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C. S. FREUND

BUILDING TILE OR SLAB

Filed May 15, 1922

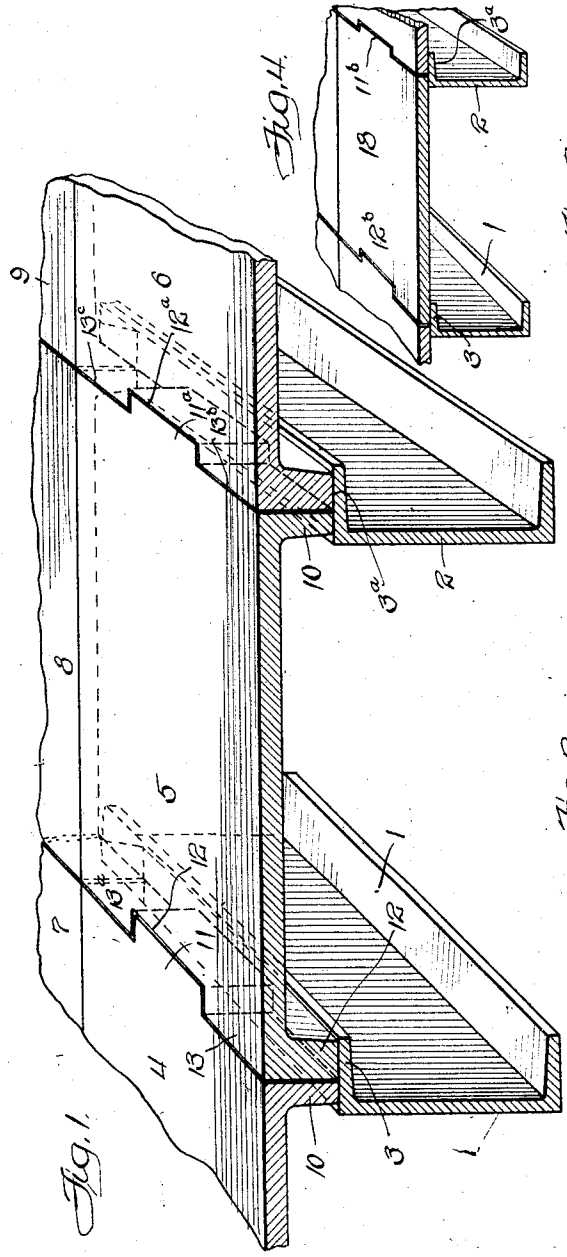


Fig. 1.

Fig. 4.

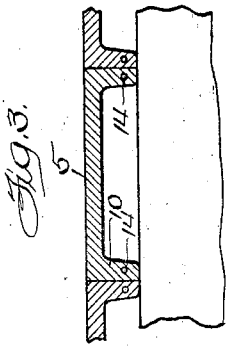


Fig. 3.

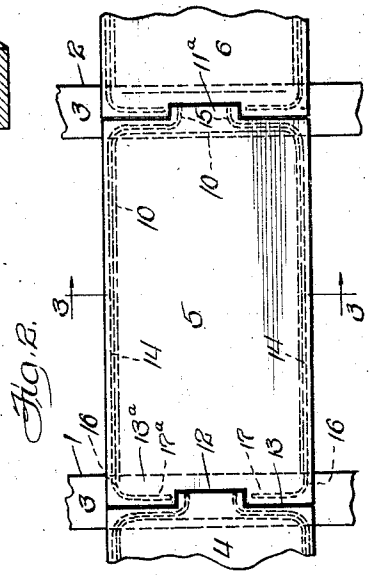


Fig. 2.

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UNITED STATES PATENT OFFICE.

CHERI S. FREUND, OF CHICAGO, ILLINOIS, ASSIGNOR TO FEDERAL CEMENT TILE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BUILDING TILE OR SLAB.

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My invention relates to building structures embodying tiles or slabs and it has special reference to improvements in tiles or slabs that are made from concrete, cement, clay or like substances and which are adapted to be supported on purlins, rafters or beams employed in buildings for constructing walls, floors, ceilings, roofs and the like.

More particularly my invention refers to cement tiles or slabs which are adapted to be supported on purlins or beams of light construction to form a roof or floor for a building and which are provided with ample bearing surfaces in contact with said supporting members to insure the tiles or slabs being retained intact after having been once placed into position.

In building structures employing tiles or slabs, and particularly in connection with roof constructions, it has heretofore been common practice to employ I-beams as the purlins or supporting members upon which the tiles or slabs have rested. The controlling reason for employing an I-beam as a purlin was because of the extreme width of the flange formed on the I-beam and upon which the abutting ends of the end-to-end dispositioned tiles or slabs might rest. In the event that these tiles were subjected to expansion or contraction or other movement the supporting flange of the I-beam, by reason of its extreme width, precluded the tile from being released or displaced from the supporting I-beam and dropping down from the roof.

Although the aforementioned I-beams are entirely successful, from the structural point of view, the use of such I-beams renders the cost of a building construction embodying them very excessive, since such I-beams are not necessarily subjected to unduly heavy loads, but are selected primarily because of the width of their flange upon which the tiles or slabs may be supported. In the interests of economy other expedients have been proposed as substitutes for such I-beams, these expedients, while embodying sufficient strength to support the weight of the roof structure or any loads that may be imposed upon them in service, lacked a sufficiently wide bearing surface for supporting the tiles or slabs under all circumstances, particularly when the tiles or slabs contracted or moved to any appreciable degree.

As a satisfactory substitute for these I-beam supporting members, I propose to employ members having a channel-iron form which are less expensive to manufacture and considerably less in weight while, at the same time, channel irons are of sufficient strength to resist any weights or bending moments to which they are likely to be subjected when employed for this purpose. By substituting channel irons for I-beams as the purlins or beams in a building structure, I am able to decrease considerably the cost of the building without sacrificing any needed strength in the supporting members. It is known, of course, that the laterally extending flange formed on a standard channel iron is of considerably less width than the flange comprised in a standard I-beam of approximately the same standard class. Therefore, it is necessary to provide means for insuring that the tiles or slabs will be properly supported at their ends upon the flanges formed on channel irons under all circumstances and to this end my present invention is directed.

One of the objects of my invention is to provide a building construction comprising slabs or tiles in which standard channel irons may be employed for supporting said tiles or slabs at their end portions, the channel irons being of such dimensions only as are required to withstand the loads or bending moments that are likely to be imposed thereupon.

Another object of my invention is to provide a tile or slab which may be economically and readily manufactured and which, of itself, embodies means to insure its being retained in fixed position upon a supporting flange of substantially narrow width so that when a roofing structure comprising such tiles is assembled, the tiles or slabs will be permanently maintained in their positions upon such narrow flanges.

For a better understanding of the nature, scope and characteristic features of my invention, reference may be had to the following description and the accompanying drawings, in which—

Figure 1 is a broken perspective view of a roof or floor structure formed of tiles or slabs constructed in accordance with my invention, the building structure shown in Fig. 1 likewise being comprehended within the terms of my invention;

Fig. 2 is a plan view of the structure shown in Fig. 1;

Fig. 3 is a view, partially in elevation and partially in section, of the structure of Fig. 2 and taken along the line 3—3 of Fig. 2; and

Fig. 4 is a view similar to that of Fig. 1 wherein flat tiles or slabs are substituted for the channel tiles or slabs of Figs. 1, 2 and 3.

In Fig. 1, I have shown two spaced purlins 1 and 2 which may form a part of either a roof structure or a floor structure, or the like, said purlins or beams being made from channel iron sections of standard form. The purlins 1 and 2 are set upright so that their laterally extending flanges 3 and 3^a are exposed and serve as supporting surfaces for the superimposed tiles or slabs 4, 5, 6, 7, 8 and 9. The tiles 4, 5, and 6 are placed end-to-end, the abutting end portions of the adjacent tiles resting upon the flanges 3 and 3^a. Since the flanges 3 and 3^a are of comparatively narrow width, and because the maximum bearing surface allotted to each of the abutting end portions of the tiles is limited to one-half of the width of these flanges, it is necessary to provide means for increasing to a maximum the bearing surface or area of contact for each of the abutting ends of the tiles so that when the tiles contract, their end portions, normally bearing upon the flanges 3, will be retained in supporting relation upon the flanges.

As shown in Figs. 1, 2 and 3 each of the tiles 4, 5 and 6 is provided with a peripheral laterally extending flange 10, the portions thereof formed at the ends of the tiles resting upon the supporting flanges or bearing surfaces 3 and 3^a. One end portion of the tile 4 is provided with a longitudinally projecting tongue 11 that is integrally formed in said tile. This tongue 11 is shown as being centrally positioned in the end of the tile. The abutting end of the adjacent end-to-end tile 5 is provided with a recess 12 that is alined with and subtends the tongue portion 11 in order to receive the same. The opposite end of the tile 5 is likewise provided with a tongue portion 11^a which is similar to the tongue portion 11 formed in the tile 4. The tongue 11^a of the tile 5 is received in a recess 12^a formed in the abutting end of the adjacent tile 6.

It is to be observed, therefore, that the tongue-and-recess joints 11—12 and 11^a—12^a are supported, respectively, upon the relatively narrow flanges 3 and 3^a of the supporting purlins 1 and 2. In this manner, each of the tiles 4, 5 and 6 is provided at each of its ends with bearing surfaces that extend over the flanges 3 and 3^a for a distance in excess of one-half of the width of said flanges. For instance, the tongue 11 of the tile 4 provides a bearing surface for the tile 4 upon the flange 3 that is considerably in excess of one-half of the width of the flange 3, as shown particularly in Fig. 2 and, similarly, the projections 13 and 13^a formed on the tile 5 by reason of the intermediate recess 12, provide bearing surfaces for the tile 5 upon the flange 3 that are considerably greater than one-half of the width of the flange 3. A similar construction obtains with reference to the tiles 5 and 6. Therefore, when the tiles 4, 5 and 6 contract, they will nevertheless be supported upon the flanges 3 and 3^a, since the tongues 11 and 11^a, in the first instance, will retain the corresponding ends of the tiles 4 and 5 in position and the projections 13 and 13^c, as well as 13^b and 13^c, in the second instance, will retain the tiles 5 and 6 in position. Also, by reason of the tongue-and-recess joints formed between the abutting ends of the tiles, the tiles will not be readily displaced after having been once positioned in a roof structure.

As shown in Figs. 2 and 3, the tile 5 is provided along its two sides with reinforcing bars 14, these bars being embedded in the peripheral flange as shown in Fig. 3. The ends 15 of the reinforcing bars 14 terminate in the tongue portion 11^a of the tile 5 and thus lend considerable strength thereto. The ends 16 of the reinforcing bars 14 may terminate in the projecting portions 13 and 13^a either remote from the recess 12 or may be bent, as shown at 17 and 17^a, in order that they may project closely to the periphery of the recess 12.

In Fig. 4, I have shown my invention applied to flat tiles or slabs. In this modification, the slab 18 is similar in all respects to the tiles 5 of Figs. 1, 2 and 3 excepting that it is devoid of the peripheral flange 10. However, the slab 18 is provided at one of its ends with a recess portion 12^b and at its opposite end with a longitudinally projecting tongue 11^b, these several end portions of the slab 18 coacting with the abutting ends of adjacent slabs to constitute tongue-and-recess joints that are severally supported upon the relatively narrow flanges 3 and 3^a of the channel irons and supporting members 1 and 2.

From the foregoing, it will be apparent that a considerable saving is effected by substituting channel iron supporting members for the well known and common I-beam members that have heretofore been extensively employed. At the same time, the bearing or contact surfaces for the slabs or tiles superimposed upon the channel-iron purlins, are considerably enhanced by reason of the tongue-and-recess joints which I have invented for supporting the abutting ends of adjacent tiles or slabs. Although I have described in detail several embodiments of my invention, it is to be understood that other modifications may be made

therein without departing from the spirit and scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the U. S. is:—

1. A floor construction comprising a plurality of parallel and spaced purlins having relatively narrow floor supporting flanges, load supporting tiles unconnected and disposed end to end for spanning said purlins and having abutting ends resting on said flanges, said tiles being formed of reinforced concrete or the like and having a substantially rectangular conformation and also having a projecting reinforced integral tongue at the edge of one of its load supporting ends, and a complementary recess formed in the edge of the opposite one of its load supporting ends, said tongues being of a thickness equal to the thickness of said edges but greater than the thickness of the central area of the tile, the entire load supporting edges including the tongues resting directly upon the purlins and adapted to provide sufficient bearing surface thereon when the same are separated by the contraction of said tiles.

2. A floor construction comprising a plurality of parallel and spaced purlins having relatively narrow floor supporting flanges, load supporting tiles disposed end to end for spanning said purlins and having abutting ends resting on said flanges, said tiles being formed of reinforced concrete or the like and having a substantially rectangular conformation and also having a projecting reinforced integral tongue at the edge of one of its load supporting ends, a complementary recess formed in the edge of the opposite one of its load supporting ends, the entire load supporting edges including the tongues resting directly upon the purlins, and reinforcing means within the tile extending from either side of the recessed portion around the perimeter of the tile and terminating within the tongue portion.

3. A floor construction comprising a plurality of parallel and spaced purlins having relatively narrow floor supporting flanges, load supporting tiles disposed end to end for spanning said purlins and having abutting ends resting on said flanges, said tiles having a projecting tongue at the edge of one of the load supporting ends, and a complementary recess formed in the opposite edges of the load supporting ends and providing a projecting portion on each side of same, said tongue and projecting portions being adapted to rest on the purlins and provide sufficient bearing surface thereon when the same are separated by the contraction of said tiles.

4. A floor construction comprising a plurality of parallel and spaced purlins having relatively narrow floor supporting flanges, load supporting tiles disposed end to end for spanning said purlins and having abutting ends resting on said flanges, said tiles having a projecting tongue at the edge of one of the load supporting ends, and a complementary recess formed in the opposite edge of the load supporting ends and providing a projecting portion on each side of same, said tongue and projecting portions being adapted to rest on the purlins and to be freely separable to provide sufficient bearing surface thereon during the expansion and contraction of said tiles.

In witness whereof, I have hereunto subscribed my name.

CHERI S. FREUND.