

April 9, 1929.

A. H. TINNEMAN

1,708,455

STOVE DOOR CONSTRUCTION

Filed Dec. 16, 1927

2 Sheets-Sheet 1

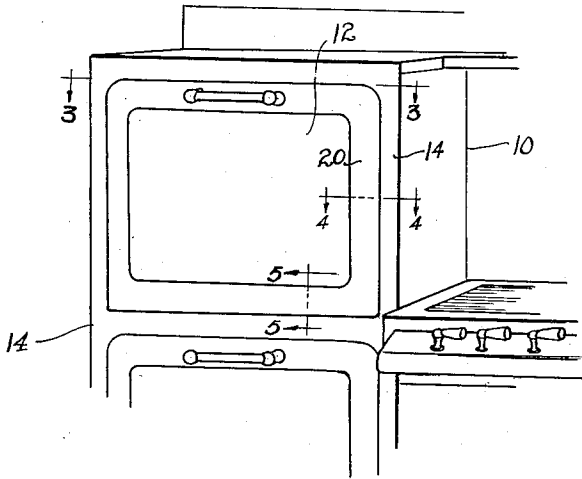


FIG. - 1

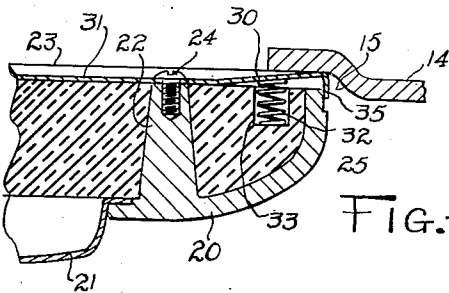


FIG. - 4

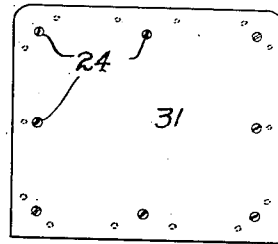


FIG. - 2



FIG. - 3

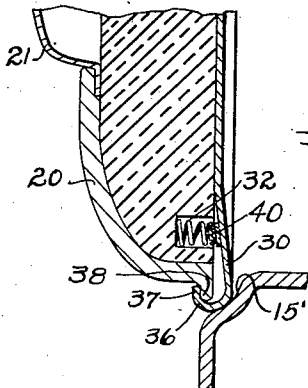


FIG. - 5

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2 Sheets-Sheet 2

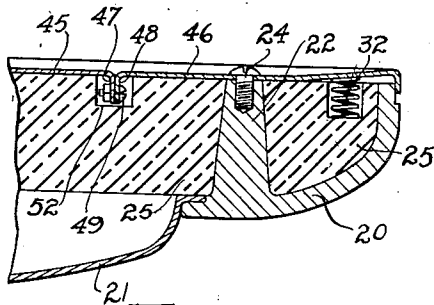


FIG. 6

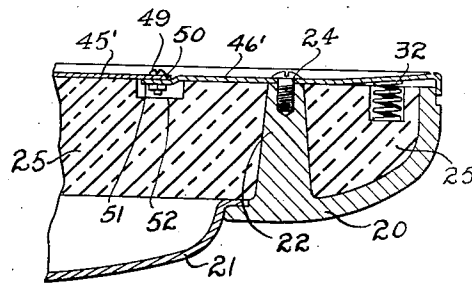


FIG. 7

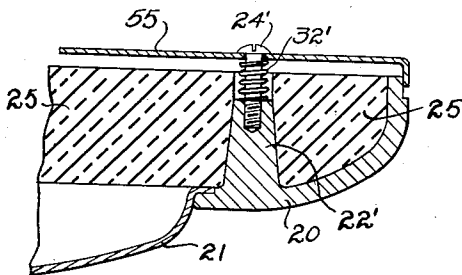


FIG. 8

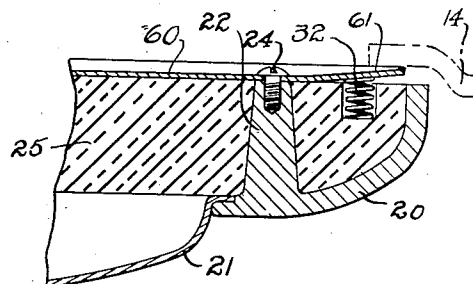


FIG. 9

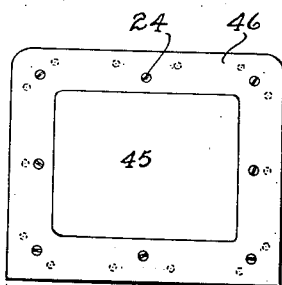


FIG. 10

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STOVE-DOOR CONSTRUCTION.

Application filed December 16, 1927. Serial No. 240,511.

This invention relates to improvements in an oven construction for gas ranges, and is more particularly concerned with the door construction in the manner of providing adequate insulation for the same. Heretofore, considerable difficulty has been experienced in maintaining a gas-tight seal between the oven door and frame of enameled ranges. Usually, the oven frame is recessed and is made of cast material which may warp during the casting operation. When such parts are enameled, they are apt to warp again. The same is true of the door frame.

To overcome the difficulties incident to warping, the practice has been to grind the surface of the metal and to fit each door into place. If the metal is ground before the enameling operation, it is apt to warp and thus destroy the effect of the grinding. If it is ground after the enameling operation, the enamel is liable to be damaged and must then be retouched. The grinding is also apt to crack the enamel in the region of the section being ground. Since such grinding operation must be performed on four sides of the door frame, it is obvious that considerable labor must be expended in effecting a tight seal.

An object of the present invention is to eliminate the necessity for all grinding operations and still obtain a gas-tight seal between the door and frame.

One form of door construction which is used at the present time embodies a cast metal frame, and a sheet metal lining plate which is intended to serve as a pan rest when the door is opened. The marginal edges of the lining plate are spaced inwardly from the marginal edges of the door frame, thus leaving a wide crack in which the dirt and grease may accumulate. Moreover, this construction necessitates contact between the cast part of the door and the oven frame.

The door lining plate was intended to act in a limited capacity as a heat insulator for the enamel surface of the door. As a matter of fact, however, the insulating qualities are not adequate. Moreover, it has not been considered practical to provide a layer of heat insulating material between the lining plate and the frame, because of the fact that the cracks which had been present between the door and oven frame allowed heat to escape around the edges of the door. This caused cracking of the enamel surfaces.

Another object of my invention is to eliminate the crack between the lining plate and frame end thereby to make a door which can be easily kept clean even though the contents of a pan may spill over the lining plate. Another object is to provide means for adequately insulating the door as well as other enameled surfaces adjacent thereto from the heat of the oven, and for reducing radiation losses therefrom. This enables the oven to be maintained at a uniform temperature with less fuel.

The preferred manner of carrying out my invention is illustrated in the drawings, wherein Fig. 1 shows part of a gas range embodying my invention; Fig. 2 is an elevation of the door illustrating the interior surface thereof; Figs. 3, 4 and 5 are sections taken through the stove on planes indicated by the correspondingly numbered lines in Fig. 1; Figs. 6, 7, 8 and 9 are sectional views showing various modifications of the door, the sections being taken along lines corresponding to line 4-4 on Fig. 1; and Fig. 10 is a plan view of the inside of the door similar to Fig. 2 but showing the lining plate made in two sections instead of one.

In the drawings 10 indicates the oven of a gas range which is equipped with a door 12. The oven frame indicated at 14 comprises a cast metal member which is usually enameled, and is provided with a recess 15 into which the edges of the door may extend. In practice the enameled surface of the frame 14 extends into the recess, and is therefore directly engaged by the marginal portions of the door.

The door illustrated has a cast metal frame 20 into which a sheet metal panel 21 may be mounted in the usual way. The frame has lugs 22 projecting therefrom at spaced intervals, while a lining plate 23 is arranged to be attached to the lugs by securing members 24. A block of heat insulating material 25 may be molded to fit into the space between the frame and plate, as illustrated in Fig. 4. Such block extends entirely across the door and is held in place by the plate, which also serves as a shield for that portion of the insulation near the edges of the frame.

To make a gas-tight seal between the door and frame, I prefer to allow slight play between the edges of the lining plate and the edges of the door frame, as is illustrated in an exaggerated form in Figs. 4 and 5. This may be accomplished by extending that por-

tion 30 of the plate near the edges thereof at an angle to the body portion 31. The resiliency of the metal will then tend to make the plate closely engage the oven frame at all points when the door is closed. To facilitate such engagement I may employ springs 32 which are placed in recesses 33 at spaced intervals in the insulating block. These springs function to urge the edges of the lining plate away from the edges of the door frame, and therefore into close fitting engagement with the oven frame when the door is closed. By flanging the edges of the plate, as at 35 in Fig. 4, and 36 in Fig. 5, I can effect a resilient connection between the door and the oven frame along all edges of the door.

By means of my invention I can utilize castings which might be slightly warped, and at the same time I can eliminate the necessity for grinding the castings either before or after the enameling operation. In addition I can utilize a block of insulating material in the door construction and thereby maintain a uniform temperature in the oven with less fuel consumption.

In Fig. 5, I have shown the preferred construction at the hinge edge of the door. The hinge construction is immaterial, but I preferably use an invisible hinge door suspension, such as shown in my prior Patent No. 1,567,630, issued Dec. 29, 1925.

Assuming the relation of lining plate 31 and the door frame, shown in Fig. 4 at the hinge edge, there would then be a tendency for the lining plate to be permanently distorted in carelessly opening and closing the door. I therefore provide for securing the free edge 30 against excessive movement away from the door. This comprises bending the flange 35 inwardly toward the door as at 37, in such manner that the portion 37 may engage an outwardly projecting rib 38 on the door frame. The flange 36 is made generally rounded, as shown, to fit a rounded recess 15' in the oven frame against which the door closes. The rounded contacting surfaces prevent binding and provide for guiding the edge of the flange back to position when the door is being closed.

In Fig. 5 I show a convenient means for insulating the springs 32 against heat from the lining plate, likely to draw the temper from the springs and shorten their period of effective use. This may comprise a block of insulating material for example, porcelain or other suitable composition interposed between the spring and the plate. Such block is indicated at 40 and has an outwardly extending projection extending into the embrace of the coils of the spring adjacent the plate.

In the event that there are defects in the material forming the lining plate, the application of heat thereto may cause the plate to

buckle in such manner as to affect the sealing qualities of the free edge or margin portions 30 of the plate. This tendency to buckle may be overcome by making the plate in sections. In Figs. 6, 7 and 10, I have shown the plate made in sections. The inner section (Fig. 6) is designated 45 and the outer section 46. The two sections may be joined together, by reason of bent up mutually overlapping edge flanges 47 and 48, which may be secured together as by a series of rivets or bolts, one of the latter being shown at 49. With this arrangement the plate 45 is reinforced at its edges, wherefore any tendency for this plate to be buckled by excessive heat will not be transmitted to the plate 46. Adequate room for the joint may be afforded by recessing the insulation block 25 as at 52.

A modified form of composite plate arrangement is shown in Fig. 7, wherein the sections 45' and 46' are connected by a lap-joint, as by reason of overlying marginal portions of the respective plates, designated 50 and 51. The portion 51 is shown as depressed out of the plane of the plate 46', in order that the pan rest afforded by the two-part plate may be substantially a continuous planular surface. This arrangement reinforces the outer plate section, namely the section 46', by reason of the fact that the somewhat offset marginal edge portion 51 forms a reinforcing flange. In addition, the openings in one or the other of the overlying portions 50 or 51, for securing members, such as bolts 49, may be larger than the bolts, thereby permitting relative sliding between the plate sections in the event of unequal expansion and contraction of the sections.

Fig. 8 shows a modification as to the lining plate, and consists in providing for relative movement between the plate, designated 55, and the door, by reason of slidably mounting the plate on the attaching screws which engage the inwardly extending projections 22'. The projections 22' extend only part way through the insulating material 25, and this leaves a recess for a spring, such as 32' surrounding the shank of the bolt, designated 24'. In this construction it is unnecessary to bend the edges of the plate as in the previously described construction, since all portions of the plate may move with reference to the door in effecting a gas-tight seal.

Fig. 9 shows a modification very similar to Fig. 4, but without the edge flange on the plate overlapping the peripheral edges of the door. If desired, the free portion 61 of the plate, herein designated 60, may stop short of the edge of the door frame. Fig. 9 is mainly to show that it is immaterial, so far as the sealing operation of the lining plate is concerned, to what extent the free edge portions of the plate overlie the door frame, as long as these edges may make contact with the underlying oven frame. Obviously, this

modification would be cheaper to manufacture.

I claim:—

1. A stove door comprising in combination, a frame and a flexible lining plate carried thereby, said lining plate having at least some of the edges thereof extending across the adjacent edges of the frame, and having such edges movable with reference to the body of the plate and to the frame.

2. A stove door comprising in combination, a frame, a lining plate carried thereby, and yieldable means disposed between the plate and frame for urging at least some of the edges of the plate away from the frame, said plate having portions thereof extending along the outer side of the frame, said portions functioning to provide a gas tight seal along the edges of the door.

3. A stove door comprising in combination, a frame and a lining plate carried thereby, said lining plate being disposed on the inner side of the door, portions of said plate being movable toward and away from the door to effect a gas tight seal when the door is closed, said plate having a flange extending over the peripheral edge of the frame and interengaging with the frame to prevent excessive movement of the plate away from the door.

4. A stove door having a frame, a lining plate comprising joined inner and outer sections substantially in a common plane, and means connecting one of the plate sections to the frame, said means permitting the edges of the outer plate to be movable with reference to the frame.

5. An oven door comprising a body portion, and an inner lining plate secured thereto, said plate comprising a plurality of sections joined together to provide a substantially continuous pan-rest surface, a portion of one of the sections being free from and movable relative to the body, whereby this portion may form a gas-tight joint between the door and oven frame.

6. An oven door comprising a body portion, and an inner lining plate secured thereto, said plate comprising a plurality of sections having their adjacent edge portions turned at substantially right angles and secured together to form a substantially continuous pan-rest surface, an edge portion of one of the sections being free from the body and adapted to contact with the oven frame to form a gas-tight joint between the door and frame.

In testimony whereof, I hereunto affix my signature.

ALBERT H. TINNEMAN.