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Takase

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[54] **COOKING OVEN**

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[52] **U.S. Cl.** ..... **126/21 A**

[51] **Int. Cl.** **F24c 15/16,** F24c 15/32

[58] **Field of Search** ..... 126/21 R, 19, 273, 21 A

[56] **References Cited**

UNITED STATES PATENTS

3,590,803	7/1971	Sauer	126/21 A
3,710,775	1/1973	Takase et al	126/21 A

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Attorney, Agent, or Firm—Eric H. Waters

[57] **ABSTRACT**

A cooking oven comprising a heating chamber divided by a partition wall to form a rear blower chamber containing a blower. The partition wall is provided with an opening leading to the blower chamber so that heated air from a combustion chamber is directly drawn from the combustion chamber to the blower chamber. A pair of left and right side plates project forwardly from opposite side edges of the partition plate to form air passages communicating between the interior of the blower chamber and the front portion of the interior of the heating chamber. A portion of a rear wall of the heating chamber is bent into substantially the same plane as the partition plate and an exhaust opening leading to ambient atmosphere is formed in the bent portion. The partition plate and the side plates are formed integrally and are detachably mounted within the heating chamber.

9 Claims, 3 Drawing Figures

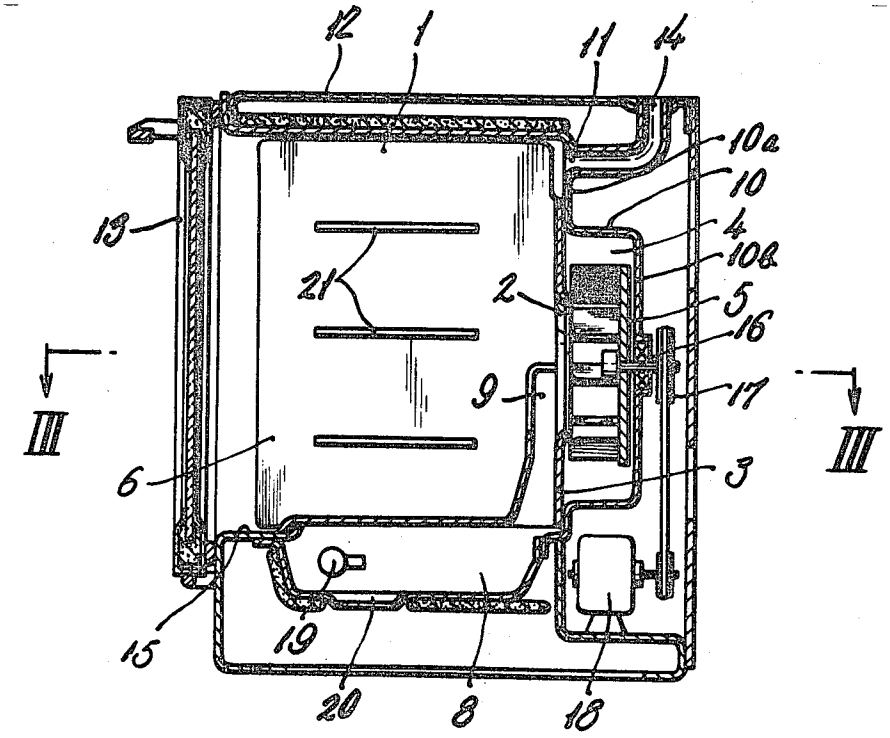


Fig. 1

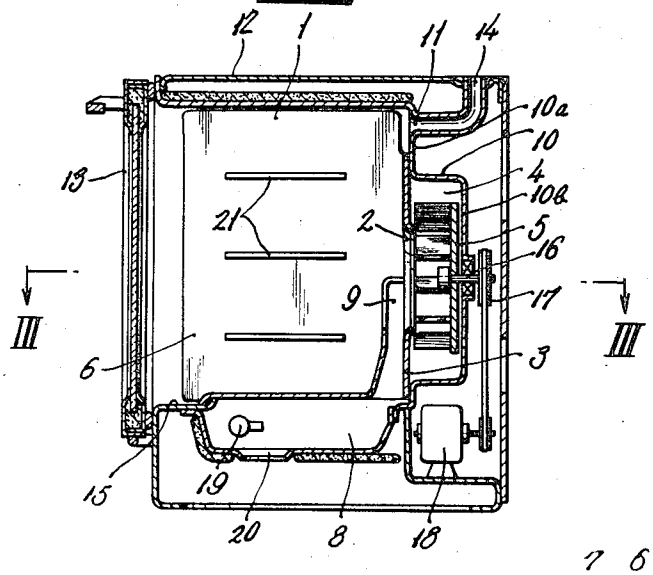


Fig. 2

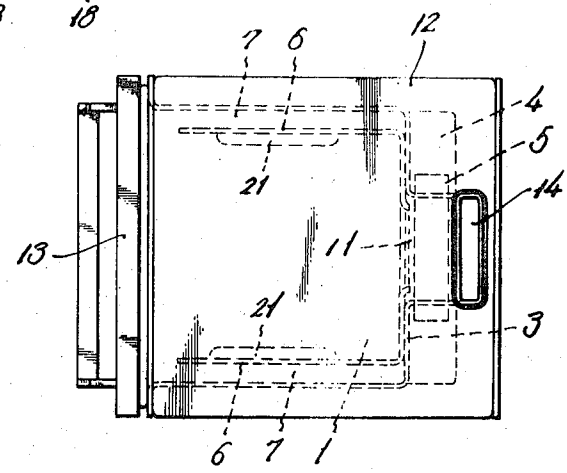
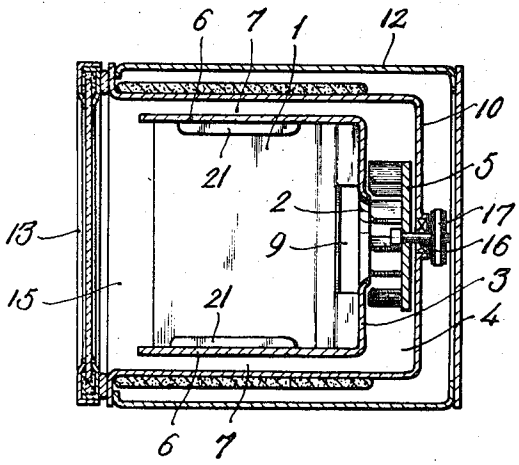


Fig. 3



COOKING OVEN

BACKGROUND

A. Field of the Invention

This invention relates to a cooking oven of the type in which hot air is forcedly circulated within a heating chamber by a blower.

B. Prior Art

The applicant has previously proposed an arrangement in this kind of oven in which a heating chamber is divided by a partition plate, with an opening, so as to form a blower chamber therebehind in which a blower is mounted, and a pair of side plates project forwardly from the opposite side edges of the partition plate to form air passages connecting the interior of the blower chamber and the front portion of the interior of the heating chamber, a hot air duct being connected to a separate combustion chamber and having an outlet in front of the opening in the partition plate. In this arrangement, however, an exhaust opening is made in the rear side wall or the upper side wall of the blower chamber, and it is a disadvantage that part of the fresh hot air drawn into the blower chamber through the duct and the opening in the partition plate is directly discharged to the ambient atmosphere from the exhaust opening which results in a thermal loss.

SUMMARY OF THE INVENTION

An object of the invention is to provide a cooking oven of the above type which avoids the above disadvantage.

A further object of the invention is to provide a cooling oven of the above type in which the heated air from the combustion chamber is directly conducted into the blower chamber and then into the heating chamber, exhaust taking place from the heating chamber.

In accordance with the invention there is contemplated a cooking oven of the above type comprising a casing for a heating chamber including side walls and a rear wall, a partition plate spaced from said rear wall to define a blower chamber therewith, side plates secured to said rear wall to form an integral assembly therewith, said side plates being spaced from said side walls of the casing to define passages therewith which lead from the blower chamber into the heating chamber, a combustion chamber beneath said heating chamber in which heated air is produced, said partition plate having an opening therein which opens into the blower chamber, a duct extending from said combustion chamber and having an outlet facing the opening in said partition plate to conduct heated air directly from the combustion chamber to the blower chamber, and blower means in said blower chamber to draw heated air from the combustion chamber directly into the blower chamber and then drive the air via said passages into the heating chamber, said rear wall of the casing including a portion extending in substantially the same plane as said partition plate and in continuation thereof, said portion of the casing being provided with an exhaust outlet leading into said heating chamber and communicating with the ambient atmosphere.

In further accordance with the invention said assembly is detachably supported within the casing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a sectional side view of one embodiment of a cooking oven according to the invention;

FIG. 2 is a top plan view of the oven; and

FIG. 3 is a sectional view taken along line III—III in FIG. 1.

DETAILED DESCRIPTION

Referring to the drawing, therein is seen a cooking oven having a heating chamber **1** which is divided by a rear partition wall **3** having an opening **2** so as to form at its rear portion a blower chamber **4**. A blower **5** is mounted in the blower chamber **4** to face the opening **2**, and a pair of left and right side plates **6**, project forwards from the opposite side edges of the partition plate **3** to form on both external surfaces of plates **6** air passages **7** communicating between the interior of the blower chamber **4** and the front portion of the interior of the heating chamber **1**. A hot air duct **9** is connected to a combustion chamber **8** disposed below heating chamber **1** and the duct **9** opens in front of the opening **2**.

According to a feature of the invention, a portion **10***a* of a rear wall **10** of a casing for the heating chamber **1** is positioned in substantially the same plane as the foregoing partition plate **3** and an exhaust opening **11** is formed in portion **10***a* connected to the exterior.

According to another feature of the invention, partition plate **3** and the side plates **6** are formed integrally and are detachably mounted within the heating chamber **1**.

With this arrangement, the hot air duct **9** is also detachable from chamber **1**, separately from or together with the partition plate **3**. In the illustrated embodiment, the hot air duct **9** is formed integral with an upper wall of the combustion chamber **8**.

Referring further to the drawing, numeral **12** denotes an outer housing and numeral **13** denotes a front door providing access to the interior of the oven. The casing of the heating chamber is externally insulated in conventional manner and is spaced from the outer housing to minimize the temperature of the outer housing. In the illustrated embodiment, the exhaust opening **11** formed in the upper portion **10***a* of the rear side wall **10** of the heating chamber **1** is in communication with the ambient atmosphere via an exhaust conduit **14** extending from opening **11** to the outer casing **12**. As shown, the opening **11** is in immediate proximity to the top wall of the casing substantially at the corner which is formed between the top and rear walls of the casing. The exhaust conduit is formed by respective bent portions of the upper wall and rear wall of the heating chamber casing. A lower portion **10***b* of the rear side wall **10** is bent rearwards to form at the front thereof the blower chamber **4**, the partition plate **3** being so placed as to cover the front of the blower chamber and be substantially in the same plane as the upper portion **10***a* so as to abut the same.

The partition plate **3** and the side plates **6** projecting forwards from the opposite side edges thereof, are integrally formed as stated previously, and the assembly is placed on a floor plate **15** within the heating chamber **1** and is detachably secured thereto. The blower **5** is connected, via a pulley **17** mounted on a rearwardly extending shaft **16** of the blower, to an electric motor **18** mounted therebelow in the space between the heating

chamber and the outer housing. The combustion chamber **8** is formed under the floor plate **15** and has a gas burner **19** mounted therein. The combustion chamber is provided in its lower surface with an air supply opening **20.** Ledges **21** are provided at several levels on the inner surfaces of the side plates **6,** so that cooking pans or the like may be supported thereon.

The operation of the apparatus is as follows:

If the gas burner **19** and the blower **5** are operated, fresh hot air produced within the combustion chamber **8** by the gas burner **19** is drawn into the blower chamber **4** from the hot air duct **9** through the opening **2** together with hot air contained within the front heating chamber **1,** and the mixture of the joined hot air is then sent to the front portion of the heating chamber **1** through the left and right air passages **7** by the action of the blower **5** and the heated air flows rearwards within the heating chamber **1** and during its travel serves to cook foodstuff in the oven. The majority of the heated air is drawn into the blower chamber **4** via the opening **2** for subsequent use again while a part thereof is gradually discharged to the exterior via the exhaust opening **11,** this operation being continuously repeated.

Thus, according to this invention, the fresh hot air produced within the combustion chamber **8** is supplied in entirety to the interior of the heating chamber **1** for being used for cooking by heat, whereby the deficiency of the conventional ovens that a portion of the fresh hot air is directly discharged to the exterior is eliminated. Thus, the thermal efficiency is improved and the time for the oven to reach operating temperature at starting is extremely shortened. In further accordance with the invention, the integral partition plate **3** and side plates **6** can be removed, for example, after use, so it can be easily cleaned while also facilitating cleaning of the interior of the heating chamber **1** and the interior of the blower chamber **5.**

What is claimed is:

1. A cooking oven comprising a casing for a heating chamber including side walls, a top wall, and a rear wall, a partition plate spaced from said rear wall to define a blower chamber therewith, side plates secured to said rear wall to form an integral assembly therewith, said side plates being spaced from said side walls of the casing to define passages therewith which lead from the blower chamber into the heating chamber, a combustion chamber beneath said heating chamber in which heated air is produced, said partition plate having an opening therein which opens into the blower chamber, a duct extending from said combustion chamber and having an outlet facing the opening in said partition plate to conduct heated air directly from the combustion chamber to the blower chamber, a blower means in said blower chamber to draw heated air from the combustion chamber directly into the blower chamber and then drive the air via said passages into the heating chamber, said rear wall of the casing including a portion extending in substantially the same plane as said partition plate and in continuation thereof, said portion of the casing extending substantially perpendicularly to said top wall to form a corner therewith, said portion of the casing being provided with an exhaust outlet disposed in said plane and perpendicular to said top wall in immediate proximity to said corner, said exhaust opening leading into said heating chamber and communicating with the ambient atmosphere while being blocked by said portion from said heating chamber.

2. An oven as claimed in claim **1** wherein said assembly is detachably supported within the casing.

3. An oven as claimed in claim **1** wherein said portion of the rear wall of the casing is bent from the remainder of the rear wall into contact with the partition plate.

4. An oven as claimed in claim **3** wherein, said rear wall and top wall of the outer casing are bent to form a conduit communicating with the exhaust outlet from the heating chamber.

5. An oven as claimed in claim **3** wherein the remainder of said rear wall outside the bent portion defines the bounds of the blower chamber, said partition plate closing said blower chamber at the front thereof.

6. An oven as claimed in claim **1** comprising a drive motor mounted outside the casing, and means coupling the drive motor to the blower means.

7. An oven as claimed in claim **2** wherein said duct is detachable from said casing.

8. An oven as claimed in claim **7** comprising an upper wall for said combustion chamber detachably supported in said casing, said duct being secured to said upper wall for removal therewith.

9. An oven as claimed in claim **1** comprising support ledges on the side plates at a plurality of levels.

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