Sept. 4, 1934. V. JACOBSON 1,972,592

STRUCTURAL ELEMENT

Filed May 6, 1931

Fig. 1.

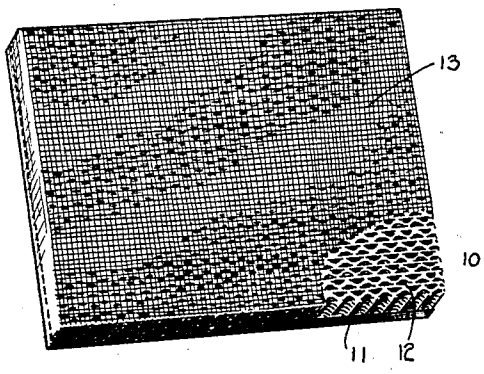


Fig. 2.

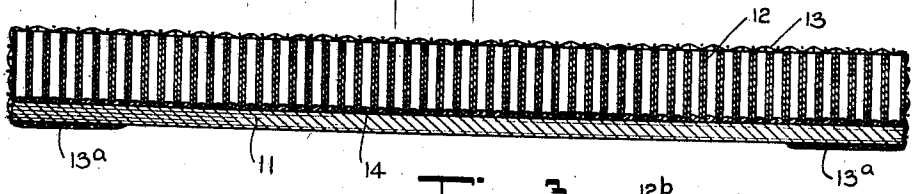


Fig. 3.

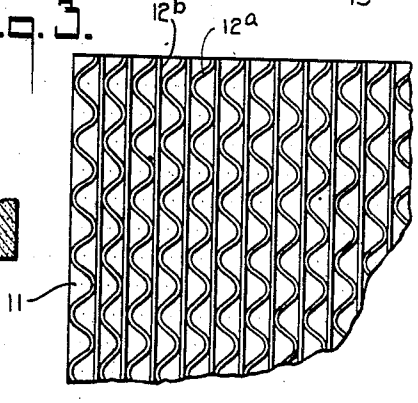
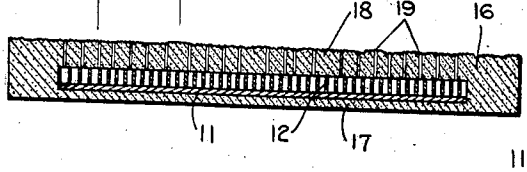


Fig. 4.



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UNITED STATES PATENT OFFICE

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STRUCTURAL ELEMENT

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Application May 6, 1931, Serial No. 535,415

3 Claims. (Cl. 154—45.9)

The invention relates to structural elements useful in building structures generally and which may be called for convenience and without limiting intention "tiles."

The principal purposes are:

To provide a tile or the like of any desired size which has some or all of the following features, characteristics or advantages: The tile itself, or the building structure (such as a wall or ceiling) in which it is incorporated is fire-proof or fire-resisting; the building structure such as a wall or ceiling composed of or incorporating the tiles in a proper manner is rendered sound-proof or passage of sound through such structure is decreased to a material degree. The tile also has in addition to the quality just stated, other notable acoustic properties including sound-absorption or as generally described, sound deadening qualities so that when used in wall or ceiling construction and especially when placed as the surface layer of such structures, the room defined by such structures is rendered non-resonant to a desired degree; thus for example in the case of a music studio, a concert hall or auditorium, sound wave reflection and other disadvantageous effects produced by walls and ceilings of a sound reflecting or resonant character, are largely or completely avoided. The tile or like article is of generally open or cellular construction, and is made up of materials which are partly or largely of ordinary commercial character easily obtainable at moderate cost and by reason of these characteristics the article is light and inexpensive. It is also usually composed of such materials that it can easily be cut (or sawed) to reduce it to any desired size or to fit particular spaces, etc.

In addition to the stated features or advantages, the article heretofore referred to as a tile and constituting a complete embodiment of the invention in one form is also devised or adapted to be incorporated in a complete building element or tile constituting another embodiment of the invention, consisting of a core or center structure, which is the tile first referred to in any of its invention forms with an outer covering or enclosure of a suitable structural material which usually is of the general nature of plaster and which has some or all of the characteristics and advantages above mentioned. From this point of view, the tile as first discussed may be considered and identified as a core structure and it has the advantage that it can be made up as a complete commercial article and shipped to tile manufacturers who may then incorporate it in a complete composite tile of the general character and by the general methods sufficiently disclosed in my prior application executed April 17, 1931 entitled "Acoustic tile" Serial No. 533,886, filed April 30, 1931.

The characteristics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawing, which shows representative embodiments. After considering these examples, skilled persons will understand that many variations may be made without departing from the principles disclosed, and I contemplate the employment of any and all structures that are properly within the scope of the appended claims.

Fig. 1 is a perspective or annular top plan view of a structural element embodying the invention in one form;

Fig. 2 is a transverse section;

Fig. 3 is a top plan view of a portion of the structure of Figs. 1 and 2, with the outer covering material removed.

Fig. 4 is a transverse section of another embodiment of the invention consisting of a structure such as shown in Figs. 1 and 2 employed as a center in a complete structural element which also includes an outer or encasing portion of the general character of plaster.

The article shown in Figs. 1 and 2 may be considered as and is either a complete tile or analogous structural element ready for use in the form shown or in any other suitable general form or size, in any suitable part of a building such as the walls or ceiling or even in the floor structure in some cases, and as so used it may be more or less embedded in such structure or may constitute the surfacing layer; also in any of its sizes it may be cut or sawed for fitting spaces, etc.; or, it may be considered and actually constitutes a core or center structure capable of use in the manner sufficiently referred to hereinabove.

Considering the article first as a complete building element, it comprises in the embodiments shown in Figs. 1, 2 and 3, a base, body or backing 11 which is a sheet of substantially continuous or homogeneous character, of substantial thickness and stiffness and having generally the qualities of lightness, cheapness, fire and sound-resistance, sound absorption or non-resonance. It may be laminated sheet material, composed largely principally or entirely of asbestos or may be in the general nature of plaster board; its fire proof or fire resisting qualities, may be inherent either in the material of which the sheet is composed, or it may be rendered fire proof or fire resistant by suitable chemical or other treatment.

Upon this base and affixed to it in a desired manner is a component 12 of the complete structure which may be considered an outward or surfacing layer, that is, in relation to the base. This component is of generally cellular structure and as shown consists of a plurality of relatively narrow strips of suitable sheet material having some or all of the preferred characteristics of fire and sound resistance, sound absorption, or non-resonance, as sufficiently above referred to.

In one specific example, the sheet or strip material is of asbestos or asbestos composition, but in the broader aspect of the invention there is no definite limitation as to the nature of the material. Some of the parts of the structural component 12 are preferably of the general nature of corrugated sheet material or corrugated board in order to provide the desired cellular formations in a most convenient manner. Thus as shown, the outward structure 12 consists of flat, straight or plain strips 12*b* alternating with corrugated strips 12*a* and the various strips are adherently secured together by any suitable glue or other binder preferably of a fire resisting character.

The plain strips in addition to their direct strengthening or supporting functions in the complete structure, serve especially to secure and maintain the corrugated strips in proper position or relation thus in an obvious manner. They support these corrugated strips in such a position that the cells provided by the corrugations extend in a desired manner that is transversely of the tile with ends of these cells in an outward and exposed position.

The structure-component 12 may be considered as consisting of commercially available material consisting of a plain strip or sheet such as 12*b* with a corrugated sheet or strip such as 12*a* secured thereon and cut to the desired width which is the vertical dimension of the component 12 in Fig. 2, secured together in any desired number or grouping, or it may be considered as shown in the drawing, a complete unit constituting the structure-component 12 made up in any desired manner.

The component 12 is secured to the base 11 usually by adhesive means. Thus as shown, there is a layer 14 of material intermediate the base and cellular component and this material may serve principally as an adhesive or it may have fire and sound resisting or other qualities desirable as sufficiently above referred to. In one preferred example, the layer 14 consists of heat-expanded mica with a binder of adhesive character..

In some preferred cases, the structure as so far described, is partially or entirely enclosed in an outer sheet or layer 13 of suitable material of the general character of netting; that is one suitable material is a textile fabric of wide mesh such as coarse cheese cloth and another suitable material is wire netting of a suitable "mesh size". This material overlies an outer face of the tile, that is, an outward side of the component 12 and portions are brought down or over the sides and ends and marginal portions such as 13*a* are secured usually in an adherent manner to margins of the back face of the base 11 substantially as shown in Fig. 2. When of a textile character, the material 13 may be chemically or otherwise treated to render it fireproof or fire-resistant.

It is now evident that the completed structural element of Figs. 1 to 3, embodies the features or qualities, or acts in the manner and for the purposes sufficiently explained earlier above.

Fig. 4 sufficiently illustrates another principal form or variation of the invention, consisting in a tile or analogous structural element incorporating as a complete sub-unit, a structure such as shown in Fig. 1 and above fully described; although, of course, considerable variation may be made in details of this substantially unitary core.

The core is imbedded or enclosed in enveloping material 16 which usually and preferably is of the general character of plaster and has the qualities generally desired for invention purposes of lightness, cheapness, convenient fabrication, etc. The enveloping material in any case is a plastic and the core is emplaced in it, or it is formed about the core in any known or suitable manner, or in the general manner fully set forth in my prior application above identified. The location of the core within the plastic, in preferred cases, as exemplified in Fig. 4, is relatively deep or near the back face of the complete tile. Thus, as there shown, there is provided a relatively thin layer 17 of the plastic at the back face of the core and a deeper outer or surfacing layer. The plastic is of sufficient quantity to fully enclose the edges of the core and in fact usually to provide plastic marginal portions such as 16 of substantial widthwise extent.

In preferred cases, also, although not necessarily, apertures or perforations such as 19 are formed or provided in the outer layer or portion of the plastic, and these lead to or into the core structure. The perforations may be of any reasonable diameter and arrangement and the arrangement may be regular or irregular. They may be formed or provided, when desired, in a manner fully set forth in my above identified application. When included, these perforations or apertures provide a communication between external atmosphere and the generally cellular core, thus causing or enabling the tile to absorb sound vibrations within the perforations and the core cells, or in other words, increasing the non-resonant and sound-proofing or sound absorbing capacities of the tile.

The outer face finish may be as desired. In certain preferred cases, this finish is of a rough or pebbly character or appearance, and this generally rough surface formation also aids materially in absorbing sound vibrations.

I claim:

1. A structural element or tile comprising a plastic body substantially enclosing a core structure comprising a sheet base and thereon a generally cellular body, the openings of certain of the cells communicating with the outer atmosphere through the exposed face of the structural element.

2. A structural element or tile comprising a plastic body substantially enclosing a core structure comprising a sheet base, and secured thereon a cellular layer of substantial thickness composed of strips of sheet material, including corrugated strips, the openings of certain of the cells communicating with the outer atmosphere through the exposed face of the structural unit.

3. The article defined in claim 1 with the addition that the plastic body has in its outward portion a plurality of perforations extending to the core.

VICTOR JACOBSON.