Dec. 30, 1947. J. J. KUETTEL 2,433,767

DOOR CONSTRUCTION

Original Filed Dec. 1, 1937

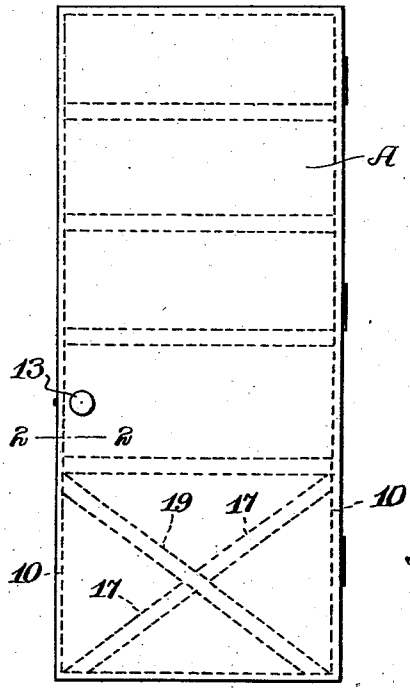


Fig. 1

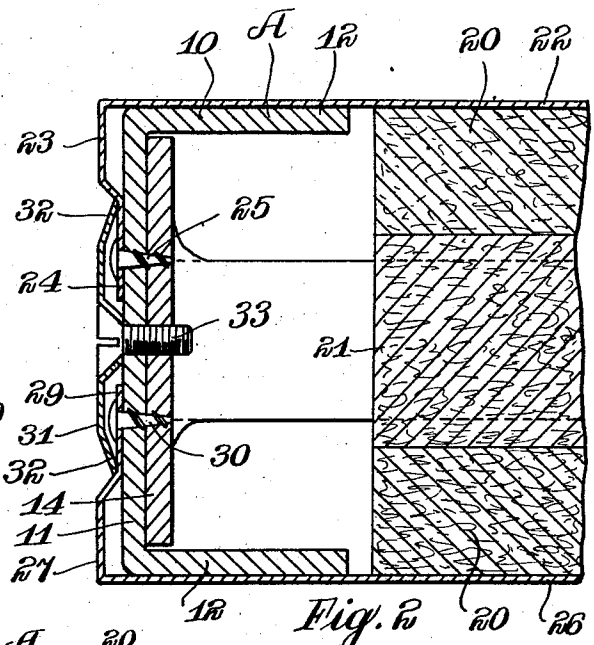


Fig. 2

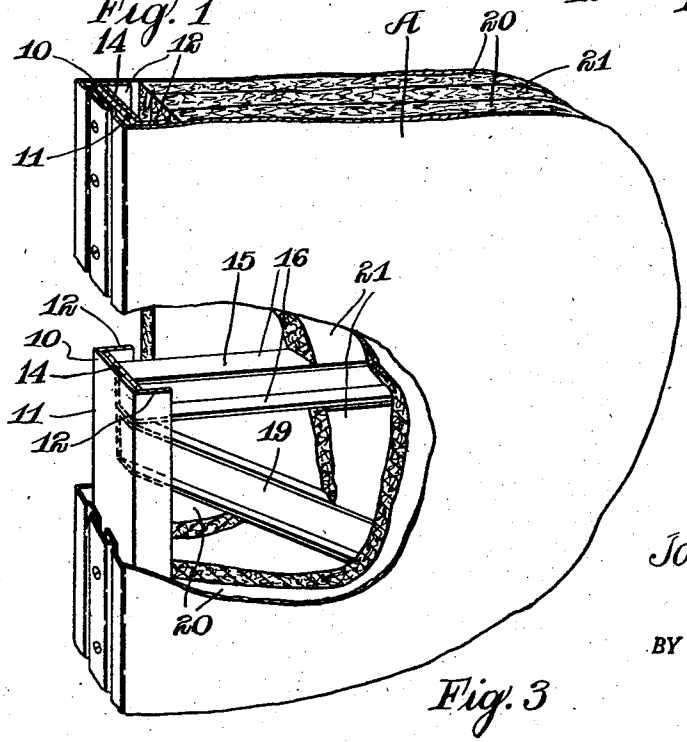


Fig. 3

John J. Kuettel
INVENTOR.

BY Howe & Fuche
ATTORNEYS.

Patented Dec. 30, 1947

2,433,767

UNITED STATES PATENT OFFICE

2,433,767

DOOR CONSTRUCTION

John J. Kuettel, St. Paul, Minn., assignor to Herzog Iron Works, Inc., St. Paul, Minn., a corporation of Minnesota

Substituted for abandoned application Serial No. 177,628, December 1, 1937. This application April 1, 1946, Serial No. 658,631

4 Claims. (Cl. 189—46)

1

This is a substitution of my application Serial No. 177,628, filed December 1, 1937 which application has been abandoned.

My invention relates to an improvement in door constructions, wherein it is desired to provide a door formed of insulating material and covered with a covering of metal.

It is an object of my invention to provide a door provided with a metallic frame and metallic covering and which is provided with insulating sheets inclosed therein in order to prevent ready transmission of sound. The door thus constructed, is rigid and cannot readily get out of shape due to the metallic framework and yet is relatively light in weight and relatively sound-proof.

It is a purpose of my invention to provide a door having a framework formed of metallic channel members and to provide surface covering sheets marginally secured to this channel frame. The extreme edges of the covering sheets are concealed by means of a closing strip which acts to conceal the joint between the covering sheets on opposite surfaces of the door and which provides a construction having the appearance of a single covering sheet extending over both surfaces of the door.

It is a further object of my invention to provide a door having a channel frame which is reinforced by channel members extending from edge to edge of the door between the sides of the frame. These reinforcing members are preferably formed of channel irons or the like, to provide an extremely rigid door construction.

It is an object of my invention to provide a door having a pair of opposed covering sheets secured to a marginal frame and to reinforce this frame by braces which are connected between opposite sides of the frame and which are spaced from the door covering sheets. This construction permits insulating sheets to be used in filling the door which sheets are formed in one piece and extend substantially the entire area of the covering sheets and which are positioned on either side of the cross brace members. Between these sheets of insulating material other blocks of insulating material cut to fit between the cross brace members connect the two insulating sheets on either side of the braces integrally together to virtually fill the space within the covering members.

It is also an object of my invention to provide a door construction in which the insulating sheets filling the space within the frame and outer metallic covering sheets are integrally connected together and to the covering sheets by means of a suitable cement which holds both sides of the door

2

together. This construction prevents warping of the metallic covering sheets and holds these relatively thin sheets in proper position.

These and other objects and novel features of my invention will be more fully and clearly set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a front elevation view of my door in readiness for use.

Figure 2 is a cross-sectional view on the line 2—2 of Figure 1.

Figure 3 is a perspective view of my construction, with the various parts of the door partly broken away to illustrate the construction of the door.

My door A is provided with a frame formed of channels 10, the central portion 11 of which forms the edge of the door and the side flanges 12 of which extend within the inner and outer surfaces of the door. The channels 10 are welded together at the corners to provide a rectangular frame or a frame of any desired shape to form a door of proper size.

Within the channel 10 forming the vertical member of the door adjacent the edge to which the handle and lock 13 are secured, I provide a reinforcing strip 14 which is welded within the member 11 of the channel 10.

Cross braces 15 in the form of channels preferably secured on edge so that the side flanges 16 thereof are one above the other, are secured at the ends thereof to the channels 10 on the opposite sides of the door. These channels 15 form cross braces for connecting the two vertical channels of the door frame and are substantially narrower when secured on edge as disclosed, than the channels 10. The channels 15 are secured intermediate the flanges 12 of the channel 10, providing a space between these flanges 12 and the channels 15. Preferably at the bottom of the door A, I provide channels 17 and 19 which extend diagonally from the lower corners of the frame channels 10 to a point adjacent the lowermost cross brace 15. These channels 17 and 19 are welded in position and are connected similarly to the channels 15 to provide a space between these channels and the flanges 12 of the channels 10. The diagonal positioning of the channels 17 and 19 prevent any chance of the door A getting out of its proper rectangular shape.

On either side of the channels 15, 17 and 19, I provide sheets 20 of insulating material, or the like. These sheets extend virtually the entire area of the door frame and extend flush with the

outer sides of flanges 12 of the channels 10. Between the insulating sheets 20, I provide sheets 21 which are cut to fit between the cross channels 15 and to fit between the channels 17 and 19. These blocks 21 are of sufficient thickness to fill the space between the blocks 20 to support these blocks or sheets 20 flush with the outer sides of flanges 12 of the channel 10. Suitable cement is provided between the sheets 20 and the blocks 21 or sheets, to hold these various insulating members securely together.

A cover sheet 23 extends entirely over the outer surface of one sheet 20 and is turned in marginally to form an edge flange 23 which is offset at 24 to closely overlie the portion 11 of the frame channels 10. The offset portion 24 is secured to the channels 10 by drive screws 25 or by other suitable means.

A covering sheet 26 similar to the sheet 22, extends over the opposite surface of the door and is marginally bent at right angles to form an edge flange 27, having an offset portion 29 which is secured to the channels 10 by drive screws 30, or other suitable means. These sheets 22 and 26 are preferably cemented to the insulation blocks 20 and to the channel flanges 12 to maintain proper shape and to prevent warping or bulging.

An edge strip 31 overlaps the edges of the covering sheets 22 and 26 and conceals the heads of the screws 25 and 30. These edge strips 31 are provided with inturned edges 32 which extend adjacent the offset portions 24 and 29 of the covering sheets 22 and 26, and provide the appearance of a continuous covering extending over both surfaces of the door. The edge strip 31 is secured in place by means of screws 33 which extend into the portion 11 of the channels 10 and through the reinforcing strip 14. The heads of the screws 33 are preferably flush with the surface of the edge strips 31 as shown. In this way I form a door having a channel frame which cannot well get out of shape and which is provided with cross braces connecting the opposite sides of the frame. The interstices between the cross braces are filled with insulating members cemented integrally to insulating sheets on either side of these braces, which in turn are integrally secured to the covering sheets. A door A being covered entirely with metal, but being relatively light and soundproof is in this way formed.

In accordance with the patent statutes, I have described the principles of construction of my door, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that this is only illustrative of a means of carrying out my invention, and that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A door comprising a frame, cross braces extending between opposite sides of said frame and spaced from the frame edges, insulation sheets wider than said braces filling the interstices between said braces, insulation sheets overlying said first named insulation sheets and said braces, and covering sheets marginally secured to said frame overlying said last named insulating sheets.

2. A door comprising a channel frame, cross braces secured between the sides of said frame and spaced from the channel edges, insulation sheets thicker than the width of said braces filling the interstices between said braces, sheets of insulation overlying said first named insulation sheets and said braces, the outer surfaces of said last named sheets extending flush with the outer sides of said channel edges, and covering sheets secured marginally with said channel frame and overlying said last named insulation sheets.

3. A door comprising a substantially rectangular frame including four channels secured together in rectangular formation; each channel including a base extending along the door edges, and a pair of parallel side flanges extending inwardly from said base, a reinforcing strip parallel and adjacent the base of each channel and secured thereto, cross braces welded to said reinforcing strips and extending across said frame, said cross braces extending a portion of the width of said channel and secured to said reinforcing strip centrally with respect thereto, to be spaced from said side flanges, a series of laminations of insulating material within said frame, said insulating material extending flush with the outer surface of said side flanges, a pair of door coverings of sheet metal overlying said insulating material and said side flanges, marginal edges on said coverings bent parallel to, and spaced from, said bases of said channels, extreme edges on said marginal edges offset into engagement with said channel bases, means securing said extreme edges to conceal the joint therebetween.

4. A door comprising a substantially rectangular frame including a series of channels secured together in rectangular formation; each channel including a base forming the door edge, and side flanges extending inwardly from the base; a reinforcing strip secured to the bases of each of said channels, a series of cross-braces, considerably narrower than said channels, extending between opposed sides of said channels and secured to said reinforcing strips substantially centrally between said side flanges, to be spaced considerably from said side flanges; a lamination of insulating material thicker than said cross braces filling the interstices between said cross braces; laminations of insulating material secured to said first mentioned lamination, one of said last named laminations extending from said first named lamination to a plane through the outer surface of said channel side flanges and the other of said last named laminations extending from said first named lamination to a plane through the outer surface of the channel side flanges on the opposite side of the door; sheet metal coverings for the opposite sides of the door, each covering overlying one of said last named laminations, and the channel side flanges on one side of the door, and having marginal edges bent parallel to, and spaced from, the channel bases; extreme edges on said marginal edges offset into contact with said channel bases; said extreme edges being parallel to, and adjacent, said bases and a covering strip overlying said extreme edges to conceal the joint therebetween.

JOHN J. KUETTEL.