

May 22, 1945.

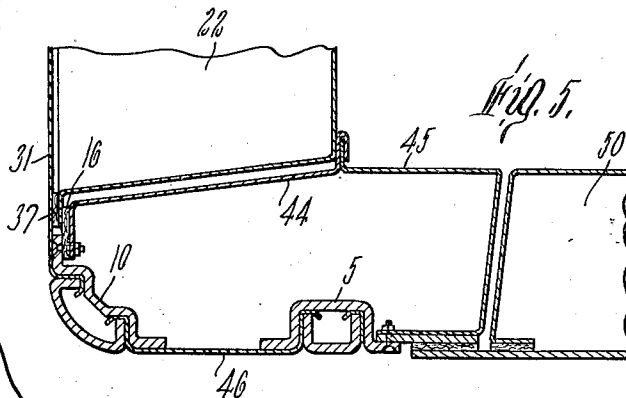
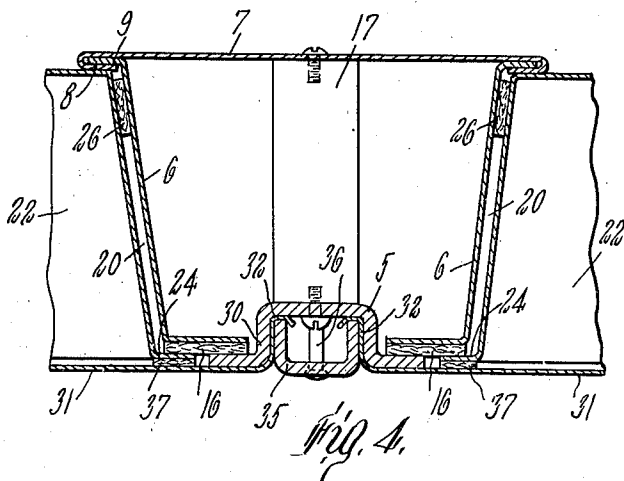
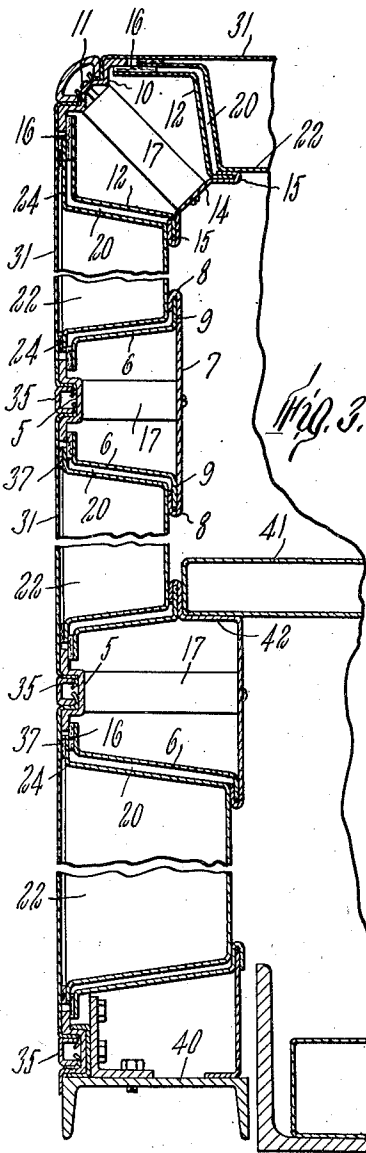
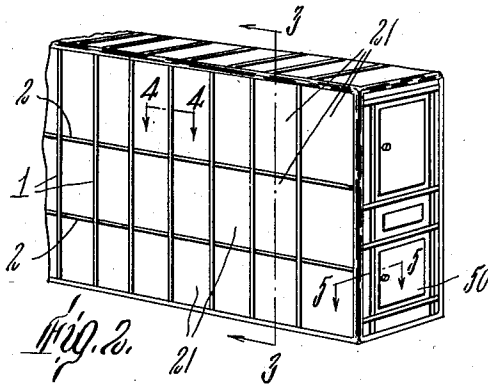
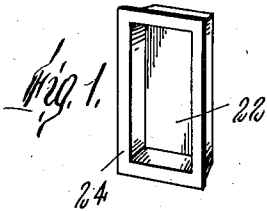
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2,376,728

INSULATED STRUCTURE

Filed Jan. 24, 1944

2 Sheets-Sheet 1



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INSULATED STRUCTURE

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2 Sheets-Sheet 2

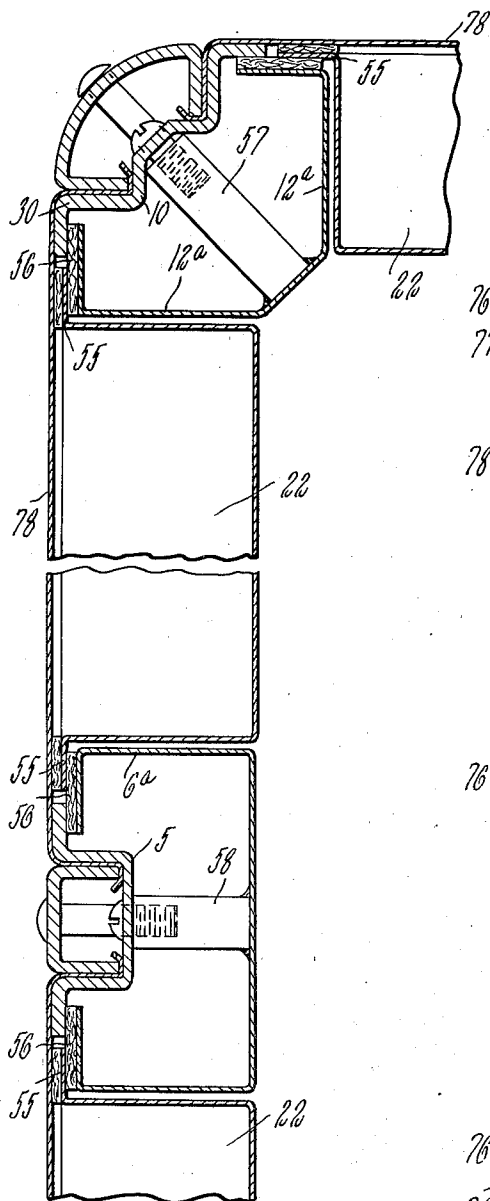


Fig. 6.

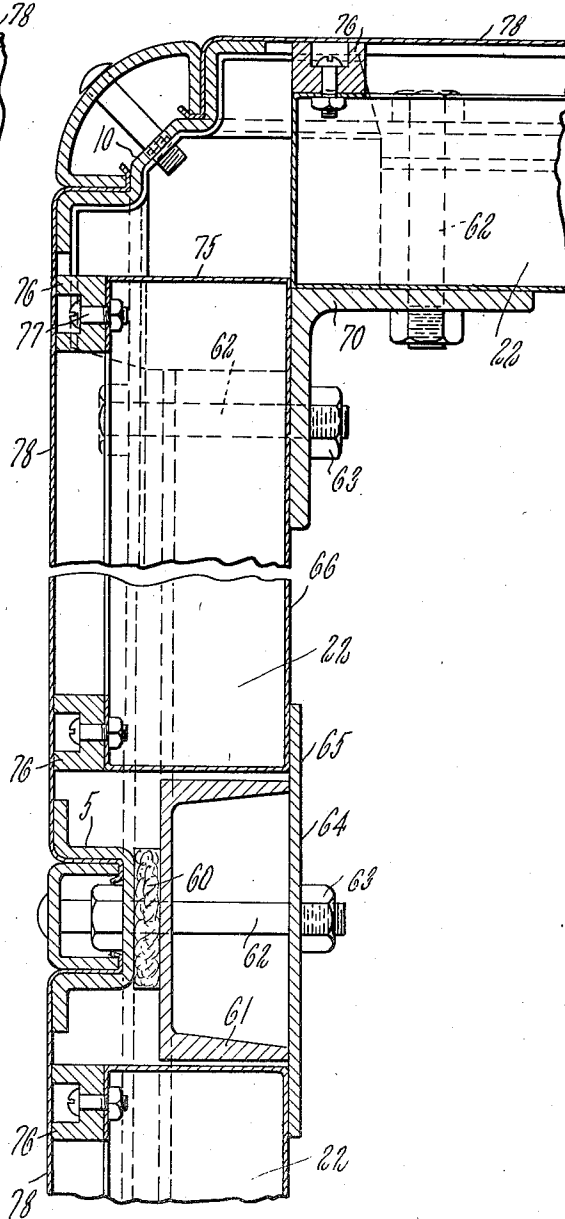


Fig. 7.

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INSULATED STRUCTURE

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3 Claims. (Cl. 189—34)

This invention relates to structures insulated particularly against the passage of heat, or the like, through its walls. More particularly this invention has for an object to provide a structure wherein the insulation is built up into panels of convenient size and inserted into position with relation to supporting frame work, and more particularly where it is so inserted from the outside of the structure. This is of particular utility where the interior of the structure is occupied as by apparatus of various kinds, or when from any other cause it is either inconvenient or impossible to apply the insulation from within.

A further object is to produce such an insulated structure wherein the insulating panels are completely covered from the outside but are readily removable when desired.

Still another object is to provide such a construction particularly suitable for application to enclosures employing the well known Lindsay structure as shown in Patent No. 2,263,511.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which

Figure 1 is a perspective view of a panel element for containing insulating material.

Figure 2 is a fragmentary perspective view of an oven embodying the invention.

Figures 3, 4 and 5 are detail sectional views to a larger scale on the correspondingly numbered section lines of Figure 2, the insulating material being omitted for the sake of clarity.

Figures 6 and 7 are sectional views somewhat similar to a portion of Figure 3, but showing modified constructions.

Referring first to Figures 1 to 5, there is illustrated an insulating structure particularly intended for an oven. As shown this structure comprises in general a skeleton structure including a plurality of frame members 1 and 2 arranged vertically and horizontally, and defining between them spaces within which insulating panels may be received. As shown the frame members are built up from outwardly facing channels 5, to which are secured sheet metal parts 6 and 7, which together with the channels, form the hollow members 1 and 2. As shown the inner faces of the frame members are formed by the plates 7 which have in-turned marginal portions 8 engaging over outwardly directed flanges 9 of the plate members 6. The corner or edge posts of the frame members each employ an outwardly facing channel 10, the web 11 of which is bent angularly as shown best in Figure 3, with side plates 12, also bent angularly and with the inner plates 14 with marginal double

flange portions 15 enclosing the marginal edges of the plates 12. In order to prevent metal to metal contact between the channels and the side plates 6 or 12, strips of insulation such as 16 are shown as interposed therebetween. At suitable intervals, stiffening and spacer members 17 may be secured at opposite ends to the channels and to the inner face plates 7 or 14. The various frame members as thus formed define between them rectangular spaces 20 which may be filled by insulating panels 21. As shown each of these panels may comprise a pan-like sheet metal element 22, shown detached in Figure 1, which may be filled with insulating material (not shown). It may be inserted from outside into the openings 20 between the frame members 1 and 2. As shown in Figure 3, the inner walls of these insulating panel elements may be seated against the frame member flanges, such as 8 and 15, while if desired the outer faces of the panels may be provided with outwardly directed flanges 24 which may engage against the marginal portions of the insulating strips 16. The hollow frame members as well as the panel frames 22 may be filled with suitable insulating material so as to result in a structure having the desired thickness of insulating material within its walls.

Where the temperature differences within and without the structure is to be considerable, it is preferable that the spaces between the frame members should have their side walls inwardly tapered with correspondingly tapered walls of the insulating panels as shown in Figures 1 to 5. This permits the panels to be removed or replaced readily since they are not likely to become bound through expansion when heated between the side walls of the frame members, motion of the panels in the removing direction immediately freeing the panels from the frame members. This action is further facilitated by the use of compressible gaskets such as strips 26 which may be interposed between the walls of the frame members and of the panels, as is best shown in Figure 4. The channels 5, as shown, are of the type employed in the well known Lindsay structure having the outer margins of their flanges 30 bent outwardly into a common plane. This facilitates the application thereto of finishing sheet metal panels or plates 31 provided with inwardly directed marginal flanges 32 which may be engaged with the inner faces of the parallel portions of the flanges 30. These finishing panels may be clamped securely in position by inwardly facing clamping channels 35 which may be removably secured to the webs of the channels 5 as by screws 36. In order to prevent metal to

metal contact between the outer finishing panels and the insulating panels, insulating spacers 37 may be inserted between the plates 31 and the panel flanges 24. The finished outer wall of the structure, therefore, presents the usual appearance of the Lindsay structure which presents a neat surface capable of receiving any desired finish such as a lacquer, or the like.

Where the structure is intended for use as an oven, the side frames may be built up on a supporting beam as 40 (see Figure 3) and the lower portion of the side walls may be thicker than the upper portions in order that thicker insulation may there be employed. For this reason the panels and frame members are shown as formed thicker beneath the intermediate floor element 41 than above this floor element, and the inward extension 42 of the upper horizontal frame member 2 beyond the panel immediately above it in the thinner wall section provides a suitable support for the margin of the partition 41 as is apparent from an inspection of Figure 3.

In Figure 5 is illustrated a modified edge construction and a frame member which may constitute one side of a door frame. The corner channel 10 may be the same as that shown at the upper edge of the structure illustrated in Figure 3, but the edge post itself includes not only such a channel 10, but an intermediate channel 5 with the specially formed side plates 44 and 45 which are connected to the channels 5 and 10, and form with an outer finishing sheet metal member 46, a hollow frame member at one side of the door, which is shown at 50. This door member may be formed somewhat similar to the panels 22, except that it is not secured to a frame member, but is arranged to be removable therefrom, being hinged or otherwise supported with relation thereto as may be desired.

In Figures 6 and 7 somewhat modified constructions are shown which are intended for use where the temperature differences within and without the structure are not so extreme as are intended for the structure shown in Figures 1 to 5. For such an installation, straight sided panels and posts, as distinguished from the tapered structures shown in Figures 1 to 5, are quite satisfactory. The post constructions, both intermediate and corner, are substantially the same as shown in Figure 3, including the corner modified channels 10 and the intermediate channels 5, the frame members 12a and 6a having parallel sides rather than non-parallel sides as is desirable where the temperature differences inside and outside of the structure are greater. This construction, also, is somewhat different from that illustrated in Figures 3, 4, and 5 in that the means for preventing the passage of the panels entirely through the skeleton frame comprises flanges adjacent to the outside of the panels rather than flanges adjacent to both the inside and outside projecting from the frame members and insulating panel, respectively. Thus the frame members are provided with no inwardly directed flanges corresponding to the flanges 8 and 15 shown in Figure 3, while the panel elements are provided with the outwardly directed marginal flanges 55 which are adapted to overlie the insulating and gasket strips 56, the inner margins of which may be placed between the channel flanges 30 and the margins of the plates 12a. Since no inwardly marginal flanges of the frame members are employed, a single plate 12a or 6a may constitute the entire sheet metal portion cooperating with the Lindsay channels 5 or 10 to

form the frame members, though commonly spacers such as 57 or 58 between the central portions of the plates 6a or 12a and the Lindsay channels 5 and 10 will be employed.

In Figure 7 somewhat different forms of frame members and panels are illustrated, though each frame member comprises the Lindsay channel 5 or 10. To the channels 5 may be secured, preferably with an intermediate insulating block 60, an inwardly facing channel 61 of conventional form which may be secured in position by means of a bolt 62 and a nut 63 which may also secure in position an inside plate 64, the margins of which form flanges 65 against which the inner faces of the insulating panels 66 may abut. At the corners angle members 70 may form the flanges against which the insulating panels are seated and these may be angle members secured to the upright Lindsay channels 5, as by bolts and nuts 62 and 63. The insulating panels here shown are box shaped sheet metal members 75 having in-turned marginal flanges at their outer faces to which may be secured insulating spacers 76 as by bolts 77 against the outer faces of which the finishing external sheet metal members 78 bear.

In each of the constructions shown, it will be noted that there are cooperating parts on the frame members, or panels, or both, which prevent the panels from being pushed entirely through the openings between the frame members and that in each instance the frame members are built up, including the Lindsay channel posts, to form hollow posts within which insulation may be placed, and that when the insulating panels are in position, means are provided to prevent metal to metal contact between them and the outside surface members of the structure. It will also be noted that it is an easy matter at any time, by removing the outer finished sheet metal portions of the Lindsay structure, to obtain access to the individual insulating panels which may be removed or replaced as desired without requiring access to the interior of the structure. The panels may be made of convenient size and shape for ready handling and when in position act with the insulated hollow frame members, to provide complete insulation for the entire structure. The insulating filling may be mineral wool, ground cork or other material suitable to the temperature conditions to be encountered in any particular case.

From the foregoing description of certain embodiments of this invention, it should be evident to those skilled in the art that various other changes and modifications might be made without departing from the spirit or scope of this invention.

I claim:

1. A structure including frame members secured together and presenting a skeleton construction defining a plurality of openings spaced by said frame members, each of said frame members comprising a channel having its open side outwardly facing, and metal plates carried by said channel and forming therewith hollow frame members, a plurality of panel members of shape and size to substantially fill said openings, said frame and panel members containing insulating material, marginal flanged plates having their flanges entering the open sides of said channels and covering said panel members, and means for releasably holding said flanges to said channels.
2. A structure including frame members secured together and presenting a skeleton con-

struction defining a plurality of openings spaced by said frame members, each of said frame members comprising a channel having its open side outwardly facing, and metal plates carried by said channel and forming therewith hollow members having their side walls around said openings relatively inclined to cause said openings to taper inwardly, a plurality of panel members of shape and size to substantially fill said openings and having side walls tapered to correspond to the taper of said openings, said frame and panel members containing insulating material, marginal flanged plates having their flanges entering the open sides of said channels and covering said panel members, and means for releasably holding said flanges to said channel.

3. A structure including frame members secured together and presenting a skeleton construction defining a plurality of openings spaced

by said frame members, each of said frame members comprising a channel having its open side outwardly facing, and metal plates carried by said channel and forming therewith hollow members having their side walls around said openings relatively inclined to cause said openings to taper inwardly, a plurality of panel members of shape and size to substantially fill said openings and having side walls tapered to correspond to the taper of said openings, said frame and panel members containing insulating material, marginal flanged plates having their flanges entering the open sides of said channels and covering said panel members, insulating spacers between said panel members and marginal plates, and means for releasably holding said flanges to said channel.

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