

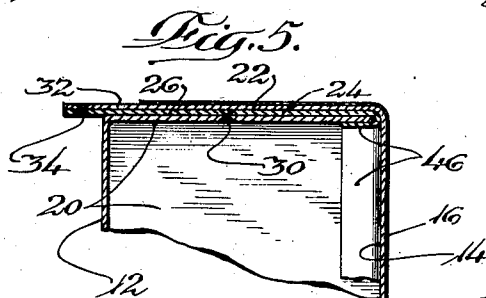
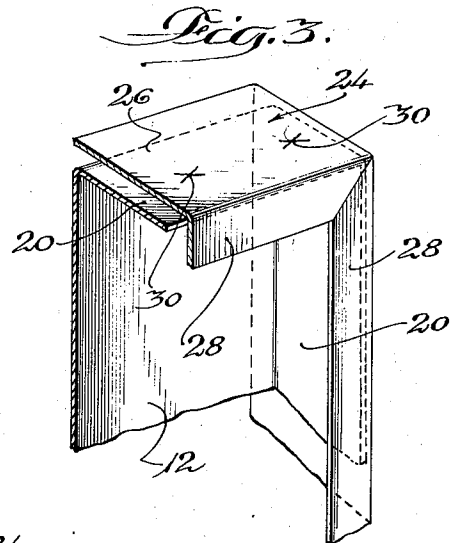
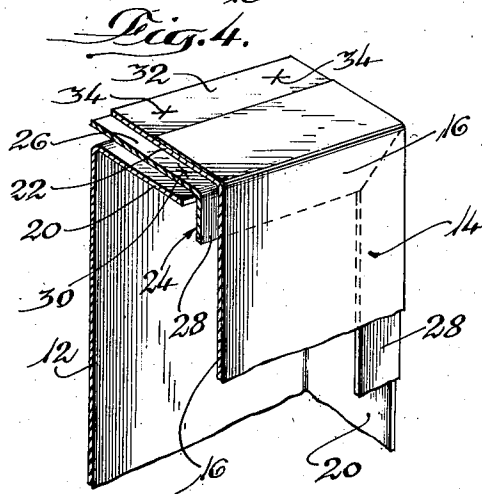
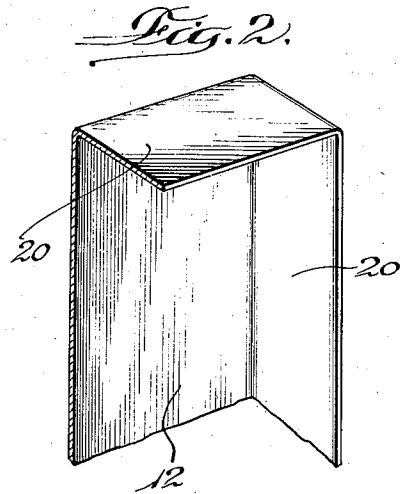
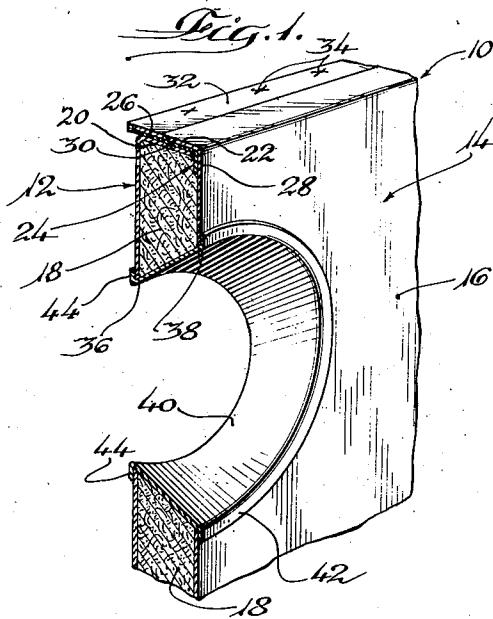
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2,391,436

OVEN WALL PANEL

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2,391,436

OVEN-WALL PANEL

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5 Claims. (Cl. 189—34)

My invention relates to thermal-insulating reflector panels, particularly adapted for use in the construction of heating ovens employed in the drying of paints, varnishes, lacquers and the like upon objects placed within or passed through the oven.

Such panels, each ordinarily accommodating one or more lamps, are arranged in groups or sets to form more or less confronting or facing banks which constitute the side—sometimes also the top and bottom—walls of an oven. The arrangement is such that the effective lamp-rays are not only those directly striking the object or objects to be heated, but also those which pass the object and are reflected back by the wall on the opposite side. The rays which strike the opposite wall tend unduly to heat what may be behind that wall—such as lamp socket bases, wiring, etc.—and consequently it is desirable, if not absolutely necessary, that the panels be rather highly thermal insulating.

Generally speaking, such panels include spaced front and rear metallic walls having therebetween a filling of suitable heat insulating material, the walls being provided with openings for the reception of appropriate electric lamps, preferably of the infra-red variety.

Heretofore it has been customary to coat the reflecting outer surface of the front walls of such panels with metallic coatings capable of receiving a high polish, in order to increase the light reflecting property. Coatings of gold, silver, nickel and chromium have been used for this purpose. Such coatings, however, are open to the objection that they oxidize rather rapidly and accumulated dirt is not readily removed with the result that the effectiveness of the reflective surface deteriorates rapidly and is not readily restored.

I have found that a reflecting surface of a vitreous substance, such as porcelain enamel and the like, overcomes these objectionable features of the metallic reflecting surfaces; but being electrically high resistant or non-conducting, walls coated with such vitreous substances do not lend themselves to spot welding operations for fabricating the spaced walls into insulation holding panels.

The principal object of my invention is, therefore, to provide a panel construction wherein a front reflecting wall coated with a vitreous reflecting surface may be secured by spot welding operations to a spaced rear wall, the space between the two walls being capable of receiving and holding suitable heat insulating materials.

Another object is to provide a thermal-insulating infra-red oven panel of substantial thickness having a spot welded construction and composed of a minimum number of parts.

Another object is the provision of a thermal-insulating infra-red oven panel which is relatively easy to manufacture, thereby keeping the cost at a minimum.

Still a further object is the provision of a novel method of manufacturing a thermal-insulating panel of welded construction having a reflecting surface coated with a vitreous material such as porcelain enamel.

Further objects and advantages will become apparent from the following description taken in conjunction with the drawing, in which

Fig. 1 is a perspective view of a fragment of a thermal-insulating panel constructed according to the present invention;

Fig. 2 is a fragmentary perspective view of one corner of the back plate of the panel;

Fig. 3 is a fragmentary perspective view of one corner of the back plate with a preferred form of welding strip in position;

Fig. 4 is a fragmentary perspective view of one corner of the panel with the front plate welded in position, but with the insulation omitted for purposes of clarity; and

Fig. 5 is a cross-sectional view through one edge of a panel illustrating a modified form of construction with the insulation omitted for purposes of clarity.

In the drawing the numeral 10 designates generally a thermal-insulating panel of considerable thickness incorporating my invention and having a rear wall 12 and a front wall 14. The wall 14 is coated with a vitreous substance, such as porcelain enamel or some other material having similar characteristics to form a good reflective surface 16. Between the walls 12 and 14, I pack insulation 18 which may be Fiberglas or other suitable insulating material.

The rear wall 12 is made of sheet metal and usually has a generally rectangular plane body portion. Surrounding the plane surface are flanges 20 which are bent at right angles to the body portion and toward the front of the panel. The front wall 14 has a similar shape, but is very slightly larger; the sheet from which the front wall 14 is made is bent to provide right angle flanges 22 directed toward the rear of the panel. When the walls 12 and 14 are assembled, the flanges 22 will overlies the flanges 20 due to the slightly larger size of the wall 14, giving the panel a flat box-like construction. The flanges

22 are somewhat wider than the flanges 20 and when the walls are caused to assume their proper relative positions, a narrow strip of the flange 22 will extend rearwardly of the panel assembly.

As seen most clearly in Figs. 1 and 4, the coating of porcelain enamel 16 extends for a considerable distance over the flanges 22 so that, when the panels 10 are assembled into an oven wall, the minute spaces between the panels, if any should exist, would be completely filled with the reflective substance to prevent any loss of radiated rays through crevices between abutting panels.

I prefer to manufacture the panels by spot welding the flanges of the rear wall 12 to the front wall 14, but the porcelain enamel surface 16 prevents direct application of the spot weld to the flange 22 at any position where it overlies the flange 20. Furthermore, it is difficult, and in most instances impossible, to position an electrode of the spot welding equipment between the walls 12 and 14 of the panel during the welding operation. I therefore provide an angular welding strip 24 having a wide body portion 26 to which the rear wall 12 and the front wall 14 may be spot welded, the portion 26 being substantially the same size as the attaching flange 22. A flange 28 is used to position the welding strip 24 in its proper place in the panel to insure that there will be a sufficient portion of the strip extending to the rear of or overhanging the wall 12 so that a spot welding tool of the ordinary variety may be applied to spot weld thereto the flange 22 of the front wall 14.

Figs. 2, 3 and 4 illustrate the steps to be taken in assembling the elements of the panel. After the plate forming the rear wall 12 has been punched and bent to provide a substantially rectangular plane surface surrounded by the flanges 20, the welding strip 24 is placed with the forward edge of the flange 20 seated in the bend between the portion 26 and the flange 28. In this position the wide body portion 26 extends beyond the wall 12 and the flange 20 may be spot welded thereto, as indicated at 30.

The front wall 14 is punched and bent so as to form a generally rectangular plane surface bounded by the flanges 22, and after being shaped the front wall is coated with a coating of porcelain enamel or other vitreous substance having similar high reflective properties. This coating 16 covers the entire outer surface of the wall 14 and a major portion of the flanges 22, leaving a narrow uncoated strip 32 extending completely around the rearmost edge of the flanges 22. The uncoated strip need be only as wide as the width of that part of the flange 22 which extends to the rear of the wall 12.

The front wall 14 is positioned as shown in Fig. 4 with the welding strip 24 seated in the corner joining the flange 22 to the front wall 14. While held in this position, the flange 22 and strip 24 are spot welded together at suitable intervals within the uncoated area 32 of flanges 22 such as indicated at 34. Spot welding in this region by welding tools of standard varieties is readily accomplished because of the overhang of the uncoated area 32 of flange 22 and welding strip 24. The front and rear walls 14 and 12, are thus easily, accurately, and permanently secured in a rigid structure.

This structure may be used in the manufacturing of two types of panels—one in which openings are provided through which the lamp bulb may project, and the other having a per-

fectly plane surface which serves merely as a reflector. These panels may be designated as "lamped" and "solid," respectively. In the "lamped" panels, circular openings 36 and 38 are punched in the rear and front walls, respectively, the opening 38 being the larger. A frusto-conical reflector 40 is fitted into the openings, and has a narrow flange 42 which overlies the surface of the front wall 14, and a plurality of securing tabs 44 which are bent over the rear wall 12. The insulation 18—such as Fiberglas—may be blown or otherwise suitably packed into the space between the walls 12 and 14 through one of the openings formed by the holes 36 and 38. When the panel has been completely packed with insulation, the flared reflector 40 is secured in place by inserting it from the front of the panel so that the flange 42 engages the front wall 14 and the tabs 44 extend through the opening 36. These tabs 44 are then bent over so as to engage the rear wall 12.

If the panel be of the "solid" type with imperforate, plane front and rear walls, the insulation is packed into the panel before the front wall is welded in place.

It will be noted that no internal bracing is needed in either style panel as the packed insulation keeps the walls separated.

Fig. 5 illustrates a modified form of panel construction which differs from the previously described embodiment in that the welding strip 24 is provided with a hook-shaped edge 46, which is adapted to engage the outer edge of the flange 20. The hook shaped edge 46 properly positions the strip 24 with respect to the wall 12 and seats in the bend joining the flange 22 with the front wall 14. In all other respects, the construction is substantially the same as that illustrated in Fig. 1. It will be noted that the flange 28 and the hook 46 both serve the same purpose—the accurate positioning of the welding strip 24 relative to the attaching flanges 20 and 22.

It will be appreciated that I have devised a novel thermal-insulating and reflecting panel construction, and that as a result of my invention I am able readily and efficiently to use a reflective surface of porcelain enamel or the like.

While I have illustrated and described preferred forms of my invention and a preferred manufacturing method, it will be obvious to those skilled in the art that modifications may be made in both the construction and in the method without departing substantially from the spirit and scope of my invention. Therefore, I desire to be limited only by the appended claims.

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

1. A thermal-insulating panel comprising, a substantially plane rear wall provided with a flange bent toward the front of the panel, a substantially plane front wall spaced from the rear wall and provided with a flange bent toward the rear of the panel, the front wall flange overlying the rear wall flange and overhanging the rear of the panel, a reflective non-weldable substance coated on the front wall, and a welding strip interposed between the flanges, the welding strip being welded to the rear wall flange and being welded to the front wall flange in that portion of the flange overhanging the rear of the panel.

2. A thermal-insulating panel comprising, a substantially plane rear wall surrounded by an integral flange bent toward the front of the panel, a substantially plane front wall spaced from the rear wall and surrounded by an integral flange

bent toward the rear of the panel, the front wall flange overlying the rear wall flange and overhanging the rear of the panel, a reflective non-weldable substance coated on and substantially covering the exposed surface of the front wall, a welding strip interposed between the flanges, the welding strip being welded to the rear wall flange and being welded to the front wall flange in that portion of the flange overhanging the rear of the panel, and insulation packed into the space between the front and rear walls.

3. A thermal-insulating panel comprising spaced front and rear walls, a forwardly directed flange secured to the rear wall, a rearwardly directed flange secured to the front wall and overlying the rear wall flange, the front wall flange being sufficiently wider than the rear wall flange to overhang the rear of the panel, and a welding strip interposed between and spot welded to the flanges, the points of spot weld to the front wall flange lying in that portion of the flange overhanging the panel.

4. A thermal-insulating panel comprising spaced front and rear walls, a forwardly directed flange integral with the rear wall, a rearwardly directed flange integral with the front wall and overlying the rear wall flange, the front wall flange being sufficiently wider than the rear wall flange so as to overhang the rear of the panel, a coating of vitreous reflective material adhering

to the outer surface of the front wall and that portion of the front wall flange adjacent the front wall thereby providing an uncoated area in that portion of the flange overhanging the rear of the panel, and a welding strip interposed between the flanges and welded to the rear wall flange and spot welded to the front wall flange in the uncoated area.

5. A thermal-insulating panel comprising, a substantially plane rear wall provided with a flange bent toward the front of the panel, a substantially plane front wall spaced from the rear wall and provided with a flange bent toward the rear of the panel, the front wall flange overlying the rear wall flange and being sufficiently wider so as to overhang the rear of the panel, a coating of porcelain enamel adhering to the exposed surface of the front wall and to that portion of the front wall flange adjacent the front wall, a welding strip interposed between the flanges, the welding strip having positioning means formed thereon and having a portion substantially the same size as the front wall flange, the welding strip being welded to the rear wall flange and being spot welded to the front wall flange in that portion of the latter not coated by the porcelain enamel, and insulation filling the space between the walls.

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