July 15, 1958 A. H. BRODBECK 2,843,110

DOOR

Filed Jan. 16, 1956

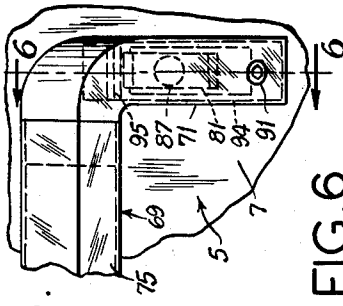


FIG. 5.

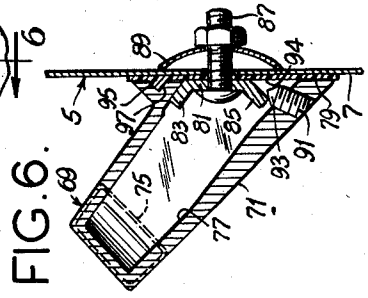


FIG. 6.

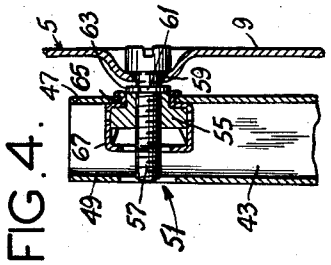


FIG. 4.

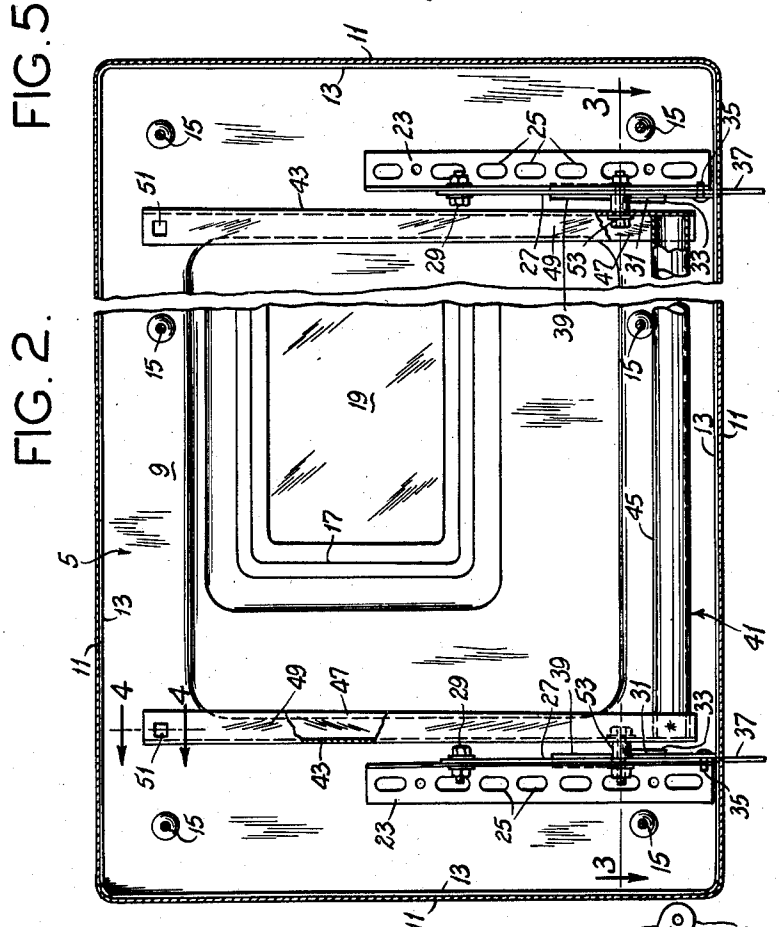


FIG. 2.

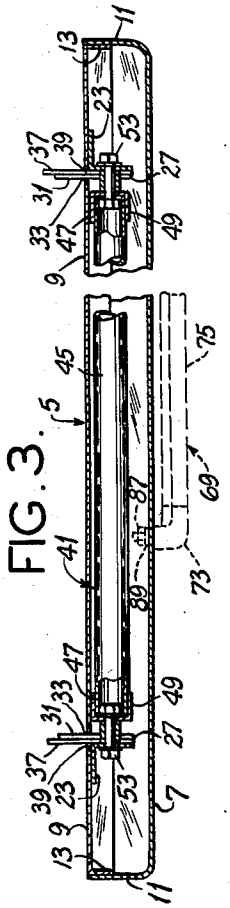


FIG. 3.

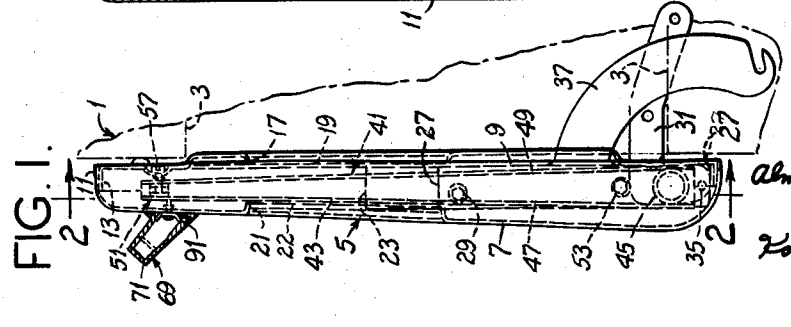


FIG. 1.

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United States Patent Office 2,843,110 Patented July 15, 1958

2,843,110

DOOR

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Application January 16, 1956, Serial No. 559,207

8 Claims. (126—190)

This invention relates to doors, and more particularly to sheet metal oven doors such as are used on cooking ranges.

Sheet metal oven doors such as heretofore used on cooking ranges are apt to warp, with the result that the oven cannot be tightly closed. This is particularly the case with doors for large ovens. A door may be initially warped prior to assembly with the range, or it may warp after assembly due to mechanical strain or temperature effects. If the door is of a type that has a glass window, warping of the door may break the glass.

Among the several objects of this invention may be noted the provision of a sheet metal oven door, and particularly a door for larger sizes of ovens, which has a special stiffening means incorporated therein including a torsion bar adapted to prevent warping of the door without unduly increasing the weight and cost of the door; and the provision of a door with stiffening means as described which is capable of adjustment to remove any initial warp that may be present. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a side elevation of an oven door of this invention, a portion of a cooking range on which the door is used being indicated by dot-dash lines;

Fig. 2 is a section taken on line 2—2 of Fig. 1, parts being broken away;

Fig. 3 is a section taken no line 3—3 of Fig. 2;

Fig. 4 is an enlarged section taken on line 4—4 of Fig. 2;

Fig. 5 is an enlarged fragmentary view in front elevation showing a portion of the door handle; and

Fig. 6 is a section taken on line 6—6 of Fig. 5.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, there is indicated at 1 a cooking range having an oven 3 and a rectangular door 5 of this invention for the oven. The door 5 comprises an outer sheet metal panel 7 and an inner sheet metal panel or lining 9. The outer panel 7 has a peripheral flange 11 and the lining 9 has a peripheral flange 13. The flange 13 of the lining 9 fits within the flange 11 of the front panel 7, and lining 9 and panel 7 are secured together in conventional manner as by bolts indicated at 15. Reference may be made to U. S. Patent 2,293,399 for a suitable mode of securing lining 9 and panel 7 together. The lining is provided with a central window opening 17 in which there is a pane of glass 19. The outer panel has a window opening 21 in register with opening 17 in which there is a second pane of glass 22.

Two angle brackets 23 are fastened as by welding to the inside of the lining 9 adjacent opposite sides of the door. Holes 25 may be provided in the brackets to decrease their weight. A hinge member 27 is secured to each bracket as indicated at 29. Two hinge members 31 extend from the range at opposite sides of the oven through slots 33 in the lining 9 and have pin connections at 35 with the lower ends of members 27. The pin connections 35 are adjacent the bottom of the door, and the door is thereby hinged for swinging movement on a horizontal axis adjacent the bottom of the door between the closed position illustrated in Fig. 1 extending vertically upward and an open position extending generally horizontally forward from the range. Each of the members 27 has an integral arcuate arm 37 which extends rearward through a slot 39 in the lining 9 and through a slot in the front of the range to reach into the interior of the range. Springs (not shown) are connected to the ends of the arms 37 for biasing the door to its closed position. Suitable conventional stop means (not shown) may be provided for limiting the outward swing of the door and determining its open position.

In accordance with this invention, a stiffener frame generally designated 41 is incorporated in the door between the outer panel 7 and the lining 9. This frame is of U-shape, having rigid side bars 43 and a base bar 45 which constitutes a torsion bar. As shown, each side bar 43 is of channel shape in cross section, the flanges of the channel being designated 47 and 49. The open sides of the channels are directed inward toward one another. The side bars are substantially parallel, and the base or torsion bar 45 extends substantially at right angles to the side bars. The torsion bar, as shown, is preferably a steel tube having its ends entered between the flanges 47 and 49 of the channel side bars and welded to the latter.

The frame 41 is secured to the inside face of the lining 9 straddling the window opening 17 with the side bars 43 adjacent opposite sides of the door and with the torsion bar 45 extending horizontally adjacent the lower edge of the door. The side bars 43 extend from near the upper edge of the door to near the lower edge of the door on the inside of the brackets 23. Each side bar has an adjustable connection at 51 adjacent its upper end to the lining 9, and is pivotally connected at 53 at a point spaced from its lower end to the respective bracket 23 on a horizontal axis generally parallel to the lining 9 and at right angles to the side bar. The adjustable connection at 51 comprises a nut 55 fixed to bar 43 and a screw 57 extending through a hole 59 in the lining 9 threaded in the nut. The screw has an annular groove 61 receiving a clip 63 on the inside of the lining 9 for holding the screw against axial movement relative to the lining while permitting the screw to rotate. The nut 55 is locked against rotation relative to the bar 43 in a rectangular opening 65 in the flange 47 of the bar toward the lining 9, and is held in the opening by a conventional commercially available retainer 67. By turning the screw in one direction or the other (the head of the screw being on the outside of the lining 9) the adjacent portion of the lining may be drawn toward or moved away from the upper end of the bar 43. The connections at 53 secure the hinge members 27 to the brackets 23 in addition to the connections at 29.

The screws 57 may be utilized to remove any initial warp that there may be in the lining 9. For example, if the upper right-hand portion of the lining 9 is warped in outward direction prior to assembly with the range, the lining 9 may be straightened by threading the screw 57 which connects the lining and the right-hand bar 43 into the respective nut 55 to force the upper right-hand portion of the lining 9 inward. Inward warp may be removed by threading the screw in outward direction.

The frame 41 acts to resist any tendency of the lining 9 to warp and thereby maintains the door flat. It will be understood that there may be a tendency for the door to warp after it has been assembled with the range, due to temperature effects or mechanical strain. Any tendency of the upper right-hand portion of the lining 9 to warp in outward direction, for example, results in the tendency of the right-hand bar 43 to rotate in counterclockwise direction, as viewed in Fig. 1, about its pivot 53. This has a tendency to twist the torsion bar 45 at its right end in counterclockwise direction, as viewed in Fig. 1. Since the left end of the torsion bar 45 is fixed to the left-hand bar 43, the torsion bar is effective torsionally to resist twisting and thereby holds the lining 9 against warping. Any tendency of the upper left portion of the lining 9 to warp in outward direction, for example, results in the tendency of the left-hand bar 43 to rotate in counterclockwise direction, as viewed in Fig. 1, on its pivot 53. This has a tendency to twist the left end of the torsion bar 45 in counterclockwise direction, as viewed in Fig. 1. Since the right end of the torsion bar 45 is fixed to the right-hand bar 43, the torsion bar is effective torsionally to resist twisting and hence again holds the lining against warping. The action on inward warping tendencies will be apparent.

From the above, it will be apparent that any tendency of the door to warp is resisted by the torsional resistance of the torsion bar to twisting. This bar, while being hollow and thus adding relatively small amount of weight to the door, has high strength in torsion to resist high warping stresses.

A handle for the door is indicated at 69. This handle comprises right- and left-hand end members 71 and 73 which extend outward from the front of the outer panel 7 of the door, and a crossbar 75 extending between the end members at their outer ends. Each of the end members is of hollow construction so as to have a recess 77 therein which is open at the inner end of the end member. As shown, the inner end of each member, which is designated 79, is in a plane at an angle with respect to the length of the end member, so that the end member may be assembled with the outer panel 7 with its inner end confronting the front of the panel member and with the end member inclined upward away from the door.

Each of the end members 71 and 73 is secured to the panel 7 by means of a retainer member 81 which is received in the recess 77 in the end member. This retainer member 81, as shown, consists of a rigid metal strip having end portions bent to provide angled wings 83 and 85. A bolt and nut fastener 87 holds the member 81 to the panel 7, a spring washer 89 being used between the nut and the inside of the panel 7. The member 81 is secured in vertical position with the wing 83 at the top and the wing 85 at the bottom, and with the wings angled outward from the front of the panel 7. The wing 85 provides a shoulder spaced forward of the panel 7. The inclination of the upper wing 83 corresponds to the inclination of the end member with respect to its inner end surface 79, and the upper inside surface of the end member in the recess 77 engages the upper surface of the wing 83.

A set screw 91 is threaded in the bottom of the end member adjacent its inner end and engages the rearward side of the lower wing 85 to hold the end member in place. This set screw is formed with a tapered inner end 93. When the set screw is threaded into the end member, the tapered end engages the rearward side of the wing 85 and draws the end member inward toward the panel 7. As shown, a spacer 94 of insulation material is provided between the inner end of the end member and the panel 7, and the end member is drawn up tight against the spacer. The spacer may be made of a synthetic plastic material, such as a urea plastic or nylon. It may be provided with a rib 95 received in a groove 97 in the end member. The end members 71 and 73 are readily removable from the panel 7 simply by unthreading the set screws 91, thereby enabling easy replacement of the handle if necessary.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous resutls attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A door comprising a sheet metal panel and a U-shaped stiffener frame for the door comprising a pair of rigid side bars and a torsion bar extending from one end of one side bar to one end of the other side bar and having its ends fixed to the side bars, said frame being located on one face of the panel with said side bars adjacent opposite sides of the panel and extending substantially parallel to one another from near one edge of the panel to near the opposite edge of the panel, each side bar being fastened to the panel adjacent the other end of the side bar and the frame being pivotally connected to the panel on an axis generally parallel to the panel and at right angles to the side bars intermediate the ends of the side bars.

2. A door as set forth in claim 1 wherein each of said rigid side bars is fastened adjacent its said other end to the panel by adjustable fastening means adapted for moving the adjacent portion of the panel toward or away from said other end of the rigid side bar.

3. A door comprising a generally rectangular sheet metal panel hinged for swinging movement on an axis parallel to one edge of the panel, and a U-shaped stiffener frame for the door comprising a pair of rigid side bars and a torsion bar extending from one end of one side bar to one end of the other side bar and having its ends fixed to the side bars, said frame being located on one face of the panel with said side bars adjacent opposite sides of the panel and extending substantially parallel to one another at right angles to the hinge axis from near said one edge of the panel to near the opopsite edge of the panel and with said torsion bar adjacent said one edge of the panel extending substantially parallel to the hinge axis, each side bar being fastened to the panel adjacent the other end of the side near said opopsite edge of the panel and the frame being pivotally connected to the panel on an axis generally parallel to the hinge axis intermediate the ends of the side bars.

4. A door as set forth in claim 3 wherein each of said rigid side bars is fastened adjacent its said other end to the panel by adjustable screw-threaded fastening means adapted for moving the adjacent portion of the panel toward or away from said other end of the rigid side bar.

5. A door for a cooking range comprising inner and outer sheet metal panels and a U-shaped stiffener frame for the door comprising a pair of rigid side bars and a torsion tube extending from one end of one side bar to one end of the other side bar and having its ends fixed to the side bars, said frame being located between the panels with said side bars adjacent opposite sides of the door and extending substantially parallel to one another from near one edge of the door to near the opposite edge of the door, each side bar being fastened to the inner panel adjacent the other end of the side bar and the frame being pivotally connected to the inner panel on an axis generally parallel to the inner panel and at right angles to the side bars intermediate the ends of the side bars.

6. A door as set forth in claim 5 wherein each of said rigid side bars is fastened adjacent its said other end to the inner panel by adjustable fastening means accessible from outside the inner panel adapted for moving the ad-

2. A device for holding and opening bobby pins comprising a base and a plurality of upwardly disposed sides to form a cavity suitable to receive bobby pins, one of said sides defining an inside surface extending obliquely to the inside surface of said base, said one of said sides being provided with a wedge shaped outer edge for receiving and spreading apart the prongs of bobby pins, and means comprising a plurality of ridges and furrows arranged on the inside surface of said one of said sides adjacent to and extending substantially parallel with said outer edge thereof, said ridges extending in rows from said outer edge toward the inside surface of said base a distance sufficient for said ridges to engage and interlock with the wrinkled surfaces of the bobby pins to hold the bobby pins over said wedge shaped edge, and means arranged on the outside of said device for detachably connecting said device to another structure.

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