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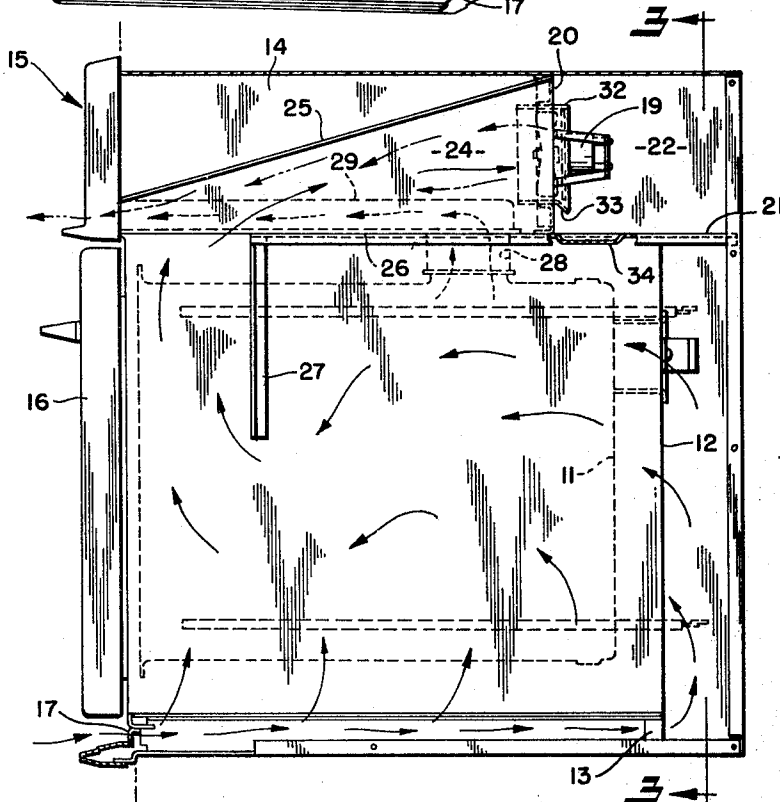
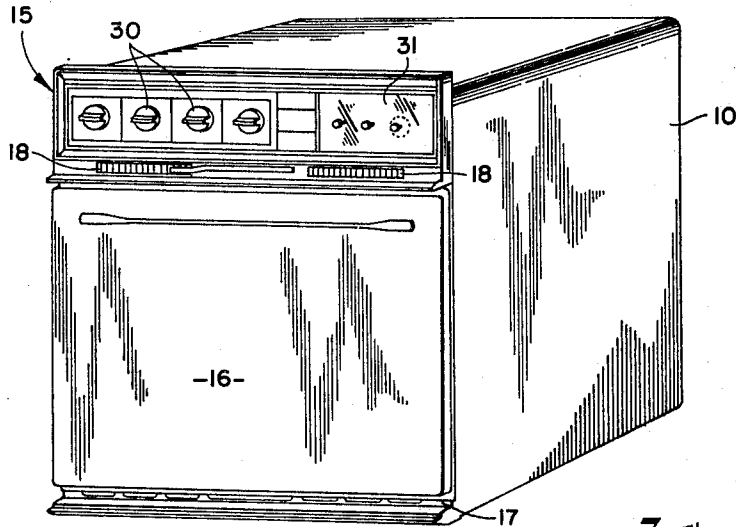
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3,485,229

BUILT-IN OVEN COOLING SYSTEM

Filed Sept. 11, 1968

2 Sheets-Sheet 1



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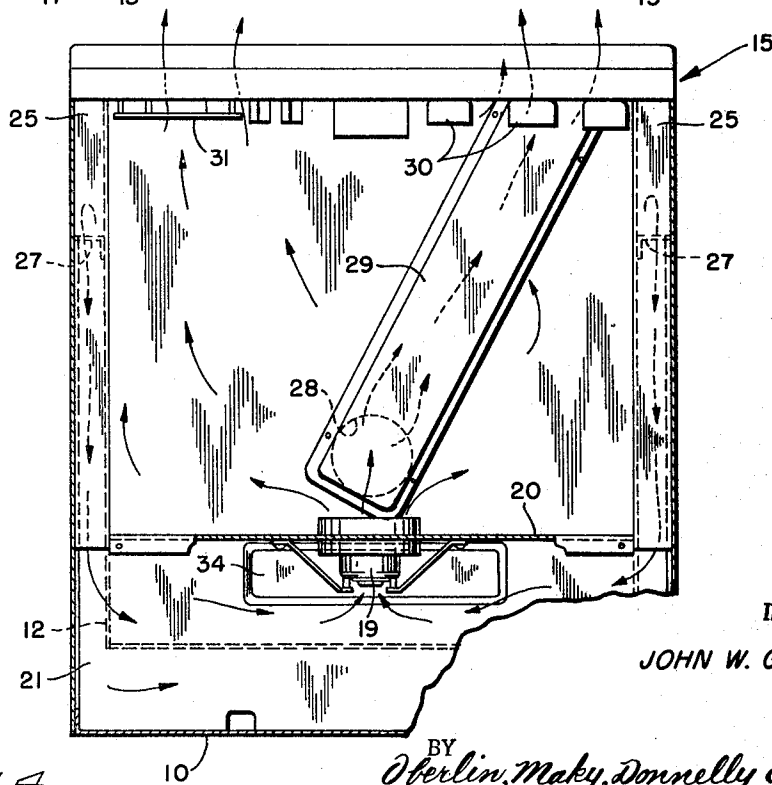
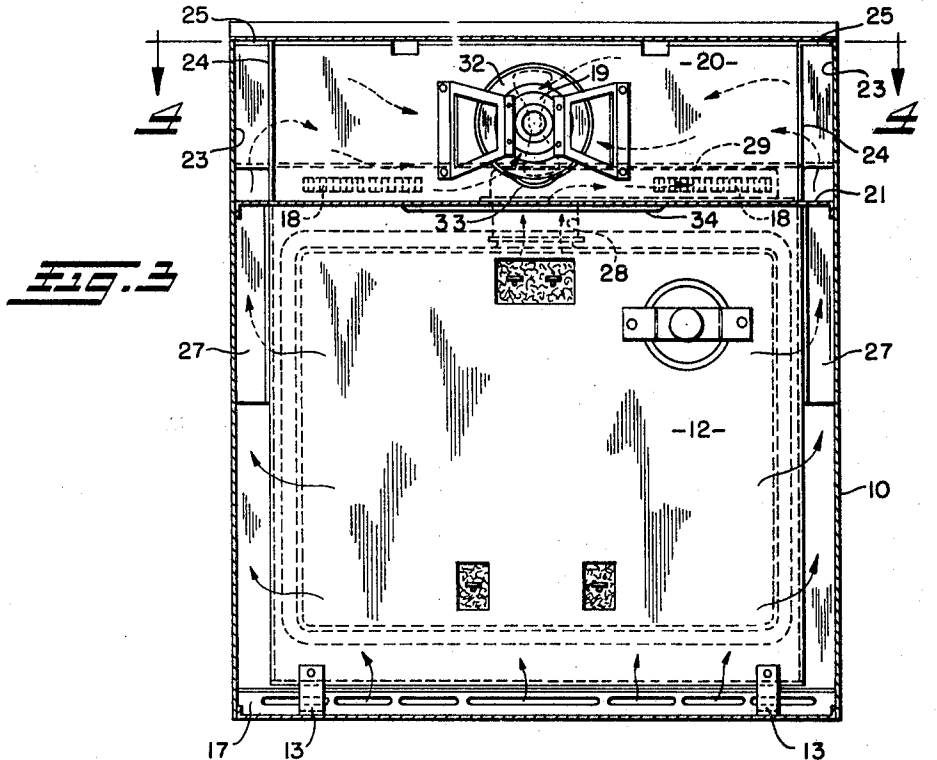
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BUILT-IN OVEN COOLING SYSTEM

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4 Claims

ABSTRACT OF THE DISCLOSURE

The oven is supported in an outer casing through which a blower circulates ambient air, with all of the flow in the casing directed by baffling over the top front portions of the side walls of the oven. Exhaust products from the cooking cavity are conveyed through a relatively long discharge duct which is exposed to the cooling air flow within the casing.

The present invention relates to domestic built-in wall ovens which can be operated safely at the abnormally high temperatures needed for self-cleaning action by virtue of special air cooling systems restricting the maximum external temperatures of the oven.

As explained in U.S. Patent No. 3,310,046, one major concern in the design of such an oven is to protect the oven control components confined in the wall recess from damaging and dangerous overheating when the oven is held at a temperature of close to 1000° F. for an appreciable period of time, as required for self-cleaning, and the patent proposes that the controls be located in a section which is separated from the oven proper in such a manner as to provide a thermal break between the two. This thermal break is actually either an outlet or an inlet in a forced air cooling system which, in the preferred embodiment of the patent, comprises a main inlet below the door from which ambient air flows within the outer oven casing substantially directly to a blower mounted in a centered top transverse partition and forwardly from the blower over the front half of the oven to an outlet between the top of the door and a superimposed control panel. Substantially the entire area of the back of the oven is excluded from the circulation by a shroud applied against the back wall of the oven liner and vented by louvers to the confined space within the building structure behind the oven. This arrangement, while affording adequate protection for the components of the noted control panel is not considered to restrict sufficiently the external temperatures of the assembly within the wall recess, particularly at the front of the oven, and improvement in this respect is a primary object of the present invention.

Another object of the present invention is to provide an air cooling system for such an oven in which the ambient air is caused to flow substantially fully over the oven liner and all of the flow is circulated over the forward top portions of the side walls of the same.

The invention, briefly, accomplishes such objectives by presenting the incoming air with baffling between the main ambient air inlet and the blower, preferably respectively at the bottom and top of the casing, which directs the flow over the top front portions of the liner sides and also over the major extent of the top of the oven. Such baffling defines a top rear plenum chamber the depth of which is roughly one-fourth of the total distance from the front to the rear of the oven.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

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To the accomplishment of the foregoing and related ends the invention, then, comprises the features herein-after fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

FIG. 1 is a perspective view of a built-in wall oven equipped with an air cooling system in accordance with the present invention;

FIG. 2 is a side elevation of the oven with the outer cabinet walls at such side removed;

FIG. 3 is a rear elevation, with the rear outer wall removed; and

FIG. 4 is a horizontal section as viewed from the plane of the line 4—4 in FIG. 3.

Referring now to the drawings in detail, the illustrated oven includes an outer casing or cabinet 10 which is generally cubical and enclosed on all sides except the front.

The cooking cavity is formed within the casing by spaced inner and outer oven liners 11 and 12, respectively, with the former also open at the front approximately in the plane of the casing front and the space between the two liners filled with thermal insulation such as fiberglass. The outer liner is supported on brackets 13 or the like at the bottom which space it from the bottom of the outer casing and it will also be evident that the back and side liner walls are spaced from the corresponding casing walls. The outer liner is moreover well below the casing top to provide a free top space 14 within the casing which is closed at the front of the assembly by an oven control section designated generally by reference numeral 15.

The oven cavity is closed by a hinged door 16 approximately coextensive with the outer oven liner, and a slotted air inlet plate 17 extends across the width of the casing below the bottom of the door. The top control section is provided with openings 18 to the interior top space above the oven liner which, as will become clear, serve as an outlet for the casing.

The air cooling system for the oven comprises an electric blower 19 mounted in a transverse partition 20 which substantially fully spans the top space 14 within the casing, as best shown in FIG. 3, and forcing the air forwardly and out the openings 18 in the bottom part of the control section. The partition is forward of the back of the oven liner 12 by about one-fourth of the depth of the same, so that the major portion of the top of the oven is ahead of the blower. The space behind the blower is fully closed at the bottom by a plate 21 which, together with the partition 20 and the outer casing, defines a top rear plenum chamber 22 to which air can enter only through side gaps or spaces 23 between the ends of the partition and the casing side walls.

An angular side baffle 24 extends from each such partition end forwardly with decreasing height to the front control section in spaced parallel relation to the adjacent casing side wall and has a top flange 25 which bridges the space to such side wall. A horizontal baffle 26 between the liner and the casing at each side extends forwardly from the partition at the bottom to a point which is spaced inwardly from the front about one-fourth of the depth of the oven, and a vertical angle 27 complements each horizontal baffle at the forward end of the same, extending downwardly slightly less than half the height of the oven liner and of course also bridging the space to the outer casing side wall.

The described baffling thus establishes the blower-induced flow clearly shown by the arrows, and it will be evident that ambient air entering the outer casing at the

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bottom inlet fully sweeps over the outer oven liner, including the back. Moreover, all of the flow must circulate over the forward top portions of the liner sides ahead of the vertical baffles 27 to proceed to the top rear plenum chamber 22.

The oven has a top vent 28 from the cooking cavity leading to an exhaust duct 29 which runs horizontally diagonally through space 14 to the outlet openings at the left as viewed from the front, so that the products issuing directly from the oven are conveyed for a significant distance in transfer relation to the forced air flow for cooling prior to discharge into the room. The control section contains the various components used conventionally to determine the operation of the oven, such as the switches 30 and timer 31, and these are also obviously exposed to the cooling air flow.

In order to protect the control components and the wiring, not shown, from contamination by greasy particles and the like which may become entrained in the air flow, the partition opening in which the blower is mounted is provided with a dished ring 32 serving to mask the blades and this ring is formed with a bottom lip 33 for dripping of grease which accumulates on the mask and gravitates to the lip. The plate 21 below the lip is preferably formed with a depression 34 serving as a sump for the grease and the grease which is thus collected will in time be largely freely dissipated.

The control of the oven will preferably include some form of interlock which will require the blower to operate in order for the oven circuit to be operative, such as noted in the aforesaid patent.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I, therefore, particularly point out and distinctly claim as my invention:

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1. A built-in wall oven comprising a liner having walls defining an oven cavity open at the front, a door for closing said opening, an outer casing surrounding the liner in outwardly spaced relation to form a cooling air chamber fully about the same, a transverse partition dividing said chamber above the liner into front and rear sections, a forwardly directed blower mounted in said partition, an oven control assembly closing the casing at the front above the door and having an air outlet therein, air inlet means also at the casing front below the door, and baffling between the liner and outer casing which defines in part restricted passages for the air extending along the top front portions of the liner side walls through which all the air circulating in the chamber must flow to the rear top section from which the blower exhausts the air through the control section outlet.

2. An oven as set forth in claim 1, wherein said transverse partition is located relatively close to the rear of the liner, the oven cavity has a vent just forward of the partition, and a discharge duct extends from said vent through the top front section of the cooling chamber to the control assembly.

3. An oven as set forth in claim 1, wherein the blower is provided with shield means for impingement thereon of grease particles and the like at the upstream side.

4. An oven as set forth in claim 3, wherein said shield means has a bottom drip lip, and a sum is formed below said lip to contain grease which drips from the same.

References Cited

UNITED STATES PATENTS

3,310,046 3/1967 Scott et al.

CHARLES J. MYHRE, Primary Examiner

U.S. Cl. X.R.

219—400