

Aug. 5, 1958

H. W. SCHULZE ET AL

2,846,557

VAPOR TREATING MEANS

Filed Sept. 9, 1955

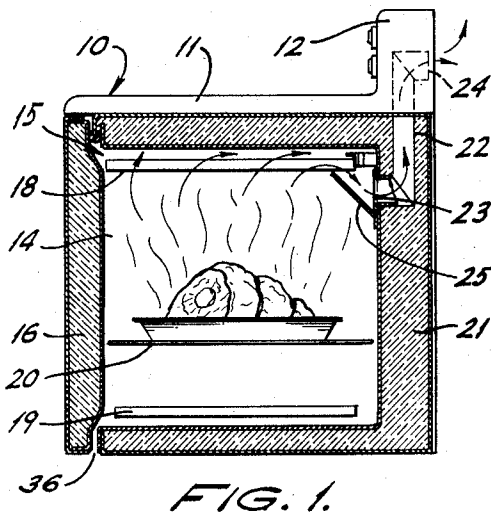


FIG. 1.

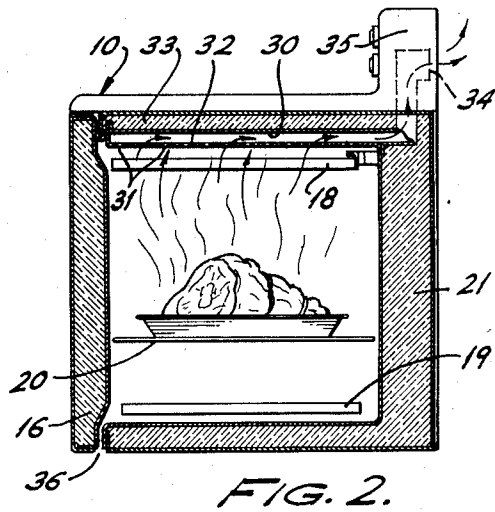


FIG. 2.

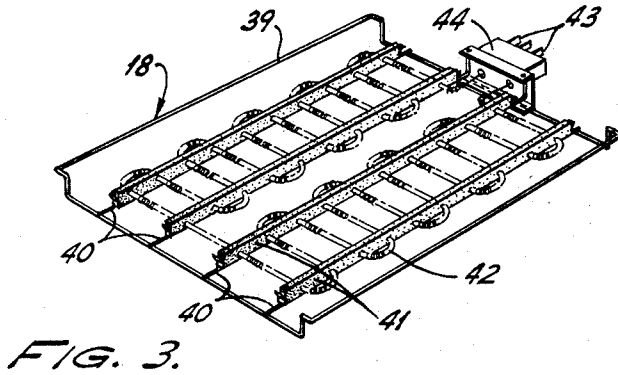


FIG. 3.

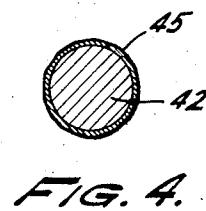


FIG. 4.

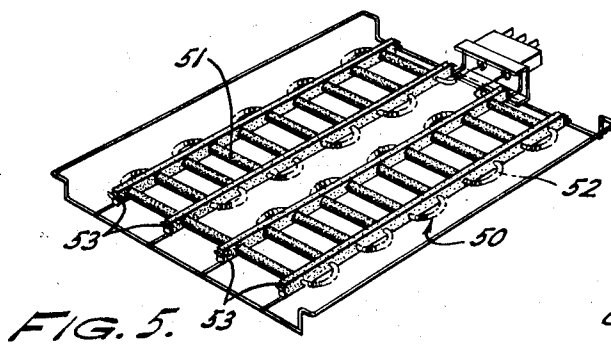


FIG. 5.

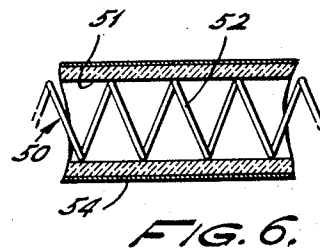


FIG. 6.

INVENTORS
HERMAN W. SCHULZE
DONALD W. SCOFIELD
BY
Carl H. Synnestvedt
AGENT

2,846,557

VAPOR TREATING MEANS

Herman W. Schulze, Jenkintown, and Donald W. Scofield, Glenside, Pa., assignors to Philco Corporation, Philadelphia, Pa., a corporation of Pennsylvania

Application September 9, 1955, Serial No. 533,493

4 Claims. (Cl. 219—35)

The invention hereinafter described and claimed has to do with heated enclosures, such as ovens, and has for its primary object the provision of a composite unit which not only serves to heat the oven, but also includes means for effecting catalytic incineration of smoke and odors arising during use of the oven.

One of the problems encountered in the use of ovens, and particularly in the use of ovens of the type incorporated in domestic cooking ranges, is the contamination of room air by smoke and odors escaping from the oven. Such smoke and odors, and particularly those which arise from volatilization of certain fats, are highly objectionable.

Many attempts have been made in the past to meet this problem, one of the earlier endeavors being embodied in the familiar hood structures which have been utilized with oven equipment. Some ovens have been equipped with stacks intended to carry off the fumes and smoke resulting from use of the oven, and to discharge such fumes and smoke outside of the building. Also, ovens have been provided with filters of metal-wool or similar material. These and other devices have been resorted to in an effort to meet the problems with which this invention is concerned, but have not met with substantial success, particularly when adapted for use in modern domestic kitchens.

The problem has successfully been dealt with by apparatus forming the subject matter of assignee's copending application, Serial No. 460,863, filed October 7, 1954, in the name of Donald W. Scofield and entitled "Vapor Treating Means." In the apparatus of the aforesaid application, means is provided to pass the oven air through a chamber positioned on the outside of the oven and including catalytic incineration means to eliminate smoke and odor arising from the cooking, and then return the clean air to the oven. The present invention has for an object the provision of vapor treating means which does not require passing the vapors exteriorly of the oven, nor necessitate use of air moving means.

In one aspect of our invention its is an object to provide, in combination with the oven enclosure of a domestic range, improved composite heating and air treating means effective both to heat the oven and to remove smoke and odors incident to the use of the oven.

A more specific object of the invention is to provide such apparatus, characterized by compact, economical construction.

In accordance with the invention, there is provided a compartment, herein illustrated as comprising the oven of a domestic electric cooking range, provided with heating units adjacent its upper and lower walls, and a vent opening through which the oven air is discharged into the room where the oven is positioned. The upper heating unit comprises a novel composite structure including both a heating element and a catalyst, mounted entirely within the oven. The vent is so arranged that oven air flowing toward it must first pass through the heating unit where it is acted upon by the catalyst, and thus sub-

stantially cleaned of its impurities by catalytic incineration, prior to being discharged into the room.

The invention will be fully understood from a consideration of the following detailed description taken together with the accompanying drawing, in which:

Figure 1 is a sectional view of an oven compartment embodying the concepts of the present invention;

Figure 2 is a view similar to Figure 1 but showing a modified construction;

Figure 3 is a perspective view of an oven heating unit constructed in accordance with the concepts of the present invention;

Figure 4 is a sectional view, on an enlarged scale, taken through the wire forming the combined heating element and catalytic incineration means of the apparatus shown in Figure 3;

Figure 5 is a perspective view similar to Figure 3, but showing a modified construction; and

Figure 6 is an enlarged view, partially in section, illustrating the composite heating unit shown in Figure 5.

Now making more detailed reference to the drawing, and particularly to Figure 1 thereof, it will be seen that the invention is therein illustrated as embodied in a domestic range 10 including a top wall 11 having along its rear edge a splashguard 12. Beneath the top wall 11 are side, rear and bottom walls defining an insulated oven enclosure 14 having its open front 15 closed by a door 16. The door may be pivotally mounted upon the range structure by any suitable hinge means (not shown). The oven is provided with upper and lower heating units 18 and 19, and an oven rack 20, the latter being provided to support pans in which cooking takes place. The rear wall 21 of the range is provided with a vent duct 22 having its inlet port 23 in the rear wall of the oven just beneath the plane of the upper heating unit 18, and its outlet port 24, for convenience, in the rear wall of the splash-guard.

It is important, as is more fully explained later, that the oven air, prior to its being vented from the oven, pass through the upper heating unit. This can be accomplished in a number of ways, for example by the use of an angularly positioned baffle (25), provided on the rear wall of the oven with its lower edge secured to the wall just below the outlet port 23 and its upper edge terminating just beneath the bottom of the upper heating unit. It should be understood that the inlet port 23 and the baffle 25 may extend either completely, or partially, across the wall, as desired.

Now with reference to Figure 2, it will be seen that the range structure shown in this figure differs from that shown in Figure 1 only in the oven vent arrangement, identified in this figure by the numeral 30. In this modified construction, the inlet to the oven vent is provided by a plurality of apertures 31 in the top wall 32 of the oven, with the vent duct overlying the apertures and passing through the insulation 33 surrounding the oven, to the outlet port 34 in the back of splash-guard 35. This vent arrangement may extend over all of the top wall, or over only preselected portions, as desired.

It should be understood, in connection with the oven structures described, that these are to be considered typical, and that other suitable constructions may be used, the important consideration being that the construction be such that smoke and odors arising from articles being cooked pass through the heating element prior to entering the vent. To this end the heating unit is preferably positioned between the vent port and the oven air inlet, the latter being provided, as is customary, by leaving space between the cabinet and the bottom of the door, as indicated by the numeral 36.

Now with reference to Figures 3 and 4, illustrating a preferred construction, heating element 18 is shown as

3

comprising a wire framing member 39 including a plurality of transverse rods 40 supporting insulators 41 provided with apertures through which the heating element 42 is threaded in a convoluted or serpentine path, as shown. Element 42 preferably comprises a continuous coil of wire with its ends connected to terminal prongs 43 in an insulating terminal block 44 fastened to the rear of frame 39. In particular accordance with the present invention, and as more clearly seen in Figure 4, the wire, forming element 42, is provided with a thin catalytic coating 45.

While there are a number of ways in which the combined heating element and catalyst may be fabricated, I prefer to utilize as the base of this coil, a wire of nickel-chromium alloy, for example the alloy known as Nichrome. The coil is coated by any well-known technique, with a finely divided metallic coating which may, for example, be of the kind known as "platinum black." However, other well-known catalytic compositions may be used.

Figures 5 and 6 of the drawing illustrate one of the many possible modified forms of heater construction. In this form the heating element 50 is uncoated, but instead is provided with ceramic shells in the form of tubes 51, strung, as more clearly shown in Figure 6, on those portions 52 of element 50, between insulators 53. The ceramic tubes 51 are provided with a thin coating 54 of a suitable catalyst, such as mentioned above in connection with Figures 3 and 4.

In the operation of the apparatus, either for broiling or baking, element 18 is supplied with electrical energy sufficient to raise its temperature to supply heat to cook the food and to activate the catalyst to incinerate any smoke or odors coming in contact therewith.

As shown by arrows in Figures 1 and 2, smoke and odor-containing vapors and fumes emanating from the food being cooked flow upwardly through the heating unit, and in so doing are brought into contact with the heated catalyst which incinerates the undesirable components thereof, the cleaned air then passing out through the vent into the room where the oven is positioned.

From the foregoing description it will be understood that the present invention provides novel, very simple, and highly advantageous apparatus for heating the oven enclosure in which it is positioned and simultaneously cleaning the oven air of smoke and odor as it arises from food being cooked in the oven, prior to passage of the air to the ambient atmosphere.

4

While the invention has been described with reference to a preferred embodiment thereof, it is to be understood that the disclosed apparatus is susceptible of various changes and modifications without departing from the essential spirit of the invention. It will be appreciated, however, that such changes and modifications are contemplated as come within the scope of the appended claims.

We claim:

1. In a heating unit wherein an elongated heating element extends across substantially an entire enclosure: a system of tubular bodies of catalytic material within said enclosure, the heating element comprising a helical coil of electrically conductive wire, surrounding a free, central space, the outside of the coil contacting the inside of each tubular body, and the system of tubular bodies extending at least across a major part of said enclosure, to incinerate therein airborne materials such as odors and smoke.
2. A unit as described in claim 1, wherein said enclosure comprises a top wall substantially coextensive with the area thereof and wherein said heating element and said system of tubular bodies of catalytic material are disposed below and adjacent said wall.
3. A unit as described in claim 2, additionally comprising a structure for guiding and distributing heated air and airborne materials such as odors and smoke, within said enclosure, to various portions of the heating element and of the system of tubular bodies of catalytic material extending across said enclosure.
4. Apparatus in accordance with claim 1, further characterized in that the body of catalytic material substantially consists in tubular shell means, surrounding at least parts of the heating means described and having a catalytically active surface.

References Cited in the file of this patent

UNITED STATES PATENTS

1,828,635	Abbott	Oct. 20, 1931
2,102,482	Parker	Dec. 14, 1937
2,224,945	Ames	Dec. 17, 1940
2,300,837	Ames	Nov. 3, 1942
2,535,268	Coats	Dec. 26, 1950
2,658,742	Suter	Nov. 10, 1953
2,729,735	Fries	Jan. 3, 1956
2,731,541	Houdry et al.	Jan. 17, 1956
2,752,477	Norris	June 26, 1956