This invention has for its object certain improvements in bakers’ ovens of the kind known as steam-pipe (draw-plate) ovens wherein the heating of the oven chamber is effected by closed steam pipes partially filled before their final closure with water or other fluid; these pipes entering the furnace located at one end of the oven, so that the entire oven is heated from one end, preferably that opposite the charging door through which the goods to be baked are inserted.

The particular objects and features of this invention are to obtain greater uniformity of temperature throughout the oven-chamber or chambers, and to effect an economy in fuel, by passing the products of combustion from the furnace through a chamber underneath the sole-plate of the oven-chamber or chambers to the front end of the oven, thus supplementing the heat in that part of the oven and securing more uniformity in heating through the length of the oven chamber and thence in a reverse direction through a chamber or chambers above the oven-chamber before going to the chimney. In combination with such an arrangement means are provided for drawing off from the oven-chamber any superfluous vapors arising from the goods being baked or otherwise. A further feature of the invention is to insulate the oven in its upper part by employing two or more superimposed chambers outside the oven-chamber, the innermost chamber being adapted to serve for collecting superfluous vapors from the oven and the outer chamber or chambers through which the flue-gases are passed on their way to the chimney serving to jacket the top of the collecting-chamber, and thus to further assist in insulating the oven from the atmosphere, means being provided to place the collecting-chamber in communication with the chamber or chambers superimposed thereon and traversed by the flue-gases, so as to enable the induced draught of the flue gases to evacuate vapors from the collecting-chambers when required.

The invention will be more particularly described with reference to the accompanying drawings, in which:

Figure 1 is a sectional side elevation of a draw-plate “Perkins tubes” heated baker’s oven according to the present invention taken on the line E.E. of Figure 2.

Figure 2 is a sectional plan view taken on the line C.C. of Figure 1.

Figure 3 is a sectional end elevation taken on the line A.A. of Figure 2,

Figure 4 is a sectional end elevation on the line B.B. of Figure 2.

Figure 5 is a sectional side elevation of a draw-plate loop-tube heated bakers’ oven of the double deck type, and

Figure 6 is a sectional plan view taken on the line D.D. of Figure 5.

Referring first to Figures 1, 2, 3 and 4, the furnace 1 is arranged in the usual manner to heat the tubes 2, 3 and 4 but instead of the products of combustion passing direct to the chimney they are directed through conduits 5 and 6 formed in the dividing wall 7, although a continuous conduit of the required area extending the whole width of the oven might be employed with equal advantages. The said conduits 5 and 6 communicate with the vertical conduit 8 which directs the products of combustion to the conduits or chamber 9 immediately under the sole plate 10 of the oven. Vertical side conduits 11 and 12 are provided to communicate with the upper chamber or conduit 18, arranged immediately above a collecting chamber 14, having perforated tiles 15 to form the roof of the oven chamber 16 supported by inverted T-shaped metal bars 17.

Similar tiles except that they have no perforations are used to construct the chamber or conduits above and below the oven chamber having metal supports where necessary.

The circuit of the products of combustion from the furnace 1 to the chimney or the like conducting means 18 is indicated by arrows.

The collecting chamber is evacuated by way of an outlet 19, controlled by a damper 95 or the like controlling means 20. The outlet 19 might be arranged at the forward end of the oven.

The sets of tubes 2, 3 and 4 are attached for the second time by the flames or hot gases at 2, 3 and 4.

It is of great importance that the products of combustion should be directed under the sole plate of the oven immediately after leaving the furnace, as it has been found by experiment in baking that the bottom heat requires supplementing, especially in this arrangement where two chambers are formed above the oven chamber. The temperature registered in the collecting chamber 14 is usually greater than that in the oven chamber by this special arrangement.
the products of combustion immediately above the collecting chamber. By this arrangement a greater economy of fuel will be the result, and a greater uniformity of temperature in the oven chamber is effected.

Referring to Figure 5 of the drawings, this shows a draw-plate oven of the double-deck type heated by closed steam-pipes as previously described for the single oven chamber, but in this case the ends of the tubes 21, 22, 23 and 24 are concentrated into a box or furnace 25 instead of the furnace extending to the full width of the oven chamber as hereinafter described. The chamber 26 employed to conduct the products of combustion in a downward direction over the tubes will communicate with the chamber or conduit 27 immediately under the sole plate 28 of the oven chamber. The products of combustion are then directed upwards through conduits 28 and 29 to communicate with the chamber or conduit 30 arranged in the partitions between the upper and lower oven chambers 31 and 32 respectively, after which the gases pass upwards again through conduits 33 and 34 communicating with the chamber or conduit 35 arranged immediately above the collecting chamber 36. The gases may pass through a further conduit 37 to the chimney stack 38, or be short-circuited by arranging the chimney or outlet at the forward end indicated by dotted lines.

Referring again to the chambers situated on the roof of the oven (which may also extend to the sides of the oven), the innermost chamber is to be used for the purpose of drawing from the oven chamber any superfluous vapours arising from the goods being baked or from the live steam that is sometimes employed when baking certain classes of goods, also any other products of the oven chamber, through perforations in the roof of the oven which are spread over a wide area extending throughout the oven but preferably over the centre portion thereof, while the other chamber or chambers conduct the products of combustion from the furnace in such a way that they pass over the whole surface of the chamber employed to draw off the superfluous vapours (and hereafter called the collecting chamber) after having been passed under the sole plate of the oven. The collecting chamber 36 is evacuated into the conduit or chamber 35 through the passage 39 controlled by a suitable damper or the like controlling means 40.

The tubes 41 shown in Figures 5 and 6 are known as "loop tubes" and take various forms to cause an even temperature throughout the oven chamber.

In an arrangement where each set of tubes or each independent unit of tubes is heated by separate furnaces, the products of combustion would be passed under their respective sole plates and unite at a point to traverse the upper chamber or chambers.

It will be understood that by the arrangement described the heat that would otherwise be wasted by passing direct up the chimney is utilized to insulate the collecting chamber and consequently the oven chamber from the atmosphere, and also the induced draught for the flue gases is employed to evacuate the collecting chamber as required. The heat directed underneath the sole plate of the oven may serve to superheat that part which is of the greatest importance.

The result of such an arrangement according to the experimental model has proved a great economy in fuel.

It will be understood that for different types of ovens and the position of any oven in a battery of ovens, slight modifications will be necessary, such as for instance in the case of ovens which take the end position in a battery of ovens special provision will be necessary to insulate the oven chamber on the side nearest to the outside wall.

The induced draught of the chimney will draw off the products of combustion through the nest direct route, therefore deflecting means may be employed to circulate the current of heat as desired so that no pockets will be formed.

It is usual to insulate the top of a baker's oven with a great thickness of brickwork, but according to the present invention the insulation is more effectually and efficiently carried out, and as the ordinary thickness of brickwork is not required on the top of the insulating chamber, this heavy weight of material is avoided.

It will be understood that by employing two or more chambers outside the oven chamber, the innermost one for the purpose of collecting superfluous vapours, etc., from the oven chambers and the outer chamber or chambers to further insulate the oven from the atmosphere or the temperature of the bakery, the drawing off of the superfluous vapours, etc., and the insulation of the chambers is effected in a very simple manner and very little alteration is required to adapt this invention to existing ovens.

The connection between the collecting chamber and the insulating chamber or chambers is effected in such a way as to prevent soot or dust being admitted into the collecting chamber.

Convenient inspection apertures or cleaning apertures are provided with gas tight doors.

A thermometer may be employed in the collecting chamber and also the insulating chambers as an additional guide to the baker.

It has been found by experiment that the
oven constructed according to this invention registers a high temperature for a much longer period than the ordinary type, therefore after closing down for the week end the required heat for baking is very quickly restored.

The induced draught may be effected by mechanical means when it is not convenient to employ a chimney, or mechanical means may be combined with the action of the chimney if required.

A damper may be employed to short circuit the products of combustion when the furnace fire has been started to prevent an unnecessary amount of dust and soot collecting in the circuit channels or chambers round the oven and for any other purpose. The outlet would be arranged in the roof of the furnace with a connection to the chimney to exhaust the products of combustion into the atmosphere.

I declare that what I claim is:

1. In a baker's oven of the kind heated from one end by a furnace, the combination comprising a plurality of superimposed chambers arranged externally and directly above the top of the oven chamber, means for connecting the innermost of said superimposed chambers with the oven-chamber so that it forms a collecting-chamber adapted to draw off superfluous vapors from the said oven-chamber, a chamber extending below the sole-plate of the oven-chamber, and means for conducting the products of combustion from the furnace to the chamber below the sole-plate and thence upwards from the front end of said sole-plate chamber to a chamber superimposed on the collecting-chamber, whereby the combustion products on their way to the atmosphere are caused to pass under the sole-plate of the oven from the furnace to the front end of the oven and then over the outer surface of the collecting-chamber in the reverse direction towards the uptake.

2. In a baker's oven of the kind heated from one end by a furnace, the combination comprising a plurality of superimposed chambers arranged externally and directly above the top of the oven-chamber, means for connecting the innermost of said superimposed chambers with the oven-chamber so that it forms a collecting-chamber adapted to draw off superfluous vapors from the oven-chamber, a chamber extending below the sole-plate of the oven-chamber, means for conducting the products of combustion from the furnace to the chamber below the said sole-plate, and thence upward from the front end of said sole-plate chamber to a chamber superimposed on the collecting-chamber, and means for placing the said collecting-chamber in communication with the superimposed chamber that is traversed by the flue gases on their way to the atmosphere whereby the induced draught of the flue gases is employed to evacuate the collecting-chamber.

3. In a baker's oven of the kind heated from one end by a furnace, the combination comprising a plurality of superimposed chambers arranged externally and directly above the top of the oven-chamber, means for connecting the innermost of said superimposed chambers with the oven-chamber so that it forms a collecting-chamber adapted to draw off superfluous vapors from the oven chamber, a chamber extending below the sole-plate of the oven-chamber, means for conducting the products of combustion from the furnace to said sole-plate chamber and thence upward from the front end of said sole-plate chamber to a chamber superimposed on the collecting chamber, a chimney connected with the said superimposed chamber, and controllable means for placing the collecting-chamber when required in communication with the superimposed chamber that is traversed by the flue gases on their way to the atmosphere to enable the induced draught of the flue gases to evacuate the collecting-chamber.

4. In a baker's oven of the kind heated from one end by a furnace, the combination comprising a plurality of superimposed chambers arranged externally and directly above the top of the oven-chamber, means for connecting the innermost of said superimposed chambers with the oven-chamber at a plurality of places so that it forms a collecting-chamber adapted to draw off superfluous vapors from the oven-chamber, a chamber extending below the sole-plate of the oven-chamber, means for conducting the products of combustion from the furnace to the said sole-plate chamber, conduits at the forward end of the oven for conducting the combustion products from the sole-plate chamber to the front end of a chamber superimposed on the collecting-chamber, a chimney connected with the said superimposed chamber, and a damper for placing the collecting-chamber, when required, in communication with the superimposed chamber that is traversed by the flue gases on their way to the atmosphere, to enable the induced draught of the flue gases to evacuate the collecting-chamber.

5. In a baker's oven of the kind in which the heating of the oven-chamber is effected by closed tubes partially filled with heating liquid and heated at one end in a furnace, the combination comprising a furnace in which the said tubes are heated at one end, a chamber contiguous to said furnace and in communication therewith through which chamber the said tubes are passed and wherein subjected to a secondary heating by the products of combustion passing through, a chamber extending below the...
sole-plate of the oven-chamber and in communication at one end with the chamber in which the secondary heating of the tubes is effected, a chamber external to and superimposed upon the top of the oven-chamber and having communication with the interior of the oven-chamber at a plurality of points so as to form a collecting-chamber for drawing off superfluous vapors from the oven-chamber; a chamber external to and superimposed upon the collecting chamber, vertical conduits connecting the front end of the sole-plate chamber with the chamber superimposed on the collecting-chamber, controllable means for placing the collecting-chamber in communication with the chamber superimposed thereon, and a chimney for carrying away the combustion products and vapors from said superimposed chamber.

6. In a double-deck baker's oven of the kind heated from one end by a furnace, the combination comprising a plurality of superimposed chambers arranged externally to and directly above the top of the upper oven-chamber, means for connecting the innermost of said superimposed chambers at a plurality of points with the upper oven-chamber so that it will form a collecting-chamber adapted to draw off superfluous vapors from the oven-chamber, a chamber extending below the sole-plate of the lower oven chamber, means for conducting the products of combustion from the furnace to the said sole-plate chamber, a hollow partition forming a chamber separating the lower oven-chamber from the upper oven-chamber, conduits connecting the front end of the sole-plate chamber of the lower oven to the front end of the said partition-chamber, conduits connecting the rear end of the partition-chamber with the chamber superimposed on the collecting chamber, controllable means for placing the collecting-chamber when required in communication with the said superimposed chamber, and a chimney connected with said superimposed chamber for carrying off combustion products and vapors therefrom.

In witness whereof, I have hereunto signed my name this 20th day of October, 1825.

WILLIAM DREDGE.