July 30, 1963 J. K. NEWELL, JR 3,099,259

GASKETING ARRANGEMENT FOR OVEN DOOR

Filed Dec. 21, 1960

FIG. 1

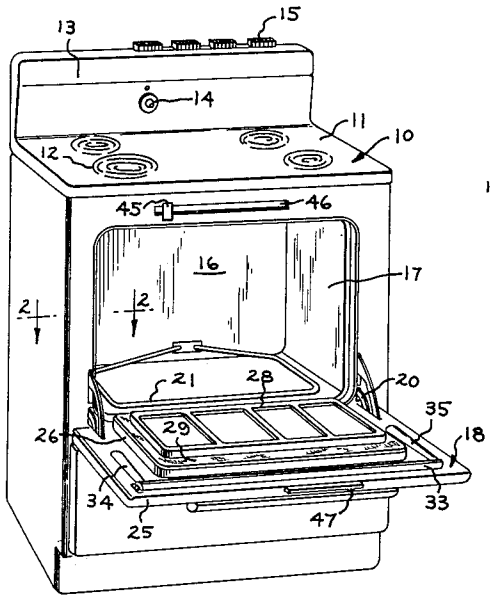
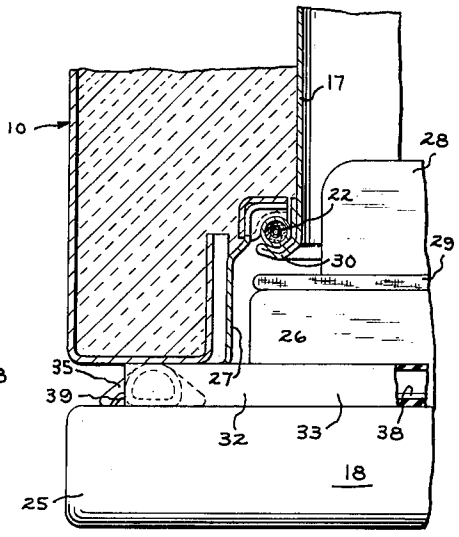


FIG. 2



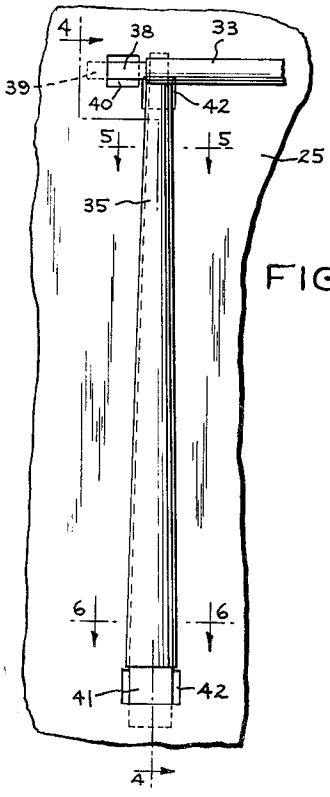


FIG. 3

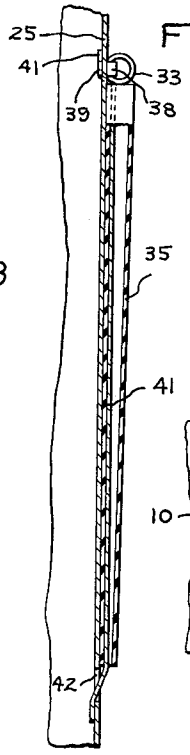


FIG. 4

FIG. 5

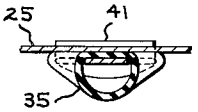
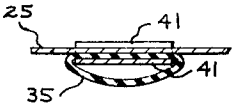


FIG. 6



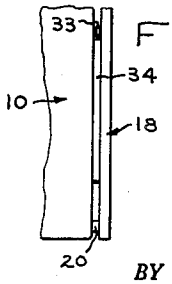


FIG. 8

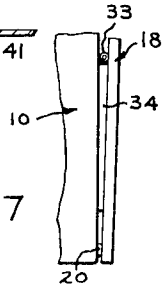


FIG. 7

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GASKETING ARRANGEMENT FOR OVEN DOOR

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3 Claims. (Cl. 126—190)

The present invention relates to domestic ovens and particularly to a means for sealing the oven door and retaining within the oven the smoke, odors, vapor and heat generated therein.

Standard ranges today have satisfactory door sealing gaskets which operate at temperatures below 600° F. but this invention relates to a new high temperature oven which is designed with an automatic heat cleaning cycle as is taught in the copending application of Bohdan Hurko, Serial No. 27,926, filed May 9, 1960, which is likewise assigned to the General Electric Company, assignee of the present invention. As there described and claimed, the oven is designed to operate through two temperature ranges such as a normal cooking range having a maximum temperature below 600° F. and a higher heat cleaning range having a maximum temperature between 750° and 950° F. The high temperatures within the heat cleaning range serve to burn off all food soil and leave the inner walls of the oven cavity perfectly clean.

The principal object of the present invention is to provide a domestic oven with a high temperature door gasketing arrangement which will properly seal the smoke, odors, vapor and heat generated within the oven as well as withstand the destructive forces which are set up when the oven door is slammed shut during its expected life span.

A further object of the present invention is to provide a wedge-shaped gasket that serves as a bumper member and withstands the compressive shock during door slamming operations.

A still further object of the present invention is to provide a double gasketing arrangement for an oven door wherein a first gasket serves as a bumper member to withstand the door slamming forces while a second gasket is protected in such a way that it does not fulfill a sealing function until after the door is closed and then latched shut.

The present invention is incorporated in an oven which has controlled heating means capable of elevating the oven temperature to a level between 750°–950° F. in accordance with the disclosure of the aforementioned copending application of Bohdan Hurko. The standard gasket materials for sealing oven doors are not satisfactory at these high temperatures. Hence, a double gasket design has been proposed which would include an innermost fiberglass or asbestos gasket for withstanding the high temperatures and an outermost elastomeric gasket or silicon rubber gasket for sealing the smoke, odors and vapors within the oven cavity. Unfortunately, the high temperature gasketing materials of the nature of fiberglass and asbestos have low resistance to abrasion so that these materials fail after a short time when subjected to door-slam tests conducted to insure reliability of operation over the expected life span of the oven. The elastomeric gasket also serves as a bumper member to withstand the entire compressive shock when a door is swung closed so as to protect the other gasket from the destructive forces of the door when it is slammed shut. A further improvement is to form the elastomeric gasket in a wedge shape that converges toward the hinged edge of the door so that substantially all portions of this gasket will be compressed uniformly when the door is closed. Arrangements are also shown for forming the wedge-shaped gasket from material of uniform cross section by

using a thin metal strip reinforcement of tapered shape.

My invention will be better understood from the following description taken in conjunction with the accompanying drawing and its scope will be pointed out in the appended claims.

FIGURE 1 is a perspective view of a domestic range embodying the novel gasketing arrangement of the present invention showing the oven door pivoted down to its open position;

FIGURE 2 is a fragmentary cross-sectional plan view taken on the line 2—2 of FIGURE 1 with the door in the closed but unlatched position to show the double gasketing arrangement;

FIGURE 3 is a fragmentary elevational view looking at the inner liner of the oven door and showing the elastomeric gasket which serves as a bumper member;

FIGURE 4 is a left side elevational view partly in cross-section taken on the line 4—4 of FIGURE 3 and showing the wedge shape of the gasket;

FIGURE 5 is a transverse cross-sectional plan view of the wedged-shaped gasket taken on the line 5—5 of FIGURE 3;

FIGURE 6 is a transverse cross-sectional plan view of the wedge-shaped gasket taken at the converging end of the wedge near the hinged edge of the door on the line 6—6 of FIGURE 3.

FIGURE 7 is a fragmentary left side elevational view of the oven with the oven door in a slightly inclined position representing the closed position of the door for normal cooking operations.

FIGURE 8 is a view similar to FIG. 7 showing the oven door in a vertical position representing the latched position of the door which is used during a heat cleaning cycle.

Referring in detail to the drawing and in particular to FIGURE 1, this invention has been shown in one form as applied to a free-standing electric range **10**, but it should be understood that this is for illustrative purposes only and that the invention is broad enough to be used in all domestic ovens whether they be heated by gas or electricity, or whether they be built-in wall ovens or ovens of free-standing ranges. The range **10** includes a top cooking surface **11** having a plurality of surface heating elements **12**, a backsplasher **13** containing the manually adjustable control devices **14** and **15** for governing the temperature of the range, and an oven cavity **16** formed by an oven liner **17** of box-like construction and a front opening drop door **18** which is hinged along its bottom edge as in conventional oven designs.

This invention is illustrated with an oven design that is disclosed in my earlier copending application, Serial No. 59,434, filed September 29, 1960, now Patent No. 3,017,488, which is likewise assigned to the General Electric Company, assignee of the present invention. The oven door **18** is supported on a pair of hinge brackets **20** pivotally supported within the range body and protruding outwardly from the front wall thereof. Suitable counterbalancing means (not shown) cooperate with these hinge brackets to assist in opening and closing the door as well as for positioning the door in a partially open "broil" position. The oven includes several heating elements in the form of the lower bake unit **21** and an upper broil unit (not shown) that is positioned beneath the top wall of the oven liner **17**. It is imperative to maintain relatively uniform temperatures within the oven during the oven cleaning cycle. Because of some heat loss through and around the door a mullion heater **22** is wrapped around the periphery of the oven liner just behind an annular flange **30** which protrudes outwardly therefrom, as is best shown in FIGURE 2, for adding heat in this area as is

best explained in my previously mentioned copending application, Serial No. 59,434.

The oven door 18 is a relatively thick member having three panel elements; namely, a decorative outer panel 25 which overlies the front opening in the range body, a center panel 26 which extends into a breaker frame 27 that outlines the oven opening, and an inner door liner 28 which protrudes into the front of the oven liner 17 a good distance from the front of the range body. A fibrous thermal insulating gasket 29 of fiberglass or asbestos is sandwiched between the inner door liner 28 and the central door panel 26. A small number of widely spaced fastening screws (not shown) are used between the central door panel 26 and the inner door liner 28 to hold these parts together as well as to restrict the heat conduction from one part to the other. This fibrous insulating gasket 29 is positioned to bear against the annular flange 30 at the front of the oven liner 17 only after the door is closed and then latched shut. This latching feature is a necessary precaution during the heat cleaning cycle so that entry cannot be gained to the oven cavity when the oven temperature is above the normal cooking temperature.

FIGURE 1 shows a latching handle 45 movable in an elongated slot 46 that is positioned above the door opening. This handle cooperates with a cam surface 47 located on the swinging edge of the door. This latching mechanism is explained and claimed in a copending application of Raymond L. Dills, Serial No. 59,942, now Patent No. 3,024,344, which is assigned to the General Electric Company, the assignee of the present invention. In practice the door is fitted with a double gasketing arrangement in the form of the fibrous gasket 29 and a second gasket 32 of elastomeric material such as silicon rubber or the like. While this invention has been illustrated with both gaskets supported on the inner face of the oven door it should be readily apparent to those skilled in this art that one or both of the gaskets could be supported from the range body with comparable results. The second gasket 32 of silicon rubber is of extruded tubular form of constant cross-section and it is divided into three separate sections; namely, a top piece 33, and two side pieces 34 and 35 which extend from the top piece 33 downwardly toward the hinged edge of the door for a little more than one-half the height of the door as is best seen in FIGURE 1.

The fibrous insulating gasket 29 is located closest to the oven cavity because it will withstand the highest temperatures that are to be developed during the oven's cleaning cycle. Unfortunately, the fiberglass or asbestos material is not very resistant to abrasion and it will not withstand the destructive forces that are set up when the door is slammed shut. Accordingly, the second gasket of elastomeric material is positioned to serve as a bumper member and it is of such size that it will hold the fibrous gasket 29 away from the annular lip of the door liner 17 when the door is first closed. It is only when the door is closed and then latched shut that the latch compresses the elastomeric gasket and flattens it out so that the fibrous gasket 29 can move against the lip of the oven liner.

The elastomer gasket 32 is expected to withstand the full force of the door slamming operation and it too must be designed so that it will have a long life expectancy. Since the oven door is hinged about one edge, in my example the bottom edge, the door closes faster at the bottom than it does at the top. If the elastomeric gasket 32 were of uniform thickness or height from the surface of the oven door, the bottom portion of the gasket would be compressed a great deal more than the top portion. It was found advantageous to design the elastomeric gasket so that it is compressed more or less uniformly throughout its entire length. This is accomplished by forming the side portions 34 and 35 of wedge shape where the converging end of the wedge is nearest the hinged edge of the door as is best seen in FIGURES 3 and 4 of the drawing. The top portion 33 of the gasket is formed of an extruded tubular shape with a thin metal strip 38 extending completely therethrough and having a bent portion 39 at each end for insertion into an opening 40 in the inner surface of the door so as to hold the tubular member firmly against the door surface as is seen in FIGURE 2.

The wedge shape of the side portions 34 and 35 of the elastomeric gasket is accomplished in a novel manner by using a tapered metal strip 41 which extends for the complete length of the tubular member. The wide end of the tapered strip 41 is located toward the hinged edge of the door and its width is greater than the normal width of the bore in the tubular member so as to spread the member apart in this area thereby decreasing its height as is best understood by comparing FIGURES 5 and 6 of the drawing which show transverse cross-sectional views of the wedge shaped gasket. This tapered strip 41 is held to the inner surface of the door in the same manner as the top strip 33 by having its end portions clipped into openings 42. The top end of the tapered strip 41 is adapated to underlie the top piece 33 of the gasket so as to give a good sealing action at the corners of the gasket where the top and side pieces meet.

FIGURE 7 shows the door 18 in a closed position with the door being inclined slightly outwardly and upwardly because of the wedge-shaped gasket piece 34. This is the position of the door shown in the cross-sectional view of FIGURE 2 where the fibrous insulation is spaced away from the flange 30 of the oven liner. It should be understood that it is only when the door is latched as in FIGURE 8 that the elastomeric gasket 32 is compressed enough to bring the fibrous gasket 29 into sealing relation with the oven liner flange 30.

Having described above my invention of a novel door gasketing arrangement to be used with a high temperature oven it will readily be apparent to those skilled in this art that the elastomeric gasket serves both as a sealing means and a bumper and it does not allow the fibrous gasket to function as a sealing member during the normal use of the oven for cooking. However, the elastomeric gasket is designed so that it will be compressed more or less uniformly throughout its entire length by forming its side portions of wedge shape. During the heat cleaning cycle it is necessary to seal the oven and restrict the amount of air passing into the oven as well as to limit or prevent the escape of smoke, odors, vapor and heat from the oven. At this time it is necessary for the fibrous gasket to be brought into operation by throwing the door latch and pulling the door into a tightly closed position which further compresses the elastomeric gasket and seals the fibrous gasket against the annular lip of the oven liner.

Other modifications of this invention will occur to those skilled in this art and it is to be understood, therefore, that this invention is not limited to the particular embodiments disclosed but that it is intended to cover all modifications which are within the true spirit and scope of this invention as claimed.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A domestic oven having a body forming an oven cavity, said body having a vertical wall member that has a door opening therein, a pivoted door member adapted to close said opening, a pair of gasket means arranged between the door and said vertical wall members, means for supporting each gasket means on one of said door and wall members, the first gasket means being a highly resilient elastomeric member circumscribing at least a major portion of three edges of the door opening, the said first gasket means serving also as a bumper member which cushions substantially all of the compressive shock when the door is swung shut, the second gasket means being a fibrous insulation that circumscribes a major portion of the door opening but is spaced from one of said door and wall members when the door is closed so as to be out of sealing engagement therewith, and latch means for latching said door closed thereby reducing the thickness of the

first gasket means until the second gasket means is compressed and hence sealed between the door and vertical wall members.

2. A domestic oven as recited in claim 1 wherein the first gasket means is of wedge shape in side view which converges toward the pivoted edge of the oven door so that substantially all portions of the first gasket means will be compressed simultaneously when the door is closed.

3. A domestic oven as recited in claim 2 wherein the first gasket means is a tubular elastomeric member of three lengths, a top piece and two side pieces, each of the three gasket pieces having a metal reinforcing strip extending loosely therethrough, the elastomeric material being of substantially constant cross-section, the reinforcing strip that extends through each side piece being of

tapered shape whereby the widest end of the strip will be located nearest the pivoted edge of the door so as to spread the elastomeric member apart thereby reducing its height from its supporting surface so that the converging tip of the wedge shape of the side pieces of the first gasket means coincides with the widest end of the tapered metal strip of the first gasket means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,219,962	Reynolds et al.	Oct. 29, 1940
2,760,223	Walz	Aug. 28, 1956

FOREIGN PATENTS

723,277	Great Britain	Feb. 2, 1955