April 4, 1939. F. M. VENZIE 2,153,320

BUILDING CONSTRUCTION

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Fig. 1.

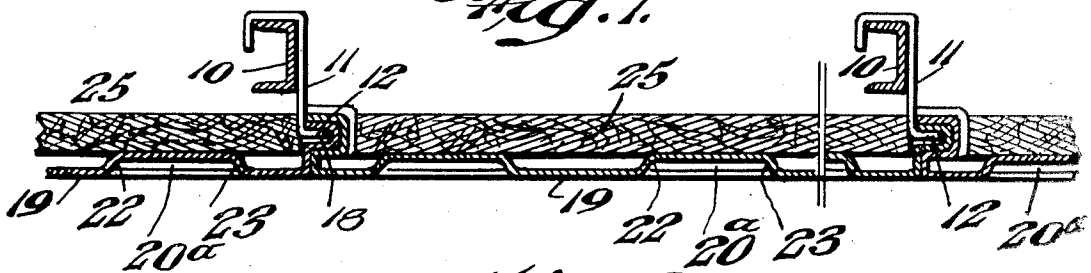


Fig. 2.

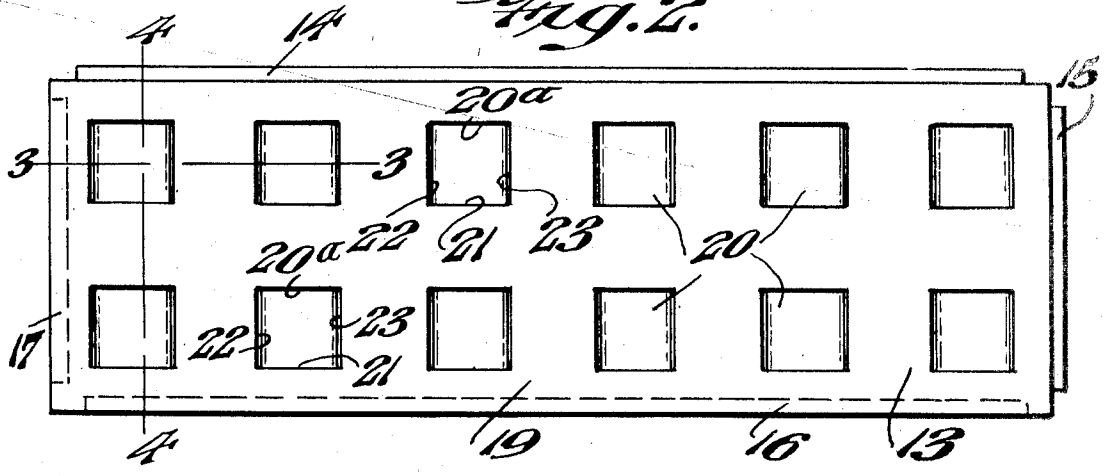


Fig. 3.

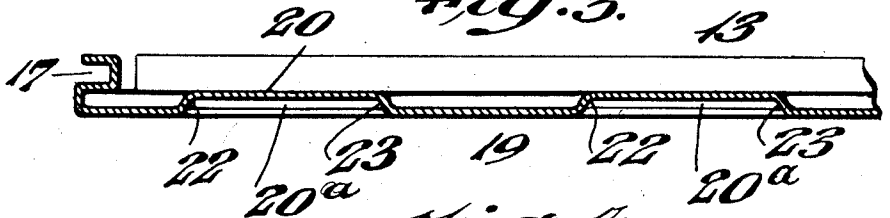
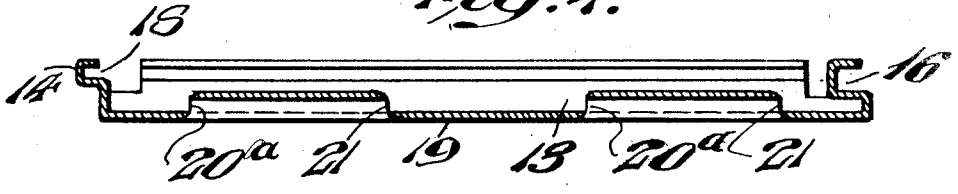


Fig. 4.



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Fig. 5.

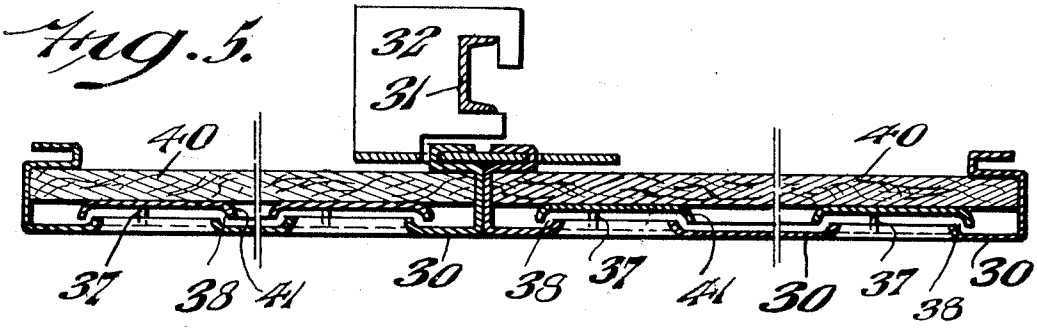


Fig. 6.

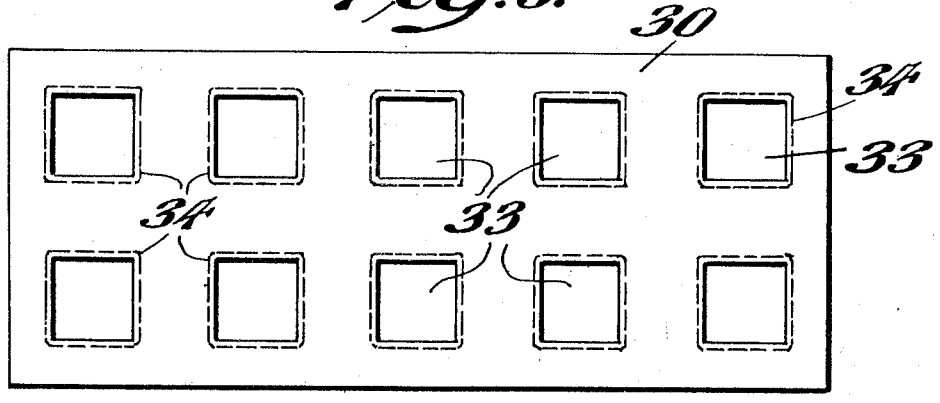


Fig. 7.

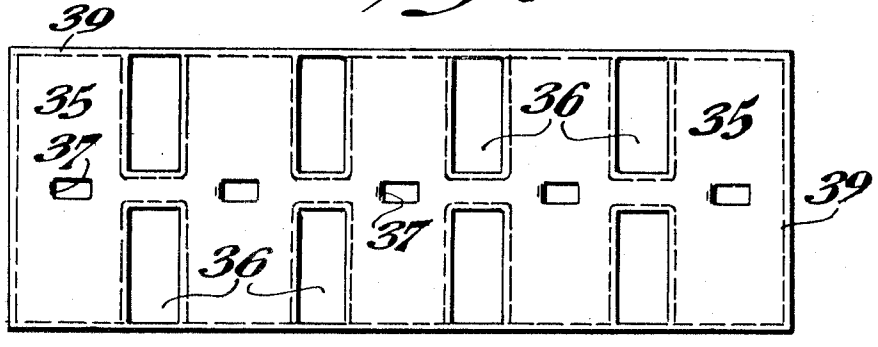
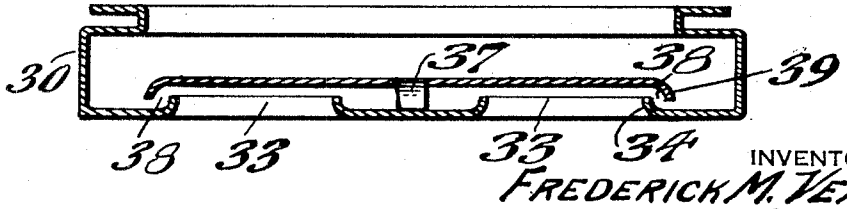


Fig. 8.



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UNITED STATES PATENT OFFICE

2,153,320

BUILDING CONSTRUCTION

Frederick M. Venzie, Philadelphia, Pa., assignor to Veco Corporation, a corporation of Pennsylvania

Application November 5, 1935, Serial No. 48,288

4 Claims. (Cl. 189—35)

This invention relates to building construction and, more particularly, to a novel sound-proof and fire-resistant ceiling involving novel surfacing units which combine utilitarian features with a suitable design.

Heretofore the numerous attempts to provide a ceiling in which is combined sound-proof and fire-resistant characteristics have resulted in either a perforated fire-resistant facing through which sound waves passed vertically through obvious openings to a sound absorbent material therebehind or in various types of sound absorbent blocks. In the former instance the obvious utilitarian characteristics of the openings detracted from the pleasing appearance of the ceiling and, in case of fire, permitted the inflammable sound absorbent material to fall therethrough. Where the blocks were used their very nature prevented a smooth surfaced ceiling.

The primary object of the present invention is to provide a ceiling structure having a smooth surface which is perforated so that sound waves may pass therethrough to reach sound absorbent material therebehind, but in which the perforations are so designed and positioned that they will neither be apparent to the casual observer nor can the sound absorbent material fall vertically therethrough.

Another object of my invention is to provide a ceiling composed of a multiplicity of perforated panels which, when assembled, will present a monolithic appearance.

A further object of my invention is to provide a ceiling construction comprising surfacing units made on the face at least of substantially fireproof material, in which face are perforations so baffled that, if a fire occurs behind the room surface of the ceiling, particles of flaming material will not drop therethrough.

A more specific object of my invention is to provide a metal surfaced ceiling unit having perforations in the room side thereof, which perforations are so covered or positioned that sound waves may pass therethrough in planes parallel to that of the ceiling surface and nothing may pass therethrough in vertical planes.

Other and more specific objects and advantages of my invention will be apparent from the following description, claims, and from the drawings in which:

Fig. 1 is a vertical sectional view through a ceiling embodying my invention;

Fig. 2 is a plan view, from the room side of a surfacing unit used in the embodiment of the invention shown in Fig. 1;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a vertical sectional view taken through a ceiling embodying a modified form of my invention;

Fig. 6 is a plan view from the room side of one of the surfacing units used in the embodiment of my invention shown in Fig. 5;

Fig. 7 is a plan view of an insert used in the unit illustrated in Fig. 6; and

Fig. 8 is a vertical sectional view through a unit and insert taken at right angles to that of Fig. 5.

Referring now particularly to the embodiment of the invention shown in Figs. 1 to 4, means for supporting ceiling surfacing units, here indicated as channel irons 10, may be mounted in any well known and suitable manner, not shown, and may have depending therefrom clips 11 provided with fingers 12 adapted to engage the marginal edges of ceiling surfacing units 13. The units 13 each are preferably rectangular and pan shaped with two edges, 14 and 15, formed wtih tongues and two, 16 and 17, formed with grooves. When the units are erected to surface a ceiling the tongues of one unit engage the grooves of an adjacent unit in the usual manner of tongued and grooved connections and thus the vertical joint between adjacent units is broken. As indicated in Figs. 1 and 4 the inner portions 18 of the tongues 14 and 15 provide means for receiving the finger 12 of the clip 11 whereby the unit is hung from the channel 10.

The face 19 of each of the surfacing units 13 is stamped to define a design in intaglio here shown as squares 20. The squares are each of the same size with the centers of adjacent squares equally spaced from one another and with the centers of those squares adjacent the edges of the surfacing unit spaced from the edges of the unit a distance equal to one half of that between their centers. Thus, when a number of surfacing units are erected together the adjacent squares 20 of two touching units will be spaced apart the same distance as two adjacent squares in the same unit.

As shown most clearly in Figs. 3 and 4, two opposite sides 20a and 21 of the squares 20 are cut completely through the face 19 of the surfacing unit 13 and the other two sides 22 and 23 are not cut but bent inwardly with respect to the face of the unit. Preferably the cut sides 20a and 21 are so positioned that the edges of the metal are in vertical alignment as shown in Fig. 4 so that,

in case of fire, there can be no vertical opening through the unit.

In order to eliminate or reduce noises each of the surfacing units 13 may be filled with suitable sound absorbent material, preferably self sustaining, such as here indicated as builder's felt 25. Such materials are usually of an inflammable character and the positioning of the edges of the metal on the cut sides 20a and 21 of the squares so that there is no vertical passageway therethrough materially reduces the risk of having particles of flaming material drop through these openings in the event that the sound absorbent body catches fire. In order to allow the passage through the cut sides of the square of desired amounts of sound waves the depth of the bend on the uncut sides 22 and 23 may be varied to space the square 20 greater or lesser distances from the plane of the face 19 of the unit 13, thus increasing or decreasing the height of the open sides. It is to be understood, of course, that the distance of the square 20 from the plane of the face 19 must be calculated in advance of the stamping operation and the dies changed to accomplish the desired result.

Another embodiment of my invention capable of accomplishing the objects before set out is illustrated in Figs. 5 to 8 inclusive. In this embodiment of the invention the surfacing units 30 may be in the shape of rectangular pans with S-shaped edges by the upper slot in which edges the units may be connected to supporting channel members 31 by clips 32. As this type of edge and connecting means is described in detail in my copending application filed Aug. 30, 1935, Ser. No. 38,496, it will not be described further herein.

Stamped or otherwise formed in the face of the surfacing unit 30 are a multiplicity of openings or perforations 33, here shown as square. These openings are spaced equally apart on centers and with the edge of the squares which are closest to the edge of the unit spaced from such edge a distance equal to only half of the distances between the edges of two adjacent squares. Thus, when a multiplicity of units are erected, the ceiling will present a monolithic appearance. Preferably also the edges of each of the openings 33 are formed with upwardly, or inwardly, turning portions as at 34 for purposes hereinafter described.

In order to provide baffles or coverings for the holes 33 an insert 35 is provided. This is preferably of metal similar to that from which the pan is formed, and like the pan is rectangular in shape but is slightly smaller in order than it may fit within the same. Depending from the insert 35 are a number of legs 37 so positioned that they will bear against the inner side of the face of the surfacing unit 30 and space the insert 35 thereabove. Obviously the length of the legs may be varied in manufacturing the insert to vary the distance between the surfacing unit and the insert greater or lesser amounts. The insert is also provided with perforations 36 spaced to lie over the closed portion of the face of the surfacing unit 30, each of the perforations being formed with a flange 41 around its periphery which connects with a flange 39 defining the edge of the insert.

As illustrated in Figs. 5 and 8 the metal portions of the insert 35 lie over the perforations in the surfacing unit 30 and the flanges 41 and 39 are spaced laterally away from the openings 33 and their flanges 34 to define a passageway 38 through which sound waves may pass to the interior of the pan to sound absorbent material such as builder's felt 40 positioned above the insert. At the same time the relative positions of the insert and pan with their flanges precludes the possibility of the sound absorbent material dropping into the room should it catch fire.

Should the surfacing units be insufficiently well made that the joints between adjacent units will not disappear upon the application of the usual coat or coats of paint to the room surface of the units, the room edges of the joints may be filled in such manner and with such materials as are well known to those skilled in the art so that a monolithic or unitary appearance will be given to the composite ceiling.

It should be obvious from the above description and from the drawings that I have provided in my invention two forms of surfacing units that not only are fire retarding but are sound absorbent and which, when erected as described, are capable of providing a ceiling having a monolithic appearance which may be given a smooth decorative finish.

Various modifications may be made in the above described embodiments of my invention wthout departing from the spirit and scope thereof as set forth in the following claims.

What is claimed is:

1. A ceiling surfacing unit comprising a metal pan having a multiplicity of perforations therethrough; a detachable metal insert in said pan, said insert covering all of said perforations, and means for spacing said covering portion from and above said perforations.

2. A ceiling surfacing unit comprising a metal pan having a multiplicity of perforations therethrough; a metal insert in said pan, said insert having a multiplicity of openings therethrough, the openings of said insert being staggered with respect to the perforations in said pan; means for spacing said insert from and above said perforations and a sound absorbent material above said insert.

3. A ceiling surfacing unit comprising a metal pan having a multiplicity of perforations therethrough; a metal insert in said pan, said insert including metal portions overlying said perforations and slotted portions spaced laterally of said perforations; and means for spacing said metal portions above said perforations.

4. A ceiling surfacing unit comprising a metal pan having a multiplicity of perforations therethrough; detachable metal means covering each of said perforations and means for spacing said last named means from and above said perforations.

FREDERICK M. VENZIE.