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OVEN DOOR CONSTRUCTION

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The invention relates to doors for cookstove ovens and more particularly to a door of the insulated type having a double-glazed window permitting visual observation of the interior of the oven while the door remains closed.

One object of the invention is to provide an oven door of the above general character constructed and arranged to support the glazing panes in a novel manner which permits quick and easy removal of one of the panes for cleaning, but which effectively prevents accidental displacement of that pane.

Another object is to provide improved means for supporting the removable pane securely in proper alinement with the window opening of the oven door and for holding it effectively against rattling or vibration.

Other objects and advantages of the invention will become apparent from the following detailed description of the preferred embodiment illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of an oven door embodying the features of the invention.

Fig. 2 is a sectional view of the door taken in a vertical plane substantially on the line 2—2 of Fig. 1.

Fig. 3 is a rear view of the door with a portion of the inner panel broken away to show the interior construction.

Fig. 4 is a sectional view taken in offset planes substantially on the line 4—4 of Fig. 3.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

For purposes of illustration the invention has been shown as incorporated in an oven door of the general type disclosed in my copending application Serial No. 20,435, filed April 12, 1948, now Patent 2,536,956, January 2, 1951. The door shown is of conventional rectangular form and of substantial thickness to provide for adequate insulation. A window is herein shown as rectangular, is provided in the door to permit visual inspection of the contents of the oven while the door remains closed.

Referring more particularly to Figs. 1 and 2 of the drawings, the exemplary door comprises an outer or face panel 15 and an inner or liner panel 16 both in the form of sheet metal stampings

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having at least their outer surfaces finished with a coating of vitreous enamel to enhance the appearance of the door and to facilitate cleaning. The panels 15 and 16 are formed respectively with continuous marginal flanges 17 and 18 dimensioned to interfit in telescoping relation and provide a generally rectangular frame or shell of substantial thickness. In the present instance the panels are secured together by means of connecting links 19 (Fig. 4) extending between and secured to the flanges 17 and 18 as shown in the above mentioned application.

Reinforcing means in the form of a stiffening panel 20 is provided between the panels 15 and 16 to impart strength and rigidity to the door structure. The stiffening panel, which also comprises a sheet metal stamping, is rigidly secured to the inner panel 16 as by bolts 21. Hinge members 22 (Fig. 2) anchored to the stiffening panel 20 and extending through slots 23 (Fig. 1) in the inner panel 16 support the door for swinging movement about an axis adjacent its lower edge. For opening the door a handle 24 is provided.

To minimize heat losses through the door, the shell structure formed by the panels 15 and 16 is packed with glass wool or other suitable insulating material except at the window opening 11. This window opening is double glazed. More particularly, the window opening is fitted with two panes 26 and 27 of glass or other suitable transparent material spaced apart to provide an intervening insulating air space 28 of substantial thickness.

As shown in Figs. 2 and 4, the front panel 15 is formed with an inturned flange 30 extending around the window opening in the panel and forming an abutment or stop for the front pane 26. In the particular door illustrated, this pane is carried on the stiffening panel 20. For this purpose the central portion of the stiffening panel 20 in which the window opening is formed is offset forwardly to provide a flat rim 31 around the opening against which the pane 26 is held by clips 32 formed on or secured to the stiffening panel and bent over the edge of the pane, preferably at the four corners thereof.

In accordance with the invention, the inner panel 16 and the stiffening panel 20 coact to provide a pair of opposed abutments at each side of the window opening spaced for the reception between them of the marginal edge portions of the inner pane 27. The abutments thus engage opposite faces of the pane when the latter is in registration with the window opening and prevent any movement of the pane perpendicular to the plane of the window. Other abut-

ments normally cooperate with the edges of the pane and serve to hold it in registration with the window opening, at least one of said other abutments being retractible to permit the pane to be slid edgewise from between one pair of the spaced abutments. The window opening in the inner panel is slightly wider than the pane so that it can then be tilted and slid edgewise in the opposite direction through that opening for cleaning or the like.

For supporting the inner pane 27 in the above manner, the stiffening panel 20 is shaped to provide flat, rearwardly facing bearing surfaces 35 along the upper and lower edges of the window opening spaced apart for engagement by the marginal edge portions of the pane, as shown in Fig. 2. Bearing surfaces 36 formed along the side edges of the opening in the panel each constitutes one of the abutments of the spaced pairs heretofore referred to. Preferably, the abutments 36 are inclined forwardly, as shown in Fig. 4, to facilitate tilting of the pane in its removal from the door, as will appear presently.

To support the inner pane 27 and to locate it for engagement with the abutment surfaces 35, the inner panel 16 is formed with forwardly turned flanges 38 and 39 extending along the upper and lower edges of the window opening in that panel. The flanges are spaced apart so as to receive the pane 27 between them. The lower flange provides support for the pane when the door is in an upright or closed position while the upper flange acts as a guide for the pane.

The flanging of the panel 16 at the window opening as above described leaves the opening slightly higher than the corresponding dimension of the pane so that the latter may be shifted inwardly or outwardly through the opening. To retain the pane in place in the window structure, the window opening in the panel 16 is made somewhat narrower (see Fig. 4) than the pane to provide the opposed abutments for cooperation with the abutments 35 in engaging the marginal edge portions at opposite sides of the pane. Preferably, these opposed abutments are in the form of narrow forwardly turned flanges 40 extending along the side edge of the window opening and adapted to bear against the rear face of the pane and thus hold it substantially in contact with the abutment surfaces 35.

With the above construction and arrangement of the panels 16 and 20, it will be evident that the inner pane 27 is securely held in place in the window structure as long as it is in registration with the window opening. To remove the pane it is only necessary to shift it edgewise parallel to the pivotal axis of the door to free one edge from the spaced abutments 36 and 40 of the stiffening panel and the inner panel. The pane may then be tilted about the bearing provided by the inner edge of the inclined abutment surface 36 at one side of the window opening into the position in which it is shown in broken lines in Fig. 4. When so tilted the pane may be easily slipped reversely out of the door for cleaning. The above steps are reversed when the pane is replaced.

Abutment means engageable with opposite side edges of the pane 27 are provided for retaining the pane in registration with the window opening 11, at least one of said abutment means being retractible to permit edgewise shifting of the pane for removal as above described. In the exemplary oven door, the retaining abutment means comprises two springs 41 (Figs. 3

and 4) arranged on opposite sides of the window opening 11 and adapted to bear against opposite side edges of the pane. Such abutment means are retractible in the plane of the window upon application of appropriate force to the pane tending to shift it edgewise, but it will be understood that abutment means retractible in other ways may be used if desired.

As herein shown each of the springs 41 comprises an elongated resilient metal rod having one end portion 42 bent over at right angles to the body of the rod and engaged in an anchoring hole in the stiffening panel 20. A lug 43 struck out from the panel 20 extends over the body of the spring at a point spaced substantially from the end 42 and serves to urge the free end of the spring against the edge of the pane with sufficient pressure to prevent undesired movement of the pane.

At such other or free end, the spring 41 is formed with a transversely bent portion 44 providing an abutment for engagement with the edge of the pane 27. To accommodate the bent portion of the spring the stiffening panel 20 is formed with an elongated slot 45 which serves to restrain the flexing movements of the spring within predetermined limits. More particularly, the slot is dimensioned so that the spring itself is prevented from shifting the pane out of registration with the window opening while permitting the pane to be shifted far enough in the opposite direction to free one edge from the overlying flange 40 of the panel 16. Thus the springs 41 serve both to yieldably retain the pane in proper relation to the window opening and to positively limit its edgewise movements relative to the door structure. Moreover, the yielding pressure exerted by the springs on the pane substantially prevent it from rattling when the door is opened or closed.

It will be apparent from the foregoing that the invention provides an oven door of novel and advantageous construction having one of the two spaced window panes supported in a manner which permits quick and easy removal for cleaning. The removable pane is yieldably retained in alignment with the window opening by springs which effectively hold the pane against rattling, yet permit the pane to be shifted edgewise into a position freeing it for convenient removal from the door structure.

I claim as my invention:

1. In an oven door structure, in combination, a pair of sheet metal panels assembled in face-to-face relation, said panels having aligned generally rectangular openings defining a window, a pair of transparent panes for closing the window, means supporting one of said panes in a fixed position adjacent the front face of the door in position to close the window, cooperating means on said panels supporting the other pane for edgewise sliding movement relative to the window, the opening in one panel being dimensioned to provide an abutment surface engageable by the upper and lower marginal edges of the other pane, and the opening in the other panel being dimensioned to clear the upper and lower edges of the other pane and to overlie the marginal edge portions at opposite sides of that pane when it is centered with respect to the window, and spring means engaging the side edges of said other pane to yieldably retain it in such centered position.

2. In an oven door structure, in combination, a face panel and an inner panel secured together

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in face-to-face relation, a reinforcing panel interposed between said face and inner panels, said panels having generally rectangular openings alined to define a window for the door structure, an internal flange on said face panel extending around the window opening therein, front and rear panes of transparent material closing the window, the opening in said reinforcing panel being dimensioned to enable the panel to engage the marginal edges of said front pane to hold that pane against said inturned flange, abutment surfaces formed on said reinforcing panel adjacent the upper and lower edges of the window opening engageable by the corresponding edge portions of said rear pane, inturned flanges on said inner panel adjacent the upper and lower edges of the window opening engageable by the corresponding edges of said rear pane to support and guide the pane for edgewise movement along said abutment surfaces, the window opening in said rear panel being dimensioned transversely so that the panel overlies the side edge portions of said rear pane when the pane is substantially centered with respect to the opening and thereby holds the pane in engagement with said abutment surfaces, and retractible abutment means normally retaining said rear pane in said centered relation.

3. In an oven door structure, in combination, a face panel and an inner panel secured together in face-to-face relation, a reinforcing panel interposed between said face and inner panels, said panels having generally rectangular openings alined to define a window for the door structure, a rectangular pane of transparent material for closing the window, said reinforcing panel and said inner panel being shaped to engage said pane at its upper and lower edges to support and guide it for edgewise movement transversely of the door opening, and spring means supported on said reinforcing panel engaging opposite side edges of said pane to retain it in centered relation to the window opening, said inner panel having portions overlying the marginal edge portions at opposite sides of the pane when in such centered relation to the window opening to retain it in assembled relation with the door structure.

4. In an oven door structure, in combination, a pair of sheet metal panels assembled in face-to-face relation and having alined generally rectangular openings defining a window, a pane of transparent material closing the window, one of said panels having abutment surfaces adjacent the top and bottom of the window opening for engagement by the upper and lower marginal edge portions of said pane, the other of said panels having inturned flanges at opposite sides of the window opening adapted to overlie the corresponding edge portions of the pane to retain it in engagement with said abutment surfaces, and spring means cooperating with op-

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posite side edges of said pane to hold it in registration with the window openings, said spring means permitting edgewise movement of the pane so as to free one side edge from the overlying flange of the other panel, and said one panel having means for preventing the spring means from shifting the pane out of registration with the window openings.

5. In an oven door structure, in combination, a pair of sheet metal panels assembled in face-to-face relation and having alined generally rectangular openings defining a window, a pane of transparent material for closing the window, said panels being constructed to provide opposed abutments at opposite sides of the window spaced apart from the reception between them of the marginal edge portions of the pane and effective to hold it against movement perpendicular to the plane of the window, means formed on one of said panels for engaging the lower edge of the pane to support the same, and other abutment means engageable with opposite side edges of the pane for holding it in registration with the window opening, at least one of said other abutment means being retractible to permit the pane to be slid edgewise from between one pair of opposed abutments, the opening in one of said panels being dimensioned to permit the pane when so freed to be tilted relative to the plane of the window and slid edgewise in the reverse direction out of the door structure.

6. In an oven door of the type adapted to swing about a horizontal axis adjacent its lower edge and having a window opening, in combination, a pair of transparent panes closing the window opening, means supporting one of said panes adjacent the front face of the door in registration with the window opening, means supporting the other of said panes in spaced relation to said one pane adjacent the rear face of the door for edgewise sliding movement parallel to the axis of the door into and out of registration with the window opening, spring means coacting with opposite side edges of said other pane, and said door having means coacting with said spring means to limit their effective action when the pane is located in registration with the window opening.

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