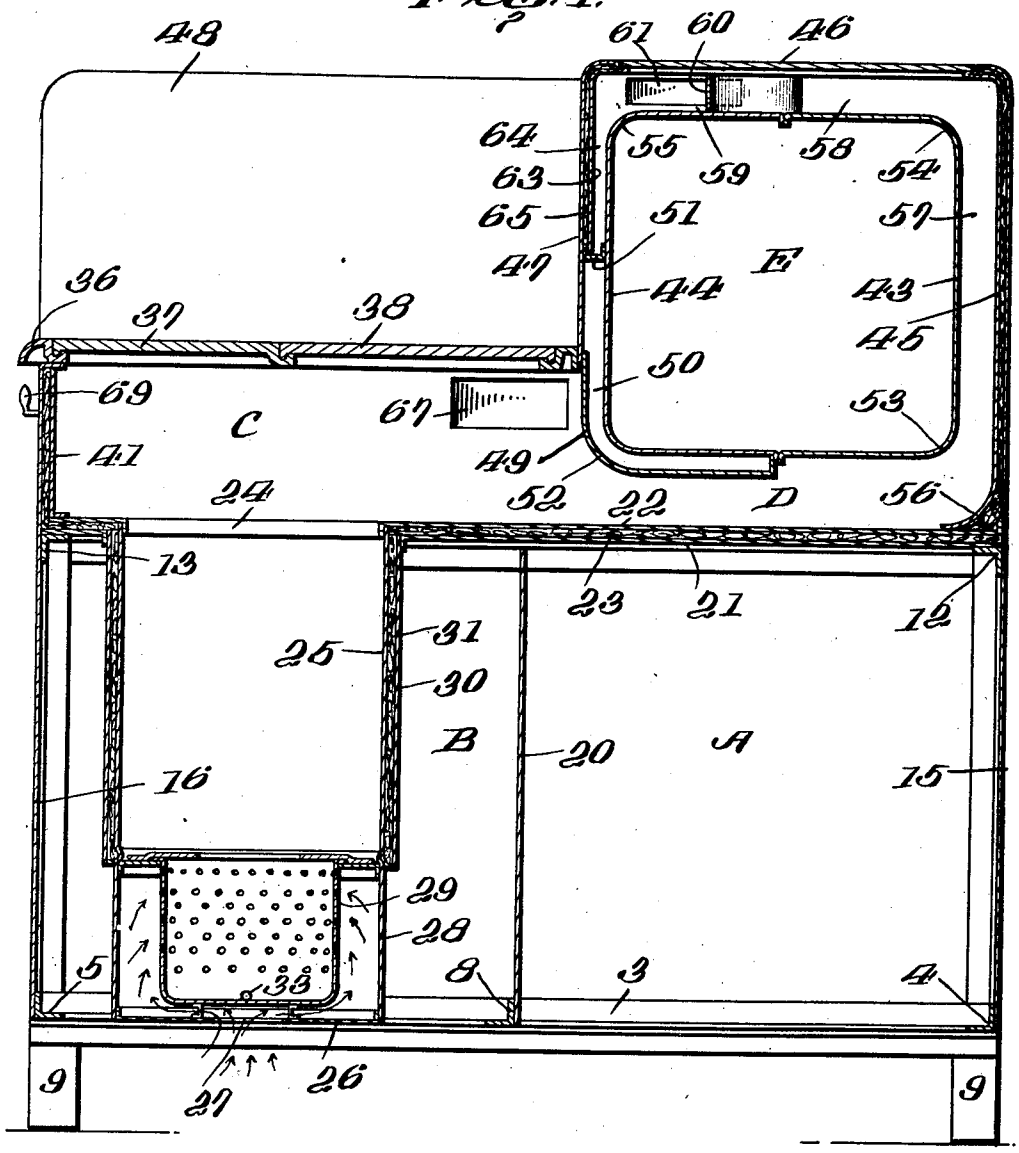
Nov. 29, 1938. A. R. PIERCE 2,138,556

POT TYPE OF RANGE

Filed June 22, 1937 3 Sheets-Sheet 1

Fig. 1.



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By Pattison, Wright & Pattison

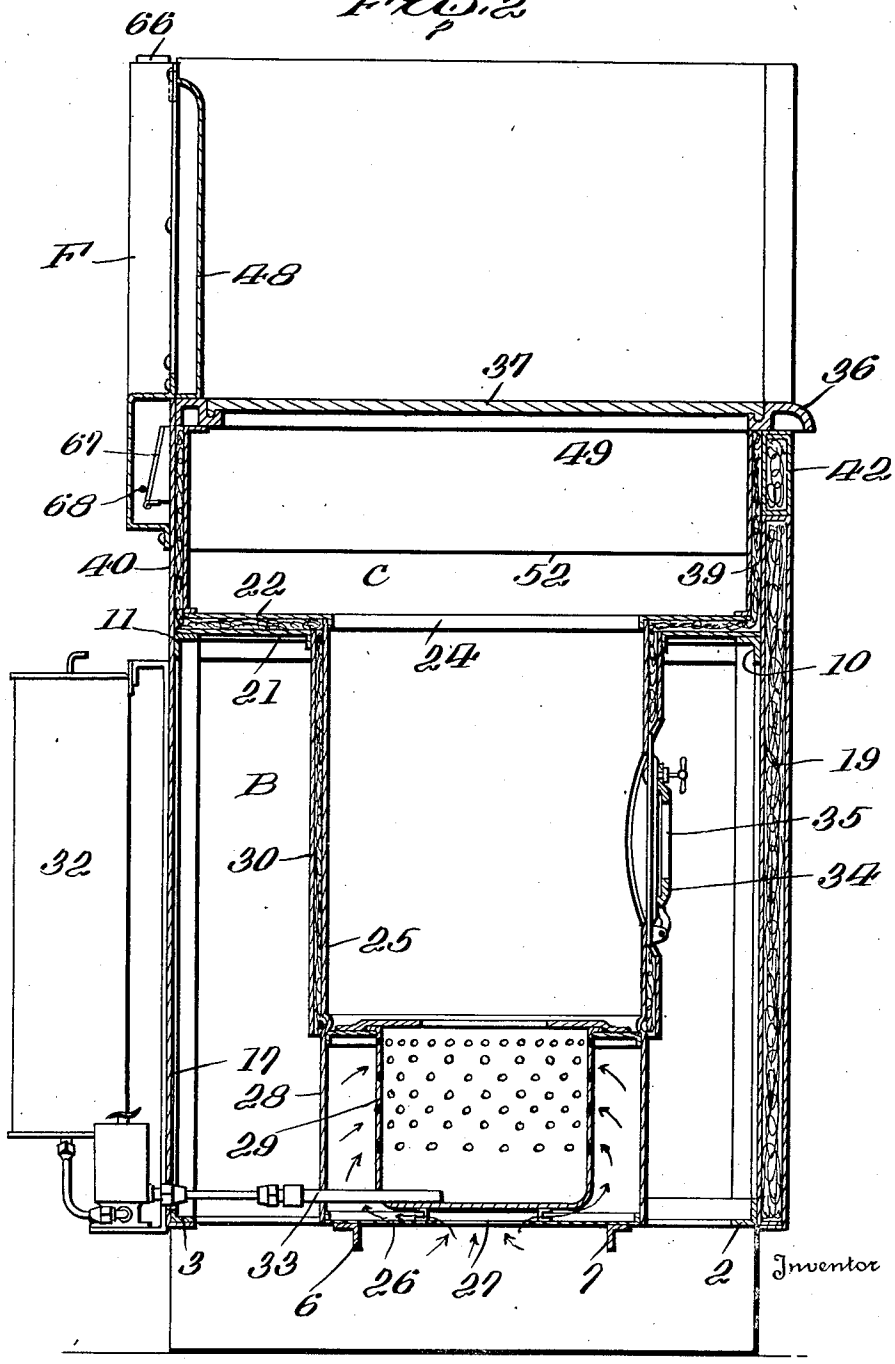
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POT TYPE OF RANGE

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FIG. 2



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POT TYPE OF RANGE

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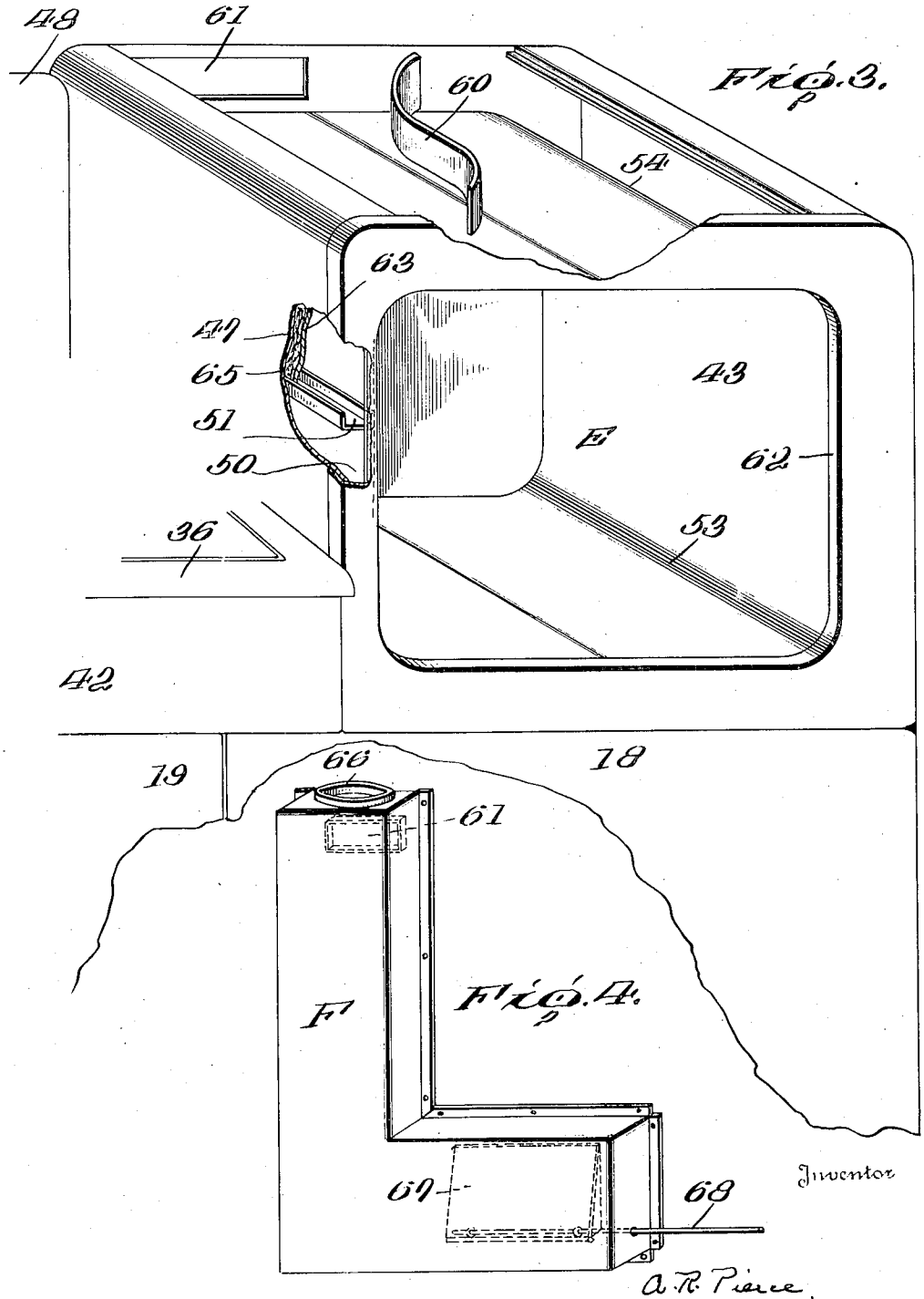


Fig. 3.

Fig. 4.

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Patented Nov. 29, 1938 2,138,556

UNITED STATES PATENT OFFICE

2,138,556

POT TYPE OF RANGE

Ambrose R. Pierce, Lorain, Ohio, assignor to American Stove Company, St. Louis, Mo., a corporation of New Jersey

Application June 22, 1937, Serial No. 149,757

6 Claims. (Cl. 126—44)

This invention relates to improvements in ranges and is directed more specifically and primarily to a range using a liquid hydro-carbon as a fuel which is burned in a pot type burner the heat from which is utilized in heating the cooking top of the range and the adjacent elevated oven which is remote to the burner.

The primary object of the invention is to provide a range of the class and type above described which is unusually highly efficient in operation because of the numerous novel features of construction and design incorporated in its make-up.

Another and further object of the invention is to provide a range particularly and especially designed and constructed to have its cooking top and oven heated by a liquid hydro-carbon fuel burned in a pot type burner.

Another and further specific object of the invention is the provision and the utilization of a novel and improved flue arrangement for the pot type burner whereby the efficiency of the burner is increased over those burners now known and in use.

Another and still further object of the invention is the complete insulation of the cooking top box or flue whereby the greatest possible heating effect of the hot gases generated by the burner are delivered to the cooking top.

Another and still further specific object of the invention is the novel fluing and insulating arrangement of the oven.

A still further object of the invention is the provision of a non-vented oven.

A still further object of the invention is the provision of a flue arrangement whereby the cooking top and oven of the range are efficiently and adequately heated yet any downward flow of flue gases from the time they are discharged from the burner is obviated.

A still further object of the invention is the provision of what I have termed a "stream line" flue outlet passageway in connection with the oven.

Other further specific objects, novel features of construction and improved results of the range built in accordance with the present invention will appear in more detail from the following description when read in the light of the accompanying drawings.

In the drawings:

Fig. 1 is a longitudinal vertical sectional view through the range.

Fig. 2 is a transverse vertical sectional view through the cooking top portion of the range, the oven and splash back being shown in full lines.

Fig. 3 is a detail perspective view of the oven, a portion of the oven being broken away and being shown in section and the oven top outer plate being removed to better illustrate the construction of the oven flue.

Fig. 4 is a detail rear view of the flue box at the back of the range.

Referring now to the drawings which illustrate a preferred and practical embodiment of the invention and in which like parts are designated by similar reference numerals throughout the description, it will be seen that a frame-work is utilized in forming the lower part or portion of the range and that this frame-work is made up of angle irons 2 and 3 which extend longitudinally of the range at its front and rear, and of angle irons 4 and 5 which extend in transverse direction at the ends of the range. Intermediate angle irons 6 and 7 arranged in parallel separated relationship extend from the end base angle iron 5 to a supplemental transversely extending angle iron 8 which is positioned approximately midway of the length of the range. Suitable legs 9 are attached to the angle iron frame comprising the base of the range and support the base the desired distance above the floor. The outer angle irons 2, 3, 4 and 5 preferably, although not necessarily, define a range having a base of rectangular configuration.

An angle iron 10 extends longitudinally of the front of the range and interconnects the front legs at their upper ends while a similar angle iron 11 extends longitudinally of the rear of the range and interconnects the rear legs at their upper ends. Angle irons 12 and 13 extend transversely at the end of the range and interconnect the front and rear legs.

The rectangular frame-work made up of the angle irons thus far described is closed in by suitable end plates 15 and 16; a rear wall or plate 17 and at the front by a pair of doors 18 and 19 (see Fig. 3 of the drawings).

A division wall or plate 20 divides the rectangular range housing thus far described into a pair of compartments A and B. The compartment A is behind the aforementioned door 18 and will serve as either a warming closet or a utensil cabinet or storage compartment, while within the compartment B is positioned the pot burner and burner drum the construction of which will be given in more detail hereinafter.

The upper ends of the compartments A and B are closed by a pair of plates 21 and 22 disposed in separated parallel relationship so as to carry between them a suitable insulation 23. The plates

21 and 22 can be properly referred to as a horizontal baffle and they extend throughout the entire width and depth of the range being broken only to provide an opening 24 which is of the same size and configuration as the upper end of the burner drum 25.

A draft plate 26 is suitably supported upon the channel irons 6 and 7 and is provided with an opening 27 for the admission of air into the lower end 28 of the burner drum at a point beneath the burner pot 29. A baffle 30 surrounds the burner drum at its upper end and extends from the baffle plates 22 and 23 to a point adjacent the upper end of the burner drum 29. This baffle is arranged in separated parallel relation to the burner drum and the intermediate space is filled with suitable insulating material 31.

At the rear of the range a fuel tank 32 is provided and from this tank fuel in the ordinary and usual manner is delivered to the bottom of the burner pot through a suitable pipe or conduit 33.

Access to the burner drum is obtainable through the door 34 preferably provided with a window 35, which door may be conveniently reached upon opening the main outer door 19 at the front of the compartment B. Incidentally this door 19 is preferably of the insulated type, as clearly appears in Fig. 2 of the drawings.

A cooking top box C and main flue D are positioned above the baffle plate 22. The range cooking top is disposed at one end or side of the range and comprises an angular frame 36 which supports the solid cooking top plates 37 and 38, which plates have what might be termed a tongue and groove supporting connection with the frame and with one another so as to prevent air leakage into the cooking top box and main flue to avoid cooling of the gases in the main flue. This type of connection between the parts is equally desirable to prevent flue gases passing upwardly through the cooking top portion of the range and obviates the necessity of the use of cement sealed or packed joints.

The cooking top box C is closed at its front, side and rear by suitable insulated walls 39, 40 and 41. To provide a stove of pleasing appearance a decorative panel 42 is provided at the front of the cooking top box so that the face of this panel and the faces of the doors 18 and 19 will be flush.

The range oven is designated as an entirety by E. In detail the oven comprises an inner unvented shell which for the purpose of convenience in manufacture is made up of two parts 43 and 44. This shell is supported so that a substantial portion of the lower end of the oven is below the cooking top plates and is in fact disposed in the main cooking top box so as to provide the main outlet flue D between the oven bottom and the baffle plate 22. There is an outer shell which is disposed in separated parallel relationship to the inner shell so as to provide a space at both sides and across the top of the inner oven shell. This outer shell is made up of an insulated end wall 45 remote to the cooking top, an oven top plate 46 and a vertically disposed side plate 47 adjacent the cooking top. A conventional splash back 48 is provided at the rear of the cooking top.

The space between the inner oven shell and the outer shell constitutes a flue passageway through which the hot products of combustion from the burner are conducted for the purpose of heating the oven. The particular construction and design of this flue passageway constitutes a very important part of the present invention.

It will be understood that the lower corner portion of the oven adjacent the cooking top will be subjected to the hotest combustion gases and therefore to equalize the heat within the oven and to prevent overheating of the oven in this particular locality a baffle plate 49 is provided which in reality constitutes a continuation of the lower end of the outer shell wall 47. This baffle extends around the lower left corner of the inner oven shell and under half of the oven bottom. As clearly appears in Fig. 1 of the drawings this baffle is arranged in separated relationship to the inner oven shell and the space between it and the inner shell provides a dead air space 50 which extends under half of the oven bottom and up the left side wall of the oven to the transverse partition 51 which is positioned approximately midway the height of the left side of the oven.

It is to be noted that the flueway around the oven is stream line. The baffle plate 49 is rounded as at 52 and all of the corners 53, 54 and 55 of the inner oven shell are rounded. The inner face of the outer shell wall 45 at its lower end is rounded as indicated at 56.

From the description thus far given it will be seen that the main flue D is in communication with the cooking top box C and extends below the oven bottom. The remainder of the flueway about the oven comprises the vertical passageway 57 at the right end or side of the oven and the space above the oven top which is divided into two passageways 58 and 59 by a vertically disposed baffle 60 which extends from the rear edge of the top of the oven to a point closely adjacent the front edge of the oven top. This top oven baffle 60 is of material merit in that it will cause the flue gases to pass over the complete oven top from rear to front and then from front to rear in their travel to the main outlet flue 61. Attention is also directed to the fact that this baffle is stream line in that it is curved to insure a smooth flow of the gases over the oven top and its design is such that the baffle in itself will not constitute an obstruction to the free flow of the flue gases. This arrangement is such that the greatest amount of residual heat in the out flowing gases is applied to the oven top and insures that these hot gases pass over the front end of the oven above the door opening 62 before they pass out of the main flue outlet 61.

At the left side of the oven adjacent the cooking top and above the transversely disposed division wall or plate 51 a vertical disposed liner plate 63 is disposed in the flue space 64. This plate 63 is arranged in separated parallel relationship to the outer shell wall 47 and the space between them is filled with a suitable insulating material 65 so that the upper left corner of the oven is fully insulated.

It has already been pointed out that the outer top 46 of the oven is in the form of a plate. This plate can be used as a cooking top plate in that the hot flue gases passing over the top of the inner oven shell are transmitted to this plate. The use of this plate however as a cooking plate is optional. If a cooking plate is not desired the double wall insulated construction illustrated at the sides of the oven would be carried over the oven top.

At the rear of the range an L-shaped main flue outlet box F (see Fig. 4 of the drawings) is provided. The main oven outlet flue 61 communicates with this flue box at a point just below the

outlet 66 of the box. The horizontal leg portion of the box extends over the rear of the cooking top flue box and communication between the cooking top flue box and the main outlet flue box F is controlled by the manually operable swinging damper 67. An elongated operating rod 68 provided with a handle 69 positioned beyond the left end of the cooking top of the range provides a convenient means for opening and closing the damper.

The damper controlled outlet to the cooking top flue box is provided for the reason that frequently it will be desired to use only the cooking top portion of the range for cooking purposes and when this is so there would be no reason for carrying the flue gases completely around and unnecessarily heating the oven. Additionally it has been found that when starting or lighting a pot type burner it is desirable to obtain the shortest flue travel possible. The exact location of the flue outlet from the cooking box into the main outlet box is not considered important. The outlet opening should be large enough to efficiently remove the products of combustion yet not be sufficiently large to cause a waste of heat by pulling the hot flue gases from under the cooking top too rapidly.

One of the important novel features of construction is that of providing a continuously increasing combustion volume from the burner pot to the main outlet flue and by reference to the drawings it will be seen that the burner drum has a greater volume than that of the burner pot and that the burner box has a greater volume than that of the burner drum. I have found that the best results can be obtained where the burner drum has a volume of three and one-half times that of the burner pot and the cooking top box has a volume two and one-half times that of the burner drum. These proportions can of course be varied within reason and good results obtained but the exact figures given are those which I have found to give the best possible results.

Another important feature of the invention is that of a continuously rising path of travel of the products of combustion. It is to be noted that the burner pot where the products of combustion are generated is at the lowest point and from the pot the hot products of combustion pass upwardly through the burner drum into the cooking top box and move horizontally therethrough into the horizontally disposed main flue D from which they move upwardly along the right side or end of the oven and then horizontally again across the top of the oven and through the flue outlet 61 vertically from the flue box F.

The fluing arrangement is also of importance as to dimension. Particular attention is directed to the fact that the baffle 49 reduces the cross sectional area of the main oven flue D at its end where it communicates with the cooking top box. Beyond this baffle the cross sectional area of the main outlet flue D increases and then the cross sectional area of the flue 57 at the right end of the oven is decreased in respect to the larger main flue D. These flue proportions are of importance in that the decreased cross sectional area of the main flue at its admission end adjacent the cooking box slows the passage of the hot gases from the cooking box and insures a more complete combustion in the cooking top box. The larger flue area under the right side of the oven bottom and the smaller area of flue 57 at the end of the box tends to hold a large volume of hot gases directly under the oven which will insure proper and even heating of the oven. The rounded corners of the oven and of the flueway insures an even, smooth and rapid flow of the combustion gases, and an even temperature distribution in the oven with the result that an even baking can be obtained therein. In the vented type of oven a shrinkage of food is occasioned due to the removal of moisture occasioned by the hot gas streams which pass out of this type of oven. This "so-called" food shrinkage is materially reduced in my range by the provision of an unvented oven.

The decreased cross sectional area of the oven flue at the sides and top of the oven speeds up the flow of the hot gases in those particular flues and will prevent the overheating of the side and top of the oven and provides the necessary draft for the operation of the pot burner.

It will be of course obvious that the range is a departure from the conventional elevated oven type of range in that the oven bottom is in a horizontal plane considerably below the horizontal plane of the cooking top with the result that the oven extends down into the cooking box and plays a part in the particular flue arrangement and flue areas heretofore described.

The baffle 49; dead air space 50; partition 51 and the flueway 64 at the left side of the oven are all important features of the present improved range. The dead air space 50 forms an insulating medium and will protect the lower left corner of the oven from direct impingement of the hot gases entering the main flue. The spacing of the baffle 49 has been carefully determined so that a proper rate of radiant heat transmission to the left lower corner of the oven is provided and this portion of the oven is guarded against overheating.

The partition 51 closes one end of the dead air space 50 and at the same time closes the lower end of the flueway 64. This partition 51 is so positioned that the left oven side is heated evenly by radiant heat and also its positioning is such as to control the draft or circulation within the portion 64 of the oven flue so as to insure proper heat to the upper left corner of the oven. Some of the hot flue gases will of course enter the flue space 64 the outer wall of which is insulated for the purpose of holding the heat within this portion of the flue. Additionally the partition 51 is positioned in the particular place illustrated in the drawings so as to prevent formation of an air pocket. It has been found if this partition is lowered to any considerable degree that an air pocket will form in the flue 64 and that this will tend to check the circulation of the gases in the flue above the oven.

Another feature to which attention is directed is the manner of insulating the range so as to assure the greatest possible efficiency and to prevent overheating of the burner compartment and the adjacent storage compartment. This is of course accomplished by the insulation of the burner drum and the insulation of the baffles 22, 23, which form the bottom of the cooking box and main outlet flue. The highest temperatures occur as the gases enter the cooking compartment and afford a most efficient heating of the cooking top plates 37 and 38. I have discovered that satisfactory and rapid heating of the cooking top plates depends upon radiant heat of combustion and not solely upon flame wiping or contact. As the highest combustion temperatures occur substantially near the top and center of the burner

drum I have by elevating the cooking top above the top line of the main outlet flue obtained a more even heat distribution to the cooking top for the reason that the general path of the hot gases and occasional flame is toward and along the main flue and flame impingement on the cooking top sections by placing them as they are is minimized.

From the foregoing it will be seen that I have provided a complete, unit design, co-related cooking and baking device designed for use with a liquid hydro-carbon type of burner and the invention is limited only within the scope of the hereinafter appended claims.

I claim:

1. An improved pot type of oil burning range comprising a range frame. a cooking top box having its upper end closed, a pot type of oil burner located substantially at the bottom of said frame, an upwardly elongated burner drum extending from said burner to said cooking top box to provide a long vertical space sufficient to insure proper mixing of and proper combustion of the gas from said burner before it reaches said cooking top box, the burner drum having its lower end surrounding said burner and the lower end of the extension having an air inlet opening to insure sufficient air for the burner and the burner drum, an oven located at one side of said cooking top box, a flue communicating with said box and the flue extending beneath said oven around its side and top and having its end provided with an outlet.

2. An improved pot type of oil burning range, comprising a range frame, a cooking top box, a pot type of oil burner located substantially at the bottom of said frame, an upwardly elongated burner drum extending from said burner to said cooking top box to provide a long vertical space sufficient to insure perfect mixing of and perfect combustion of the gas from the said burner before it reaches said cooking top box, the burner drum extending upward substantially twice the vertical length of said pot type burner, an oven located at one side of said cooking top box, a flue communicating with said box the flue extending beneath said oven and around its side and top and having its end provided with an outlet.

3. An improved pot type of oil burning range, comprising a range frame, a cooking top box, a pot type of oil burner located substantially at the bottom of said frame, an upwardly elongated burner drum extending from said burner to said cooking top box to provide a long vertical space sufficient to insure proper mixing of and proper combustion of the gas and air from said burner before it reaches said cooking top box the oven extending into and forming a depressed wall partially enclosing said cooking top box and a horizontal wall beneath said oven and separated therefrom to form a flue extending beneath the oven and around it to an upper outlet, whereby increased heat for the oven is provided by the extension of said oven into the cooking top box.

4. An improved pot type of oil burning range, comprising a range frame, a cooking top box, a pot type of oil burner located substantially at the bottom and at one side of said frame, an upwardly elongated drum extending from said burner to said cooking top box to provide a long vertical space sufficient to cause proper mixing of and proper combustion of the gas and air from said burner before it reaches said cooking top box, a horizontal wall extending from the inner side of said burner drum and in a horizontal line with its upper end to the opposite end of said frame, a vertical wall depending from said horizontal wall substantially at its center to the lower end of the range frame, an oven located at one side of the said cooking top box, a flue communicating with the cooking top box and passing between the lower end of the oven and said horizontal wall and around the outer side and top of the said oven and having substantially at its extremity an outlet for the products of combustion.

5. An improved pot type of oil burning range, comprising a range frame, a cooking top box, a pot type of oil burner located substantially at the bottom of said frame, an upwardly elongated burner drum extending from said burner to said cooking top box to provide a long vertical space sufficient to insure proper mixing of and proper combustion of the gas and air from the said burner before it reached said cooking top box, an oven located at one side of said cooking top box, a flue communicating with said box and the flue extending beneath the said oven and around its side and top and having its end provided with an outlet, said inner side of the oven provided with a dead air space extending partly up said inner wall of the oven and a flue from that point on and communicating with the exit of the first mentioned flue.

6. An improved pot type of oil burning range comprising a housing, a cooking top box having a closed top, a burner compartment extending downward from said cooking top box to the lower end of said housing, a pot type of burner in said burner compartment located substantially in the lower portion of said compartment and separated from the sides thereof, and an upwardly extending burner drum having closed connection with said burner pot and reaching upward from said burner pot and having an open upper end communicating with said cooking top box and separate from the side walls of said compartment, whereby the gases and air from said burner pot are properly mixed and proper combustion is obtained when they reach said cooking top box.

AMBROSE R. PIERCE.