Dec. 21, 1943. G. L. REES 2,337,349

VENT STRUCTURE

Filed Aug. 18, 1942

Fig.1.

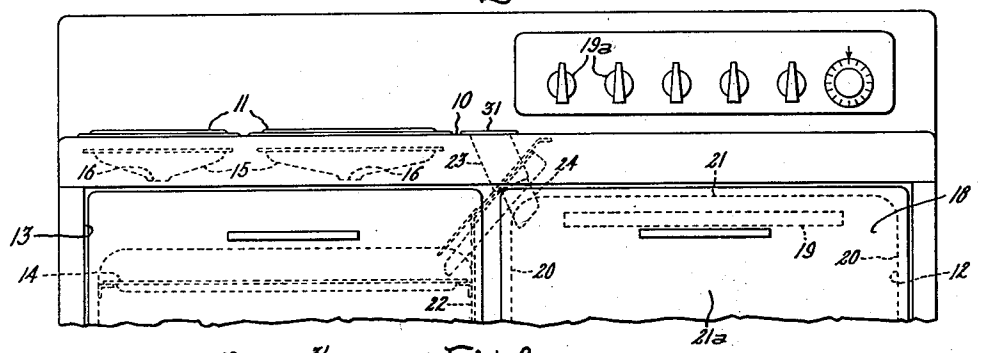


Fig.2.

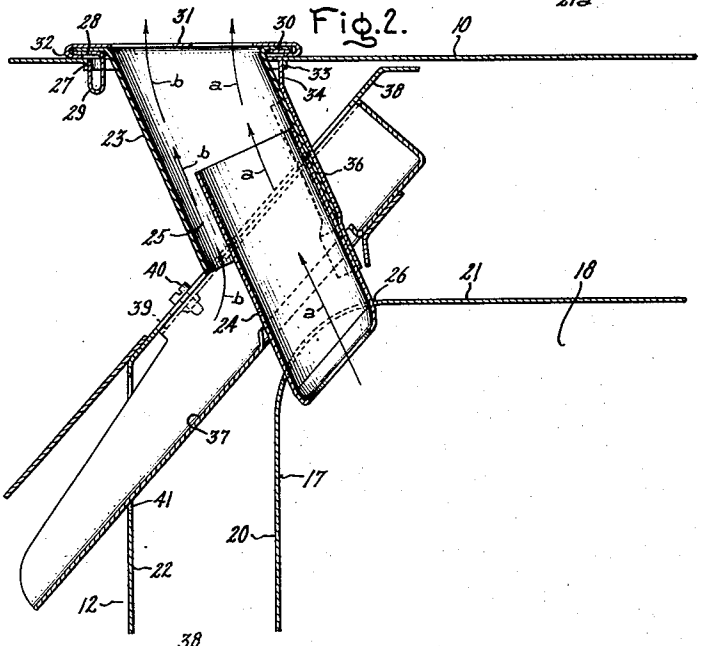
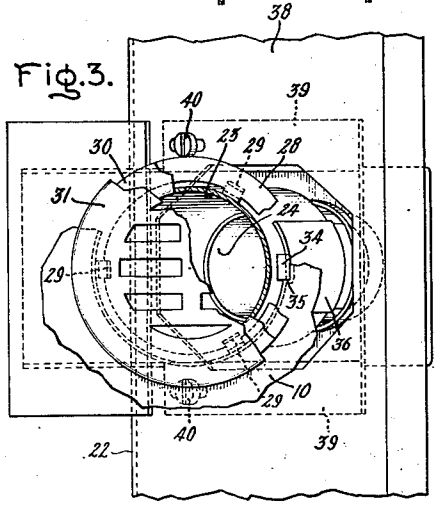


Fig.3.



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VENT STRUCTURE

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6 Claims. (Cl. 126—21)

This invention relates to vent structures, more particularly to vent structures for a heated space, such as the bake oven of a range, and it has for its object the provision of a vent structure of this character which is efficient in its operation, and has an improved and inexpensive construction.

This invention contemplates the provision of an improved vent structure for an oven which is easily removable for cleaning, and easily replaceable after cleaning; and one which cannot be replaced incorrectly after cleaning.

It further contemplates a vent structure which vents the oven directly; which will not affect adversely baking or roasting results; and which will not interfere with the case of cleaning the oven itself.

In addition, it contemplates an improved vent structure which will collect the oven vapor condensate and prevent it from dripping through the range and to the floor under the range, and also for similarly collecting any spillage through the vent discharge opening. Preferably, the condensate and spillage will be deposited on a suitable removable drip tray.

In accordance with this invention, the vent structure in one form thereof is provided with a pair of flues positioned one above the other, and preferably inclined at an angle to the vertical. The upper flue has a larger cross-sectional area than the lower, and the uppermost sides of the two flues are contiguous so that a space is left between the flues at their lowermost sides. The lower end of the lower flue is connected with the heating chamber of the oven, while the upper end of the upper flue discharges through the top plate of the range. By reason of this arrangement, moisture in the vapors issuing from the oven can condense upon the upper wall areas of the uper flue from which areas the condensate will gravitate through the space between the lowermost sides of the two flues to the lower end of the larger flue from which it discharges. Also, any spillage into the upper end of the larger flue where it vents through the top plate will fall down through the flue and discharge from its lower end.

The vent structure is provided with a receptacle for receiving the discharge from the lower end of the flue so as to prevent it from falling through the range and onto the floor under the range or on range parts that are difficult to clean.

The two flues are integrally joined together, and the integral structure is removably attached to the top plate so that it may be withdrawn for cleaning, and replaced after cleaning. The flue structure is provided with resilient clips for engaging the top plate so as to yieldingly hold the structure in its operative position.

Furthermore, this integral flue structure is provided with suitable interlocking means with the top plate which functions as a positioning index, whereby it is impossible to replace the structure after cleaning in an improper operative position.

For a more complete understanding of this invention, reference should be had to the accompanying drawing in which Fig. 1 is a fragmentary front elevation of an electric range embodying a vent structure arranged in accordance with this invention; Fig. 2 is a vertical sectional view taken through a portion of the range of Fig. 1 and the vent structure provided in it; and Fig. 3 is a fragmentary upper plan view of a portion of the range of Fig. 1 illustrating the top of the vent structure, parts being broken away so as to illustrate certain details of construction.

Referring to the drawing, this invention has been shown in one form as applied to an electric range. The electric range comprises a horizontal cooking plate top wall 10 in which are mounted a plurality of surface hot plates 11. These plates, as shown, are mounted at one side of the top wall 10, the left, as viewed in Fig. 1. The right-hand side area of the top wall 10 extends over a suitable oven 12. At the left of the oven 12 under the hot plates 11 is a suitable compartment 13 in which is mounted a removable drip tray 14 which receives spillage from the hot plates 11. The hot plates 11 preferably will be provided with pan-like reflectors 15 which are provided with centrally positioned openings 16 through which spillage from the hot plates can drain into the tray 14. The oven 12 is provided with an inner lining 17 which defines an oven heating space 18. This space is heated by upper and lower electrical heating elements, only the upper element 19 being indicated in the drawing. The surface units 11 and the oven heating elements are controlled by a plurality of switches 19a mounted in the back splasher of the range, as shown.

The inner lining 17 of the oven is defined by a pair of oppositely positioned side walls 20, a top wall 21, and bottom and rear walls (not shown). The heating chamber 18 is closed at the front by a door 21a. The oven 12 further comprises an outer lining having walls spaced from the side walls 20, the top wall 21 and the rear and bottom walls of the oven, and in the space between the two linings is inserted a suitable heat in-

sulating material (not shown); the top wall of this outer lining is defined by the top wall 10 of the range, and the wall of this lining opposite the left-hand wall 20 of the oven is defined by a vertical wall 22. The remaining walls of this outer lining are not disclosed, as they form no part of the present invention.

The vent structure for the heating chamber 18 comprises a pair of cylindrical tubular flues 23 and 24 arranged one above the other, as clearly shown in Fig. 2. The longitudinal axes of these two tubes 23 and 24 lie at an angle to the vertical. The upper flue 23 has a larger diameter, and hence, cross-sectional area, than has the lower flue 24. Also, the lower end of the tube 23 and the upper end of the tube 24 are in overlapping relation; furthermore, these overlapped portions of the tubes are in tangential relation; more specifically, the uppermost side area of the lower end portion of the upper tube 23 is in external tangential relationship with the uppermost side area of the upper end portion of the tube 24. The wall areas in tangency are secured together in any suitable way, as by welding. It will be observed that, by reason of this arrangement, a crescent-shaped passageway 25 is defined between the lowermost sides of the overlapped wall portions of the two flues.

The lower end of the lower flue 24 extends through a vent opening 26 provided in the inner lining 17 of the oven. In the particular embodiment of the invention illustrated, this vent opening 26 is provided in the corner of the lining 17, that is, at the juncture between the left hand side wall 20 of the inner lining and its top wall 21.

The upper end of the larger flue 23 emerges through the top wall 10 through a vent opening 27 provided for it in this top wall.

This upper end of the upper flue is removably held in the top wall by means of a clip structure comprising a clip ring 28 which is secured to the flue, and which is provided with a plurality of depending U-shaped resilient clips 29. As shown, the ring 28 bears against an outwardly extending flange 30 provided on the upper end of the flue 23. The upper end of this flue is covered by means of a grilled vent trim plate 31 which is secured to the flue and also to the clip ring 28. As shown, the plate 31 is provided with a downwardly and inwardly folded section 32 which clamps the plate and the ring 28 to the flange 30 in order to secure all these members together.

The depending resilient clips 29 yieldingly engage the edge of the top wall 10 around the opening 27 to yieldingly hold the flues 23 and 24 in their operative positions shown in Fig. 2. However, they readily "give" in order that the flue assembly may be withdrawn for cleaning, and also so that this structure may be reinserted in its operative position after cleaning. Preferably, the top plate will be provided with a short downwardly extending flange 33 around the opening 27 and against which the clips 29 bear.

In order to assist in properly positioning the flue structure when it is replaced in the range, a suitable interlocking index is provided between the flue structure and the top wall 10. This interlocking index comprises an index finger 34 which is mounted on the uppermost sides of the flues 23 and 24 and positioned so as to be received in a notch 35 (Fig. 3) provided for it in the top wall 10. As shown, this indexing finger 34 is mounted upon a plate 36 which is arcuate in transverse cross-section and which is secured to the uppermost sides of the two flues in any suitable manner, as by welding. It will be understood that when the flue structure is inserted through the opening 27 in the top plate 10 it can be placed only in the proper operative position of the flues, in which position the indexing finger 34 is received in the recess 35 to interlock the flue structure with the top wall.

It will be understood in view of the description thus far given that the heating chamber vents through the two tubes and the grilled plate 31 to the exterior of the range. The paths followed by the venting vapors from the oven are indicated by the arrows *a*. As the hot gases vent through the flues, as indicated, cooler air is drawn up into the larger flue 23 through the passageway 25, as indicated by the arrows *b*. This air functions to cool the hot vapors so that the mixture issuing from the grilled plate 31 is relatively cool. Also, by reason of this cooling action, moisture in the oven vapors venting from the lower flue 24 condenses on the upper wall areas of the larger flue 23, and the resulting condensate gravitates to the lowermost bottom wall areas of the larger flue, and finally discharges from the lower end of this tube. Because of the inclination of the tubes to the vertical, the condensate will tend to gravitate to the lowermost point of the larger flue shown in Fig. 2. Furthermore, the major portion of any spillage of material through the top plate 31 and into the flue structure will likewise tend to gravitate down the walls of the larger flue 23 to its bottom discharge opening, rather than to drip into the upper end of the smaller flue 24, and hence gravitate into the oven heating chamber itself.

The discharge of condensate and spillage from the lower end of the flue 23 is diverted into the drip tray 14 by means of a chute or shield 37 which is mounted upon the outer lining side wall 22. As shown, this side wall 22 is provided at its upper end with an inclined section 38 to which the chute 37 is directly attached; for this purpose, the chute 37 is provided with outwardly extending flanges 39 which are attached to the section 38 by means of tapped screws 40 directed through openings provided for them in the section 38 and tapped into holes provided for it in the flanges 39. The chute 37 is directed through an opening 41 provided for it in the vertical portion of the wall 22 so that it enters the left-hand compartment 13 to discharge directly into the drip tray 14. Therefore, any spillage and condensate in the flue 23 will flow through the passageway 25 and into the chute 37, from which it will discharge into the drip tray 14.

It will be observed that the vent structure arranged in accordance with this invention is easily removable for cleaning, and is just as easily replaceable after cleaning. Also, it will be observed that because of the indexing arrangement, it will be impossible to replace the flue structure in any but its correct operative position.

Another advantage of the vent structure of this invention is that the oven vapors and gases vent directly upwardly from the oven through the vent structure and top plate 10. Because of this direct venting, the discharge of the vapors and gas will not in any way adversely influence the roasting and baking operations.

Also, the cool air stream *b* intermingles with the hot air stream *a* to decrease the temperature of the issuing gases, and furthermore, it

will tend to condense the moisture vapor in the oven gases to cause it to condense and flow down into the chute 37 onto the drip tray 14. This is because the flues are inclined to prevent this condensate from flowing back into the oven space. Also, because of this inclination of the flues, any material spilling into the flue structure from the top will flow down into the tray 14.

In addition, it will be observed that the lower end of the flue 24 inserted in the corner of the oven lining 17 extends for but a very short distance into the heating chamber and, therefore, offers substantially no obstruction which would interfere with the cleaning of the oven lining. The vent discharge opening is well forward of the backsplasher of the range. Thus, oven vapors that might issue from the vent will not condense on the backsplasher or room wall immediately adjacent to the back of the range.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

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

1. In an oven having a heating chamber, a vent structure for said heating chamber comprising a pair of vent flues of different cross-sectional areas inclined to the vertical upwardly from said heating chamber, one end of the smaller flue being in communication with said heating chamber and the other discharging into said larger flue, and the uppermost side walls of said two flues being contiguous so that their lowermost side walls are spaced apart to define an inclined discharge passageway for the condensate collecting on the walls of said larger flue.

2. In an oven having a heating chamber, a vent structure for said heating chamber comprising a pair of vent tubes of different diameter having their longitudinal axes inclined to the vertical and their adjacent ends overlapping, and the two tubes being secured together so that their uppermost sides are in tangential relation whereby a passageway is left between the lowermost sides thereof for discharging condensate from the walls of said larger tube.

3. A range comprising a top wall, an oven heating chamber spaced below said top wall, a vent structure in said space comprising a pair of flues of different cross-sectional areas inclined to the vertical upwardly from said heating chamber, the smaller having its lower end connected with said heating chamber and the larger having its lower end overlapping the upper end of the smaller and having its own upper end venting through said top wall, the uppermost side walls of said two flues being contiguous so that the lowermost side walls are spaced apart, and a condensate and spillage discharge receiving member under the lower end of said larger flue.

4. A range comprising a top wall, an oven heating chamber under said top wall, a vent structure comprising a pair of vent tubes of different diameter having their longitudinal axes inclined to the vertical and their adjacent ends overlapping, the uppermost sides of the two tubes being in tangential relation so that a passageway is left between the lowermost sides of the tubes, means rigidly securing said tubes together, said top wall and said heating chamber being provided with vent openings, means detachably securing the upper end of said larger tube in the vent opening in said top wall so that the lower end of the smaller tube enters said vent opening in said heating chamber, an inclined discharge chute below the lower end of said larger tube, and a drip pan for receiving discharge from the lower end of said chute.

5. A range comprising a top wall, an oven heating chamber under said top wall, a vent structure comprising a pair of vent tubes of different diameter having their longitudinal axes inclined to the vertical and their adjacent ends overlapping, the uppermost sides of the two tubes being in tangential relation so that a passageway is left between the lowermost sides of the tubes, means rigidly securing said tubes together, said top wall and said heating chamber being provided with vent openings, means detachably securing the upper end of said larger tube in the vent opening in said top wall so that the lower end of the smaller tube enters said vent opening in said heating chamber, and a positioning interlocking index between said top wall and said larger tube.

6. In a range having a top plate provided with a vent opening therein, an oven vent flue extending through said opening, the upper end of said flue being provided with an outwardly extending flange above said top plate, a vent trim clip member under said flange provided with resilient clips depending through said vent opening and resiliently engaging said top plate, and a grilled trim plate covering said flange and having its edges formed around and under said flange and clip member to secure said flange and clip member together and also to said grilled trim plate.

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