April 5, 1966 L. V. BUCK 3,244,165

SEAL FOR GLASS OVEN DOOR

Filed Aug. 31, 1964

Fig. 1.

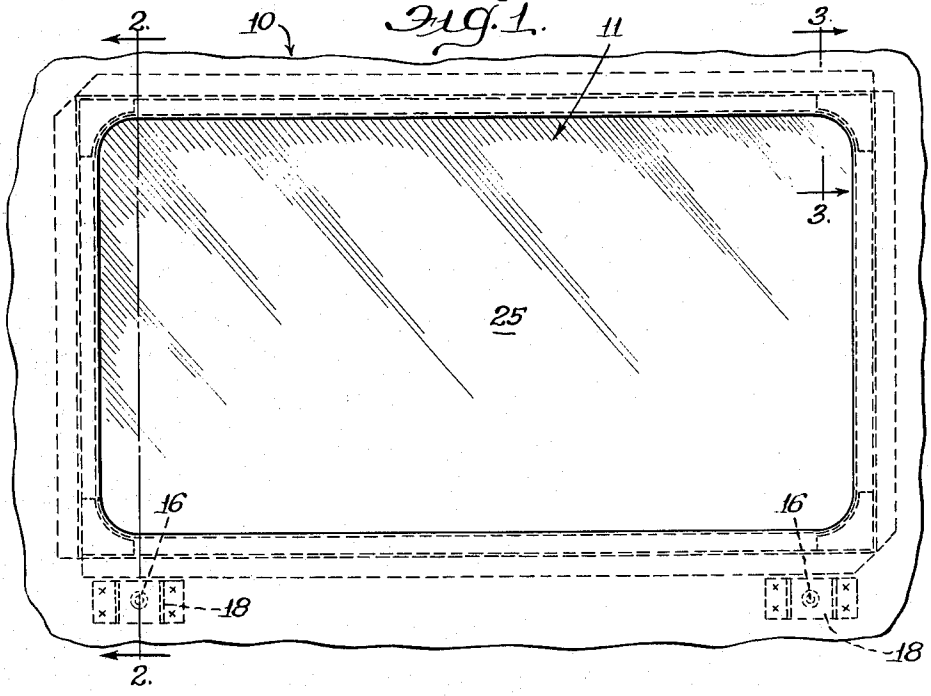


Fig. 2.

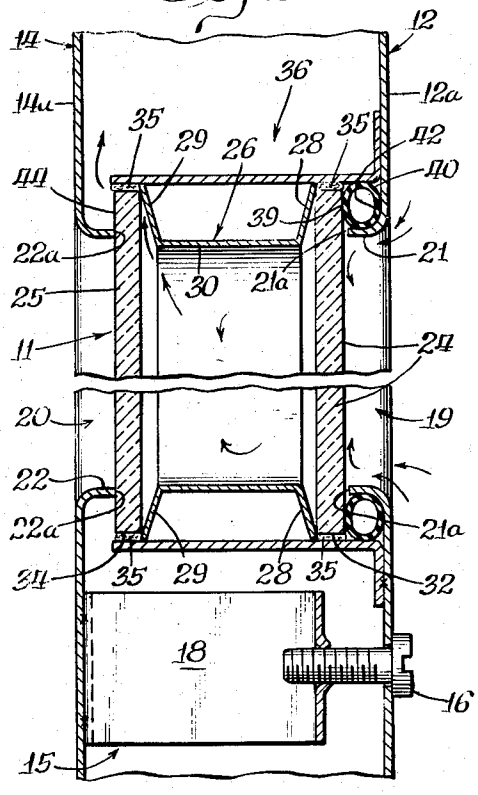
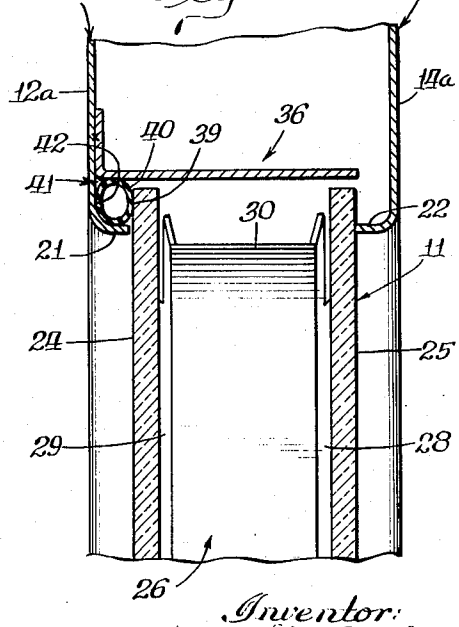


Fig. 3.



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SEAL FOR GLASS OVEN DOOR

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The present invention relates to oven doors having windows permitting viewing of an oven interior and more particularly to the mounting of the window in the oven door.

It is helpful to a housewife using an oven to have a door which permits viewing the food as it is baked, roasted, or broiled. However, in providing such windows for oven doors several problems are encountered. It is necessary that the window not permit the escape of heat to any substantial degree from inside the oven into the environment surrounding the oven, ordinarily the kitchen. The practice has been to provide a pair of glass panels spaced apart to form an air space that serves as an insulator. In mounting the window panels in a door, a seal must be provided to prevent the deposition of discoloring product on the inside surface of the glass panels, i.e., on the side of the glass panels facing the air space. The discoloring product is carried by vapors created in the oven. The seal, however, must not require a precise thickness of glass because in practice, glass plate thickness is not maintained to precise tolerances. Furthermore, the external or exposed side of the seal must permit air flow into and out of the insulating air space. This is because as the temperature of the air space changes the pressure changes, i.e. a rise in temperature increases the pressure while a drop in temperature creates a vacuum. The air must move into and out of the space to substantially equalize the pressure therein with the atmospheric pressure outside.

Accordingly, it is an object of the present invention to provide an improved mounting for window panels used in oven doors and the like, which mounting prevents entry of greasy vapors and the like into the air space between the pair of spaced apart glass panels while permitting movement of relatively clean air into and out of the air space to equalize pressures therein with those of the outside environment.

It is the overall object of the present invention to provide an economically manufacturable and easily installed window mounting for an oven door and the like adaptable for use in standard units.

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings in which:

FIGURE 1 is a portion of an oven door in elevation embodying the present invention;

FIGURE 2 is a section taken along 2—2 in FIGURE 1;

FIGURE 3 is a section taken along 3—3 in FIGURE 1.

While the invention will be described in connection with the preferred embodiment, it will be understood that I do not intend to limit the invention to that embodiment. On the contrary, I intend to cover all alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention and defined by the appended claims.

Referring more particularly to the drawings, FIGURE 1 is an elevational view of a portion of an oven door **10** which ordinarily would be hingedly mounted at the front end of an oven enclosure. The door, when closed, separates the heated oven interior from the relatively cool room in which the oven is located. In ordinary use, the oven would be heated to a high temperature, for example

300° to 500° for baking, roasting, or broiling food placed therein. The window **11** permits viewing while cooking is progressing. The door **10** is comprised of an internal panel **12**, forming an inside wall **12***a*, and external panel **14**, forming an outside wall **14***a*. The panels are constructed so that they can be assembled, and they are held together by suitable fastening means, for example a screw and anchor assembly **15**. Though a single assembly **15** is shown, there would be a plurality spaced about the window **11**. The respective panels **12**, **14**, have interfitting peripheral portions, and the respective internal and external walls **12***a*, **14***a*, are selectively drawn towards each other by tightening a series of screws **16**, which thread in respective anchors **18**, comprising the assembly **15**.

Turning to window **11**, it is formed by providing a pair of aligned openings **19**, **20**, respectively in the panels **12**, **14**. In the present instance, a pair of flanges **21**, **22**, respectively, formed as an integral part of the panels **12**, **14**, extend about the perimeter of each of the respective openings **19**, **20**. Positioned in juxtaposed relationship to the respective panels **12**, **14**, are a pair of glass panes or panels **24**, **25**, forming an insulating air space **23**. The panels are maintained in spaced apart relationship, in the present instance, by a generally U-shaped spacer **26**. To provide a bias on the respective window panels **24**, **25**, pushing them toward respective flange edges **21***a*, **22***a*, the spacer **26** is provided with a pair of legs **28**, **29**, extending from a body portion **30**. The legs react to an inward bending force and cooperate with the screw and anchor assemblies **15**, to draw the panels **12**, **14**, together, i.e., clamping the glass panels in position. Longitudinal or vertical support for the glass panels is provided by a support bracket **31**, extending about the periphery of the glass panels and suitably fastened to one of the door panels, in the present instance spot welded to internal door panel **12**. As is clear from FIGURE 2, the edges **32**, **34** of the glass panels **24**, **25**, rest on cushioning means, constructed for example of asbestos inserts **35**, which along the bottom carry the weight of the glass. The inserts **35**, can either be a single piece extending all the way around the glass or include a series of individual portions interposed in spaced apart relation between the junction of the glass edges, and support bracket **31**. The purpose of the inserts is to absorb shocks resulting from rough handling of the door **10**, and thereby prevent chipping or breaking of the glass. As is emphasized subsequently, the inserts do not form an air-tight seal.

In accordance with the present invention an improved glass panel mounting assembly **36** is provided for effecting an air-tight seal between the internal door panel **12** and the internal window panel **24** and an air-flow fit between the external door panel **14** and the external window panel **25**. As herein illustrated, an air-tight seal is effected by pressing a peripheral portion **39** of the internal glass panel **24** against a flexible sealing means **40**. In the preferred embodiment, the sealing means **40** takes the form of a small diameter hose extending about the perimeter of the opening **19** and is constructed of suitable heat-resistant, flexible material, for example silicone rubber. A channel **41**, is provided to hold the sealing means **40**, in position and also form walls against which the sealing means can be pressed, and distorted. The channel **41**, extends about the perimeter of the opening **19**, and, in the present instance, is formed by the support bracket **31**, a peripheral portion **42**, of internal door panel **12**, and flange **21**. As is clear from FIGURE 2, the support bracket **31**, is positioned outboard of the flange **21**. It is, of course, possible to use a bonding agent to attach the sealing means **40**, to the peripheral portion **42**, thus, not

requiring the flange 21, which supports the sealing means and prevents its sliding toward the opening 19, and out-of-position. Furthermore, the sealing means can take other cross section forms such as rectangular, and also it can be solid instead of having an opening extending therethrough. It must be constructed of material which can flex and thereby intimately contact the glass panel 24. Accordingly, grease vapors formed during cooking of food in the oven are prevented from entering the air space. There is no opportunity for discoloring materials to deposit on the inside surface, the side facing the air space, to impede viewing and give an unpresentable appearance to the oven window 11.

To permit communication between the air space 23, and the outside environment, the fit between the external dooor panel 14, and external glass panel 25, is not air tight. This permits equalization of the pressures in the air space 23, with those outside of the oven, as during ordinary use, the temperatures in the oven, and therefore of the air space rise and fall. In the illustrative embodiment, the edge 22*a* of the flange 22, engages a peripheral portion 44 of external glass panel 25. Accordingly, when the door is assembled and the plurality of screw and anchor assemblies 15 are tightened, the outside panel 14, is drawn toward the inside panel 12. As a result a clamping action is applied to the respective window panels 24, 25. The spacer 26 takes up any variations in glass thickness and transmits force to the inside glass panel 24, which acts on the sealing means 40. As a result of the applied pressure the sealing means 40 is distorted and intimately contacts both the glass panel and door panel.

As shown in FIGURE 3, the sealing means 40 extends about the respective corners. The legs 28, 29 of the support brackets 31 are cut-away to permit bending of the bracket. In the illustrative improved window mounting structure the bracket and peripheral portion 39 of the internal door panel surrounding the opening 19, cooperates to support the sealing means.

What is claimed is:

1. In an oven door the combination comprising a pair of panels assembled to form respective internal and external door walls, said walls supported in spaced apart relationship and having therein aligned openings; an inwardly projecting flange carried by said internal panel; a support bracket carried by one of said panels and extending across the space between said panels, said bracket spaced outboard of the perimeter of said internal door panel opening to form a channel with said flange; a flexible heat resistant sealing member positioned in said channel; an internal glass panel positioned in juxtaposed relationship with respect to said internal door panel and having a peripheral portion in pressing engagement with said sealing member; an external glass panel positioned substantially parallel and in spaced relationship with respect to said internal glass panel; a spacer positioned between said glass panels and exerting an outward spring force thereon to maintain said panels in spaced apart relationship; means carried by said external door panel engaging said external glass panel; and means for holding said internal and external door panels together whereby pressure is applied by said internal glass panel periphery to said sealing member, distorting the latter and effectuating an air-tight seal between said internal glass panel and said internal door panel.

2. In an oven door the combination comprising a pair of panels assembled to form respective internal and external door walls, said walls supported in spaced apart relationship and having aligned openings therein, an inwardly projecting flange carried by said internal panel and extending about the perimeter of said internal panel opening; a support bracket carried by one of said door panels, said bracket spaced outboard of said flange and forming therewith a channel; a flexible heat resistant sealing member positioned in said channel; an internal glass panel positioned in juxtaposed relationship with respect to said internal door panel and having a peripheral portion in pressing engagement with said sealing member; an external glass panel positioned substantially parallel and in spaced relationship with respect to said internal glass panel; a spacer positoned between said glass panels and exerting an outward spring force thereon to maintain said panels in spaced apart relationship; means carried by said external door panel engaging said external glass panel; and means for holding said internal and external door panels together whereby pressure is applied by said internal glass panel to said sealing member, distorting the latter and effectuating an air-tight seal between said internal glass panel and said internal door panel.

3. The oven door of claim 2 wherein the support flange is an internal part of said internal panel and the support bracket extends transversely from and is carried by said internal panel to form said channel for receiving said sealing member.

4. The oven door of claim 2 wherein said internal and external window panels having respective edges cushioned by shock absorbing means against direct engagement with said support bracket, said means permitting flow of air between said external door panel and external window panel to substantially equalize pressure in the air space between said internal and external window panels and pressure outside of the oven.

5. In an oven door the combination comprising a pair of panels assembled to form respective internal and external door walls, said walls supported in spaced apart relationship and having therein aligned openings; a support bracket carried by one of said panels and extending across the space between said panels, a flexible heat resistant sealing means; support means for mounting said sealing means on a peripheral portion of said internal panel wall surrounding said panel opening; an internal glass panel positioned in juxtaposed relationship with respect to said internal door panel and having a peripheral portion in pressing engagement with said sealing means; an external glass panel positioned substantially parallel and in spaced relationship with respect to said internal glass panel; a spacer positioned between said glass panels to maintain said panels in spaced apart relationship; means carried by said external door panel engaging said external glass panel; and means for holding said internal and external door panels together whereby pressure is applied by said internal glass panel peripheral portion and to said sealing means, distorting the latter and effectuating an air-tight seal between said internal glass panel and said internal door panel.

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