Dec. 22, 1936. F. M. VENZIE 2,064,996

CEILING CONSTRUCTION

Filed Aug. 14, 1933

Fig. 1.

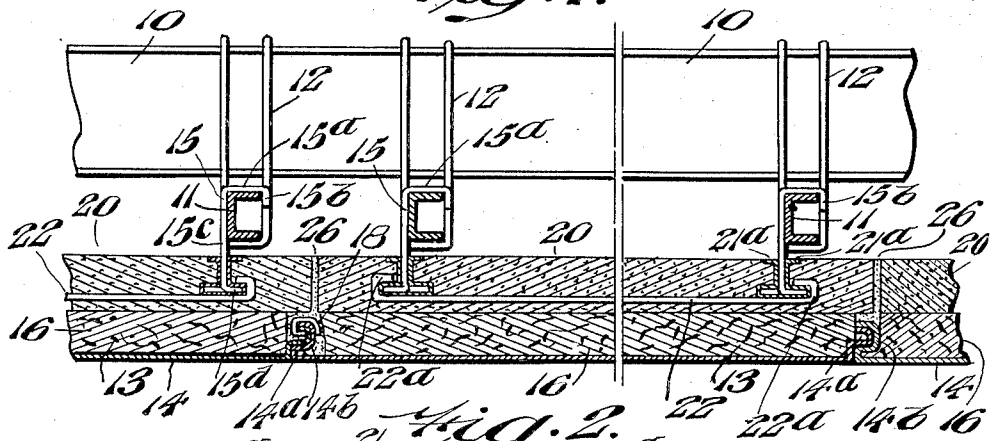


Fig. 2.

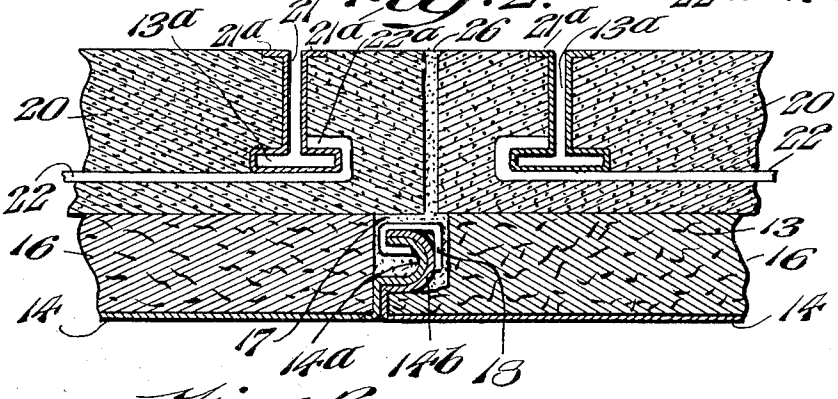


Fig. 3.

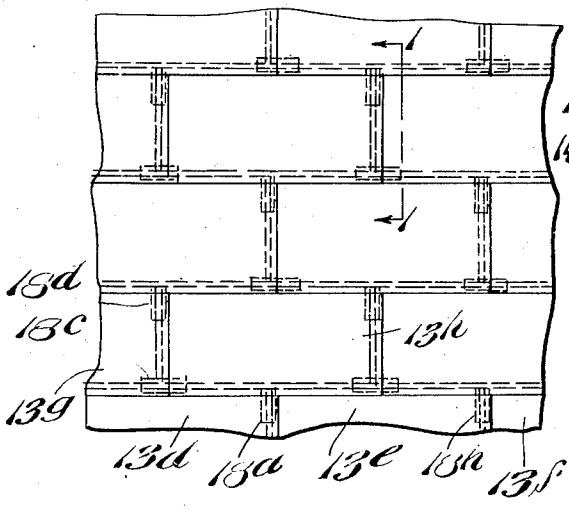
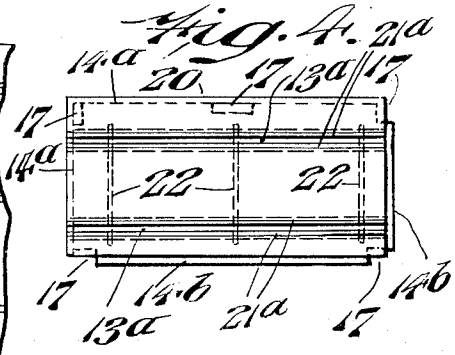


Fig. 4.



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CEILING CONSTRUCTION

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15 Claims. (Cl. 72—68)

My invention relates to ceiling construction and, specifically, therein, to a novel surfacing unit and means for connecting the same to a support.

The invention herein described comprises a novel ceiling involving the use of surfacing units of novel composition; novel means for connecting the same to a support; and novel marginal shape, whereby the units may be intimately connected to form a substantially monolithic ceiling.

An object of my invention is to provide a novel ceiling structure which may be readily and inexpensively erected.

A more specific object of my invention is to provide a novel ceiling structure composed of a plurality of preshaped metal faced units, together with novel means for suspending them from a support and means for connecting them to form a substantially monolithic construction.

A further object of my invention is to provide a surfacing unit of greater structural strength and having greater fire-resisting qualities in proportion to its dimensions and weight than those heretofore known.

A more specific object is to provide a surfacing unit of composite construction composed of a layer of highly fire resistant material having slight structural strength and a layer of material of relatively great structural strength but of relatively slight fire resisting qualities intimately connected to the first mentioned layer.

Another object of my invention is to provide a ceiling composed of ceiling slabs which when erected have a tongue and groove marginal interlock in combination with an overlapping flange positioned above the interlock.

A further object of my invention is to provide, in a ceiling structure, novel means for connecting a metal faced surfacing slab to its support.

Yet a further specific object of my invention is to provide a ceiling structure comprising the use of novel slabs, each having a metal face having interengaging metallic tongued and grooved marginal edges, a fire resistant cementitious composition in vertical alignment with the tongue and groove joint, means for maintaining the slabs in abutting relationship, and a fill of fire resistant material between portions of adjacent slabs.

Other objects and advantages of my invention will be apparent from the following specification, claims, and from the drawing in which:

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

Fig. 2 is a view similar to Fig. 1 but on an enlarged scale and with the supports eliminated;

Fig. 3 is a plan view taken from below my ceiling; and

Fig. 4 is a plan view of a surfacing unit taken from above the same.

The ceiling structure embodying my invention comprises supporting members, carried by walls or other supports (not shown), such as I-beams 10 from which are suspended plasterers' channels 11 as by hangers 12. The plasterers' channels 11 carry surfacing units 13, hereinafter described, by means of clips 15. The clips 15 are substantially U-shaped with arms of unequal length the base 15*a* of the U and shorter arm 15*b* embracing the upper face and a portion of one side of the plasterers' channel 11 and the longer arm 15*c* extending downwardly adjacent the side of the channel not embraced by the shorter arm and terminating in a T-shaped end 15*d* engaging a T-shaped slot 13*a* in the surfacing unit 13.

The surfacing units 13 each comprise a metal pan or frame 14 having side edges at right angles to its face or major surface, two of which edges are formed with tongues 14*a* and two of which are formed with grooves 14*b*. In my preferred form of construction the sides of the pans are slightly less than one half inch high and each is filled with a plastic material comprising four parts powdered asbestos and one part gypsum along with sufficient water to make a plastic mixture which extends slightly above the sides of the pan so as to solidify into a mass one half inch in thickness as indicated at 16. The composition hereinafter will be referred to as the fireproof composition, it being understood that all of the materials of which the units are constructed are fire-resistant but that the composition 16 is more fire-resistant than, but lacks the structural strength of, the other materials.

Either by the provision of suitable removable inserts positioned at the time the fireproof composition 16 is placed in the pan 14 and which are removed after the composition has hardened, or by breaking away portions of the fireproof composition 16 after it has set, the inner faces of the sides of each of the pans are freed of the fireproof material at five places as indicated (Figs. 2 and 4) at 17, namely adjacent two corners of one of the longer sides, adjacent the middle of the opposite longer side and at the ends of each of the shorter sides adjacent the last named longer side. This construction permits the insertion of clips 18 for connecting and maintaining the

marginal edges of the pans in abutting relationship.

Over the fireproof layer **16** is formed a second layer **20** preferably one and one half inches in thickness composed of approximately 97% gypsum and 3% wood chips or similar material, together with sufficient water to mix. This composition upon hardening forms a layer of greater strength relative to the layer **15** but of lesser fire-resistant qualities. In the layer **20** may be positioned, parallel to the longer sides of the unit, metal hollow T-shaped members **21** having flanged ends **21***a* lying in the plane of the upper surface of the slab. The members **21** form the T-shaped slot **13***a* within which the clips **15** are postioned. Rods **22** bent at their opposite ends, as at **22***a*, around the heads of the hollow T members **21** and at right angles thereto form an internal reenforcement for the unit. The material forming the slab **20** is highly cementitious and adheres to the fireproof layer **15** so that a unitary cementitious structure is formed.

The upper layer **20** is shaped on the two sides of the slab on which the tongues are formed on the metal pans **14** so that the outermost edges of the tongues lie in planes passing through the edges of the upper slab and are so formed on the remaining two edges that the innermost part of the grooves on the pan lie in the plane of these edges. Thus the edges of the uppermost slab are spaced apart at least twice the thickness of the metal making up the face and edges of the units, and these edges define a space **25** between the upper layers **20** of adjacent slabs into which may be introduced a grouting **26** preferably of the same composition as the fireproof layer **16**. Thus not only is the joint between the adjacent slabs broken by the tongue and groove joint but also by the overhang on two sides of the upper layer **20** of each slab. The distance which the edges of upper layer and lower layer are spaced beyond or inwardly from the edges of the pan may of course be varied provided that the overhang is sufficient to break the joint between adjacent units and sufficient space is left between the edges for the introduction of the grouting.

From the above description and a consideration of Fig. 3, it will be obvious that when erecting a ceiling of the above described units the same may be erected from below after the floor (not shown) above the supports **10** has been placed in position. In order to accomplish this result, assuming units **13***d*, **13***e*, **13***f*, **13***g* to be in position, as well as clips **18***a*, **18***b*, and **18***c*, the groove on the unit **13***h* is forced over the tongue on the units **13***d* and **13***e* and the unit **13***h* driven to the left as viewed in Fig. 3 to force the lower left corner of the unit into the clip **18***c*. The clip **18***d* is then applied from above and the clip **18***h* applied first to the unit **13***e* and then driven to the left to hold the unit **13***h* in place. The grouting may then be applied to the joints between the unit **13***h* and the units **13***c*, **13***d*, and **13***e* after which succeeding units may be erected. It will be noted that the T-shaped grooves **13***a* in the units **13** lie parallel to the direction in which the units are moved when being placed in position so that the clips **11** may be positioned prior to the erection of the units and the units, when being positioned, may slide into place without dislocating the same.

Various modifications may be made in the above described embodiment of my invention without departing from the spirit and scope thereof as set forth in the following claims.

What I claim is:

1. A ceiling comprising a plurality of surfacing units each having a metal surface and a cementitious body; slots in said body; supporting means; means, slidable in said slots and engaging said supporting means, for suspending said units from said support; and means for holding said units in contiguous relationship.

2. A ceiling comprising a plurality of surfacing units each having a metal surface and a cementitious body; metallically reenforced slots in said body; supporting means; means, engaging said slots and said support, for suspending said units from said support; and means for holding said units in contiguous relationship.

3. A ceiling comprising a plurality of surfacing units each having a metal surface and a cementitious body; slots in said body; supporting means; means, engaging said slots and said support, for suspending said units from said support; and means for holding said units in contiguous relationship.

4. A ceiling comprising a plurality of surfacing units each having a metal surface and a cementitious body; slots in said body; supporting means; and means, by engaging the edges of the slots and said support, for suspending said units from said support.

5. A ceiling comprising a plurality of surfacing units each having a metal surface and a composite cementitious body, said body comprising a layer of structurally weak but fire-resistant material and a layer of relatively structurally strong but non-fire-resistant material; slots in said body; supporting means; and means engaging the edges of said slots for suspending said units from said supporting means.

6. A ceiling comprising a plurality of surfacing units each having a metal surface and a cementitious body, said body comprising a lower layer of fire-resistant material in contact with said surface and an upper layer of relatively non-fire-resistant material of greater structural strength than said fire-resistant material connected to the upper surface thereof; supporting means; and means, engaging said upper layer and said support, for suspending said units from said support.

7. A ceiling comprising a plurality of surfacing units each having a metal surface and a cementitious body, comprising a lower layer of fire-resistant material in contact with said metal and an upper layer of relatively less fire-resistant material having reenforcements therein; supporting means; and means for suspending said units from said support.

8. A ceiling comprising a plurality of surfacing units each comprising a cementitious body having a plurality of physically different layers, one of said layers supplying strength to said units and another supplying fire-resisting qualities; supporting means; and means for suspending said units from said support, said last named means engaging said strength supplying layer.

9. A surfacing construction comprising a support; means for connecting a surfacing unit to said support; and a surfacing unit comprising a metal pan, a fire-resistant composition within said pan and a rigid, relatively less fireproof composition above said first named composition and cementitiously attached thereto, said less fireproof composition having greater structural strength than the first named composition and comprising means for receiving said means for connecting said unit to said support.

10. A surfacing construction comprising a support; surfacing means; means for connecting said surfacing means to said support; said surfacing means comprising a metal pan having a face and four side walls, a fire-resistant composition filling said pan and a rigid, relatively less fireproof composition above said first named composition and attached thereto, said less fireproof composition extending over at least one of the sides of said pan.

11. A surfacing construction comprising a support; surfacing means; means for connecting said surfacing means to said support; said surfacing means comprising a pan, a cementitious composition within said pan and a second cementitious composition above said first named composition and attached thereto, said second composition having greater structural strength than the first named composition.

12. A ceiling comprising supports; a multiplicity of surfacing units; means for suspending said surfacing units from said supports; each of said surfacing units comprising a cementitious body and a metallic combination facing and tongued and grooved marginal edging, a portion of each of said cementitious bodies extending beyond at least one of said metallic edges, and another portion of each of said cementitious bodies being spaced inwardly form at least one of said metallic edgings, whereby said extending portion of the cementitious bodies may overlap the tongued and grooved joint between adjacent units, said extending portion being spaced from the inwardly spaced portion of an adjacent unit when said units are in assembled position; and a grouting of fire-proof, cementitious material in said space and forming a monolithic structure of adjacent slabs.

13. A ceiling comprising supports; a multiplicity of surfacing units; and means for suspending said surfacing units from said supports; each of said surfacing units comprising a cementitious body and a metallic combination facing and tongued and grooved marginal edging, a portion of each of said cementitious bodies extending beyond said metallic edging and another portion of each of said cementitious bodies being spaced inwardly from said metallic edging whereby said extended portion of the cementitious bodies may overlap the tongued and grooved joint between adjacent units, the edge of the extended portion of the cementitious body being spaced from the edge of the portion of the cementitious body of an adjacent unit which is spaced inwardly from its metallic edging.

14. A ceiling comprising supports; a multiplicity of surfacing units; and means for suspending said surfacing units from said supports; each of said surfacing units having a cementitious body and a metallic combination facing and tongued and grooved marginal edge, a portion of each of said units extending beyond a portion of said metallic edge and another portion of each of said units being spaced inwardly of said metallic edge whereby the extending portion of said units may overlap the tongued and grooved joint between adjacent units.

15. A surfacing unit comprising a metal pan having a face and four side walls lying in planes at right angles to said face, a fire-resistant composition filling said pan, and a rigid, relatively less fireproof composition above said first named composition and cementitiously attached thereto extending over at least one of the sides of said pan.

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