July 7, 1936. C. J. PIMSNER 2,047,154

INSULATING PANEL

Filed March 26, 1935 2 Sheets-Sheet 1

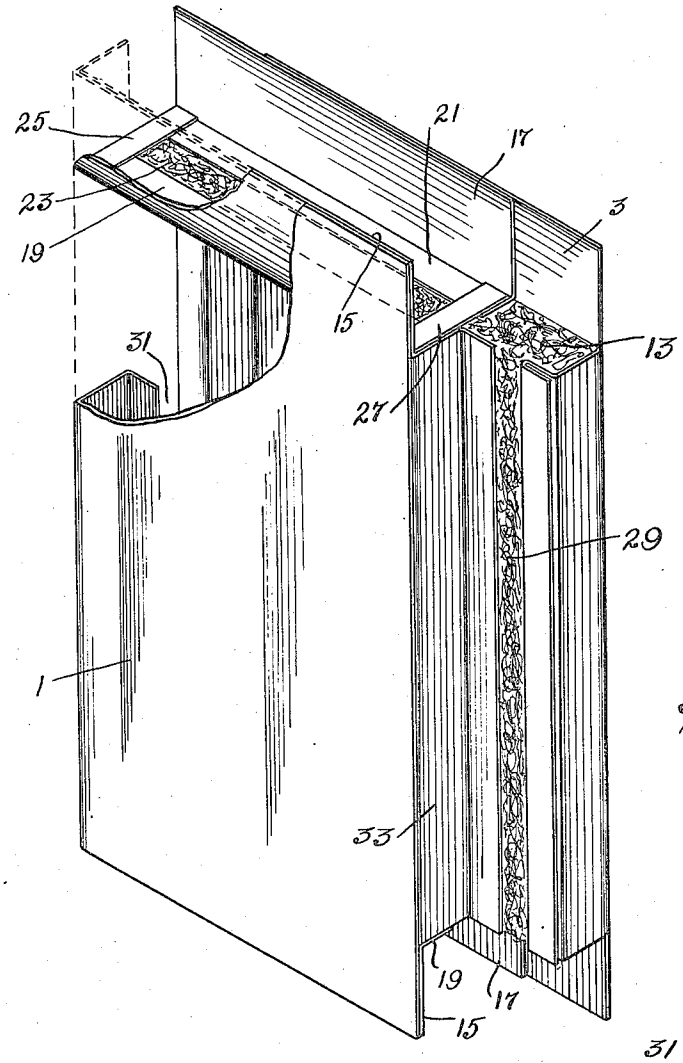


Fig. 1

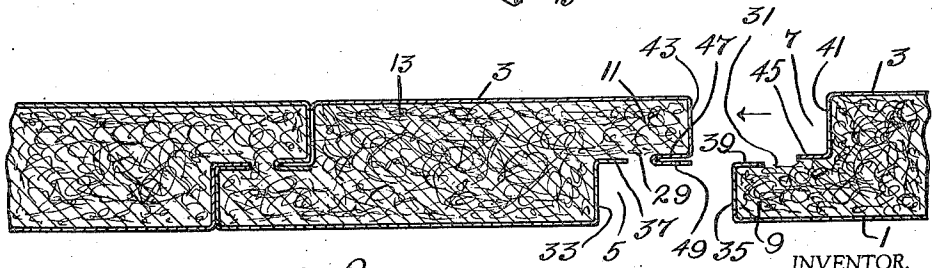


Fig. 2

INVENTOR.
Carl J. Pimsner

BY
Fay, O'Reilly & Fay
ATTORNEYS.

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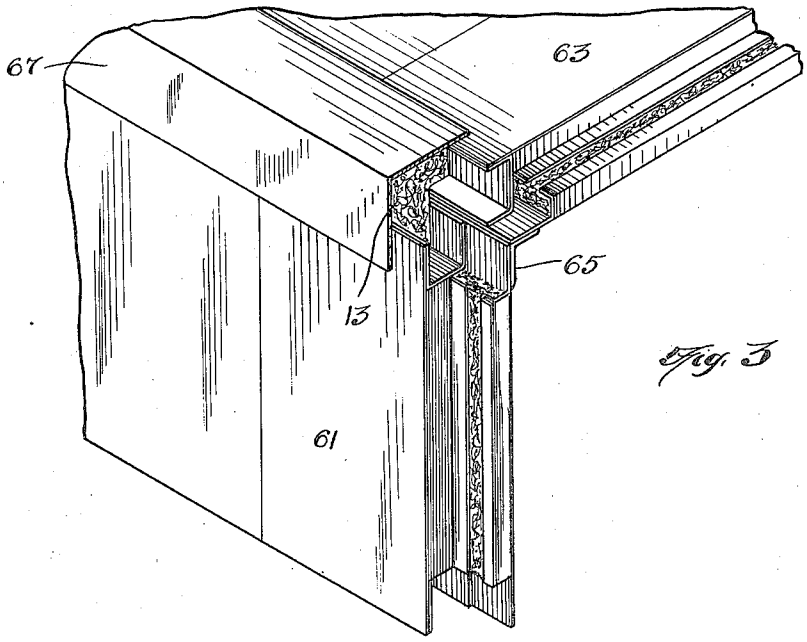


Fig. 3

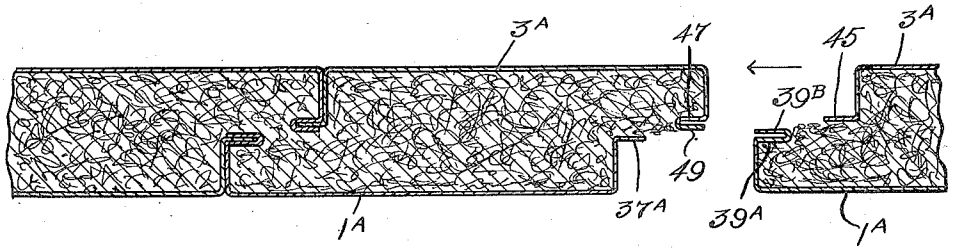


Fig. 4

INVENTOR.
Carl J. Pimsner
BY
Ralph O. Bellin & Ray
ATTORNEYS.

Patented July 7, 1936 2,047,154

UNITED STATES PATENT OFFICE

2,047,154

INSULATING PANEL

Carl J. Pimsner, Cleveland Heights, Ohio, assignor to The Foundry Equipment Company, Cleveland, Ohio, a corporation of Ohio

Application March 26, 1935, Serial No. 13,114

9 Claims. (Cl. 72—16)

This invention relates to a metallic wall construction suitable for high or low temperature insulation of structures which are readily constructed by building up a number of individual panels, interfitting along their edges, and interiorly filled with non-conducting material, the requirements of such a construction being the presentation of smooth interior and exterior surfaces, preferably smooth, such surfaces being so connected as to minimize the transmission of heat from the interior surface to the outer surface of the structure.

By reason of constructional requirements it is not ordinarily possible to use the insulating filling as a connection and there has consequently developed an art of constructing such panels with a comparatively loose interior of fibrous substance such as mineral wool, asbestos, magnesia, slag wool, or the like, filled somewhat loosely into the panel body, while having the inner and outer walls connected with as little material as possible of a nature to transmit heat, although these must be sufficient to provide the necessary structural strength. It is also necessary to have interengaging edges whereby the panels can be built up one upon another in lateral extension, preferably without the use of additional fastening elements.

In practice panels of the type whereon the present invention is an improvement have been extensively used in the high temperature field in building industrial ovens, driers, and the like, and the illustrations and description are consequently prepared from that standpoint, although the principles are equally applicable in the low temperature field, for constructing refrigerating or cooling chambers.

It will also be appreciated that the forms shown are typical and not limiting, and that the principles of unit panel construction herein are applicable to a variety of particular forms for special situations.

Other objects and advantages will appear from the detailed description and accompanying drawings.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain structure embodying the invention, such disclosed means constituting, however, but one of various structural forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a view in perspective, with elements broken away, of a preferred form of panel, part of the insulating filling being omitted for clearness;

Fig. 2 is a middle horizontal section through a plurality of panels, illustrating the method of interfitting;

Fig. 3 is a perspective showing the assembly of a plurality of panels into a side wall and roof; and

Fig. 4 is a view corresponding to Fig. 2 showing a modified interengaging arrangement.

Referring now particularly to Figs. 1 and 2, the panel comprises face plates 1 and 3 which, for purposes of description, will hereafter be referred to arbitrarily as the front and back, respectively, of the panel. The front plate, for description, will be assumed to be that which forms the outer surface of the oven or other structure built of the panels and the back plate 3 the inner surface, although in practice it is a matter of indifference which face goes inside and which outside, so long as the necessary relationship of the interengaging elements is maintained.

The panels, as particularly apparent in Fig. 2, are formed with edge rabbets, the front rabbet groove being designated by the reference character 5 and the rear rabbet groove designated by the reference character 7, with the front rabbet tongue indicated as 9 and the rear rabbet tongue as 11.

The front and rear plates are spaced apart for the reception of a filling of any suitable insulating material, some of which have been specifically mentioned above, such material being designated by the reference character 13.

The front and rear plates 1 and 3 are secured together in any suitable manner to provide necessary physical strength with a minimum of heat conductivity. The preferred form illustrated herein comprises angles 15 and 17 secured to the upper and lower edges of the front and rear plates respectively by spot welding or some other suitable attachment, these angles being narrowed on their horizontal flanges 19 and 21 respectively so as to leave a space 23 between them but at the same time to provide flanges to hold the insulating filling in place. The gap 23 is bridged by narrow strips such as 25 and 27, in such number and of sufficient size to afford the necessary strength but to reduce as far as possible the amount of metal bridging through which heat can travel. It will be appreciated that the fore-

going arrangement is susceptible of various modifications in detail.

The spacing slot 23 is carried along the vertical edges by the aid of the rabbet construction and is there designated by the reference characters 29 and 31. The width of the slots 23, 29, 31 will be suitably proportioned to the character of the insulating material, less than a space through which any appreciable quantities will fall.

With some types of construction a simple rabbet would be sufficient for the interlock of joints, particularly if the panels are laid up against a framework of some sort. Such a simple rabbet is illustrated at 67 on the panel 63, Fig. 3. Ordinarily a more secure joint, largely reducing the need for supporting framework, will be used, as illustrated in Fig. 1, and at 69 on the panel 61, Fig. 3.

The vertical edges of the panel on which the rabbets are formed, consists of backwardly directed flanges 33 and 35 on the front plate 1, which flanges are further bent at an appropriate distance in from the front face, into parallel relation to such front face, as shown at 37 and 39 respectively.

Those portions of the vertical edges which are carried by the rear plates 3 are similarly constructed by forwardly turned flanges 41 and 43 which are likewise further turned into a position parallel to the face 3 as at 45 and 47. The flange 47 is re-bent upon itself as at 49, thus forming a groove. The flange member 45 is offset slightly to the rear of the plane of the flange member 39, sufficiently to allow 45 to interfit between the elements 47 and 49 forming a tongue and groove joint. This construction in operation will be readily understood by comparison of the open joint at the right of Fig. 2 with the closed joint at the left of that figure. In the closure of the joint, the flange member 49 pushes out of the way so much of the filling 13 as immediately contacts the element 45, this by reason of the loose character of the filling. At the same time, when the joint is closed by movement in the direction of the arrow, Fig. 2, the remaining respective flange members come into abutment in the relation 41—43, 39—37, 35—33, all as readily apparent from Fig. 2.

In using the specific form of panel herein illustrated, the contact with adjacent panels and top and bottom is established by means which form no part of the present invention and are hence not illustrated, and the spaces between the members 15 and 17 are filled with insulating material during the construction.

If additional tightness of the rabbet joint is desired, it may be secured by the means shown in Fig. 4, wherein the inner flange 39A of the face plate 1A is re-bent as at 39B to form a groove which receives the other flange 37A of the adjacent face plate 1A. In this construction the flanges 45, 47 and 49 are unchanged and form the same tongue and groove joint already described when the joint is closed. Thus the modification of Fig. 4 includes two tongue and groove joints instead of one at each rabbet. It will be understood that sufficient offset of the respective flanges is provided to permit this tongue and groove fit.

A convenient corner construction for use in joining vertical and horizontal walls is illustrated in Fig. 3. As shown in that figure, the vertical panels such as 61 are joined to the horizontal panels such as 63 by means of an inner angle 65 to which the channel extensions of both panels are secured by riveting, spot welding, or otherwise. The outside of the corner is completed by an overlapping angle 67 of proper dimensions also suitably secured outside the channel extensions of the panels, and the intervening space is filled with insulating material 13.

It will be seen from the foregoing that I have devised an insulating panel of high thermal efficiency without loss of structural strength, one that is easy to manufacture and easy to handle in construction, suitable either for high or low temperature insulation, providing a smooth inner and outer surface and affording good mechanical bonding of adjacent panels.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the structure herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A panel of the character described comprising front and rear faces, non-conducting filling therebetween, edges on said panel of interfittable formation, said interfittable edges being formed of metal strips each secured to an adjacent face of the panel but laterally spaced therefrom, the non-conducting filling material within the panel being exposed at said space.

2. A panel of the character described comprising front and rear faces, non-conducting filling therebetween, edges transversely discontinuous surrounding said panel, certain of said edges being of step shape matable with the corresponding edge of an adjacent panel, said edges including surfaces parallel to said front and rear faces which surfaces are formed of strips parallel to said front and rear faces, spaced from said faces, and laterally spaced from each other, said strips constituting, respectively, tongues and grooves interengageable with complementary tongues and grooves in corresponding relation on an adjacent panel.

3. A panel of the character described, comprising a casing structure, thermally insulating filling therewithin, principal faces of said structure comprising spaced thermally conducting plates, subordinate interengageable faces of said structure parallel to the main faces comprising discontinuous portions of thermally conducting material and exposed areas of said filling.

4. An insulating wall construction comprising panels having a casing, insulating filling within said casing, said filling being self-sustaining over a limited distance, mutually adjoining rabbeted edges on said panels, said rabbeted edges having mutually adjoining spaces, said spaces being formed by an omission of the panel material for a distance less than the distance over which said filling is self-sustaining.

5. An insulating wall construction including a wall and a roof each comprising panels which include a casing of heat-conducting material, non-conducting filling in said panels, adjoining panel edges having overlapping portions, said edges being composed of heat-conducting material, but having gaps abutting in the wall, said filling material showing exposed areas at said gaps, and a wall angle construction comprising an inner angle member to which the inner faces of those panels adjacent the wall angle are secured, and an outer angle member secured to the outer faces of said panel members, the spaces between said inner and outer members being filled with insulating material.

6. A construction for angular junctions of heat confining walls, which walls comprise a plurality of panels, said panels individually comprising front and rear faces, insulating filling and channel edges, the channel edges having slots through which the insulating filling is exposed; an inner angle member connected to two adjacent angularly related courses of such panels, and an outer angle member overlying the edge channels of the same two courses, insulating filling within the space between said angles and within the adjacent edge channels, said filling being in contact through said slots with the filling inside the panels.

7. A heat insulating wall comprising metal-cased panels, insulating material filling said panels, edge junctions for said panels including certain abutting edges of channel formation, said channel-formed edges including exposed areas of insulating filling material substantially the entire length of the channel base, and other insulating material in the spaces made by such abutting channels, said last-named insulating material being in contact through said areas with the first-named insulating material.

8. A construction for junctions of heat confining walls, which walls comprise a plurality of panels, said panels individually comprising front and rear faces, insulating filling and edges having slots through which the insulating filling is exposed; an inner connecting member connected to two adjacent courses of such panels, and an outer connecting member overlying the edges of the same two courses, insulating filling within the space between said connecting members, said filling being in contact through said slots with the filling inside the panels.

9. In an oven wall spaced front and rear surfaces with insulating intermediate filling, each of said surfaces composed of interlocked plates, each of said plates including a web transverse to the direction of the wall and bearing against a transverse web of the next plate, and ties of relatively small cross section both individually and in the aggregate connecting said front surface with said rear surface within the panels of each surface.

CARL J. PIMSNER.