Nov. 17, 1931. V. J. HULTQUIST 1,832,397

TILE

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Fig. 1.

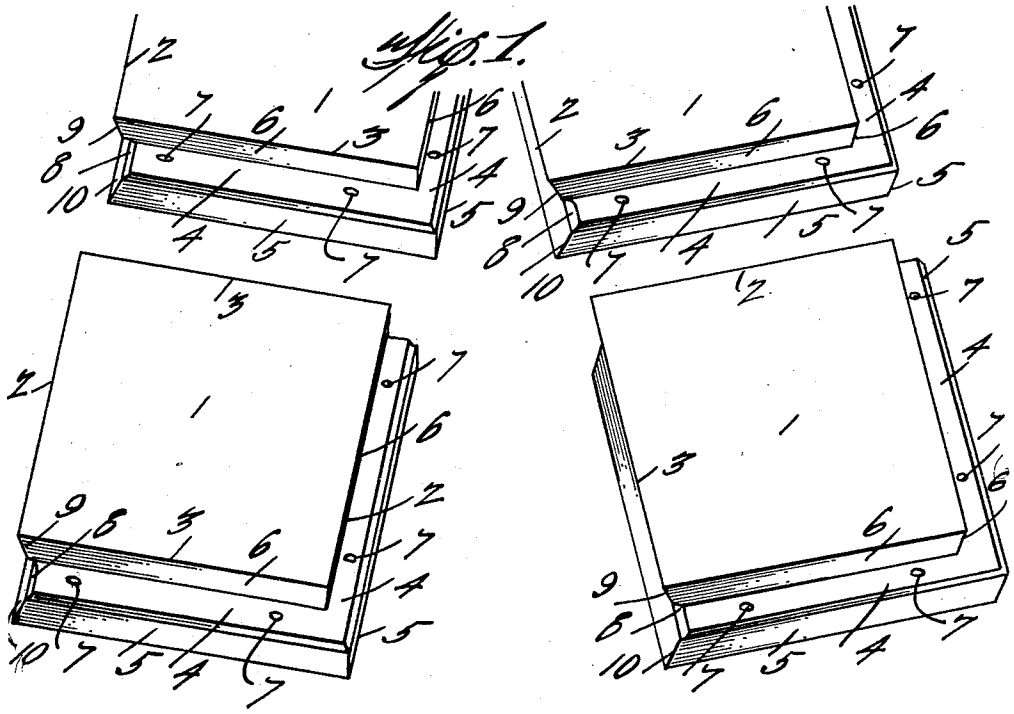


Fig. 2.

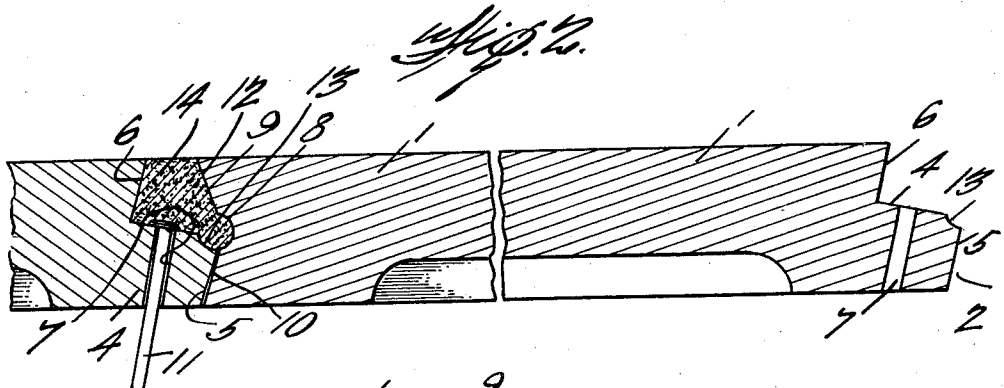
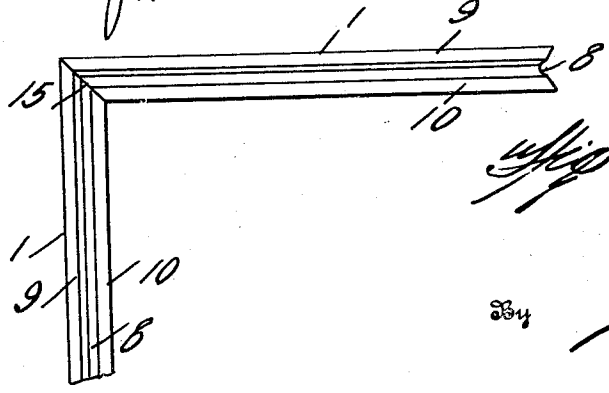


Fig. 9.



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Fig. 3.

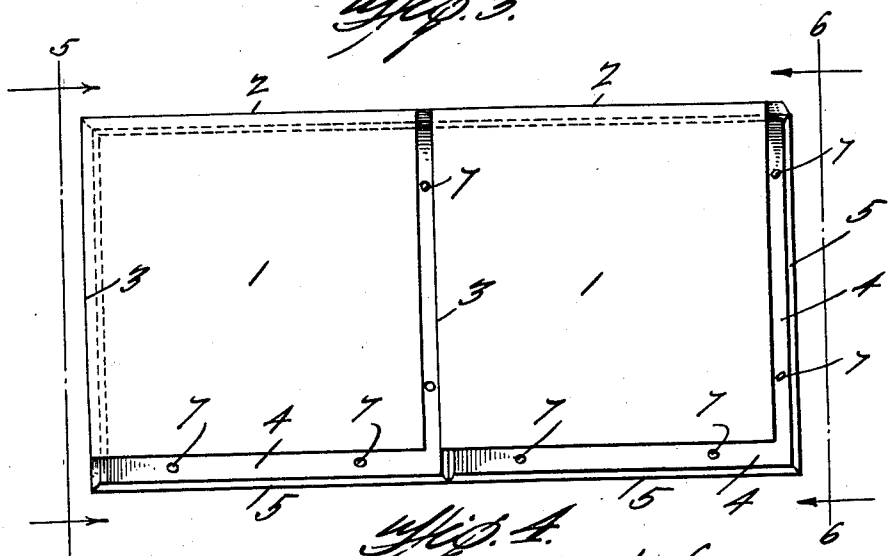


Fig. 4.

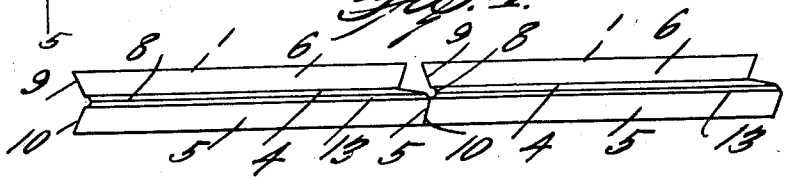


Fig. 5.

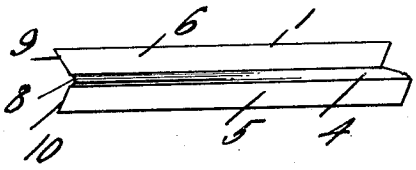


Fig. 6.

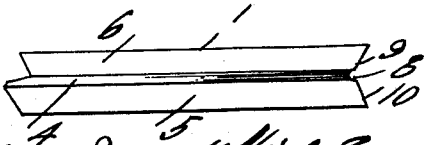


Fig. 8.

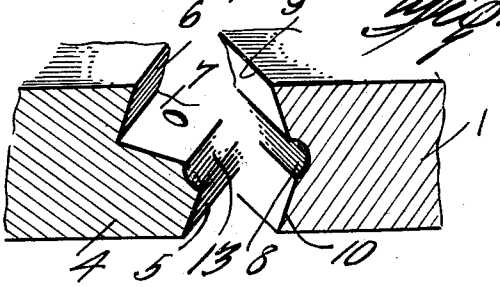
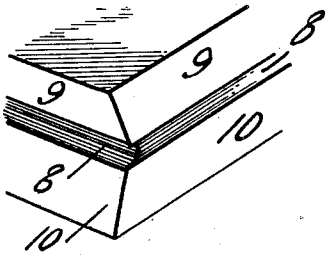


Fig. 7.



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TILE

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Fig. 10.

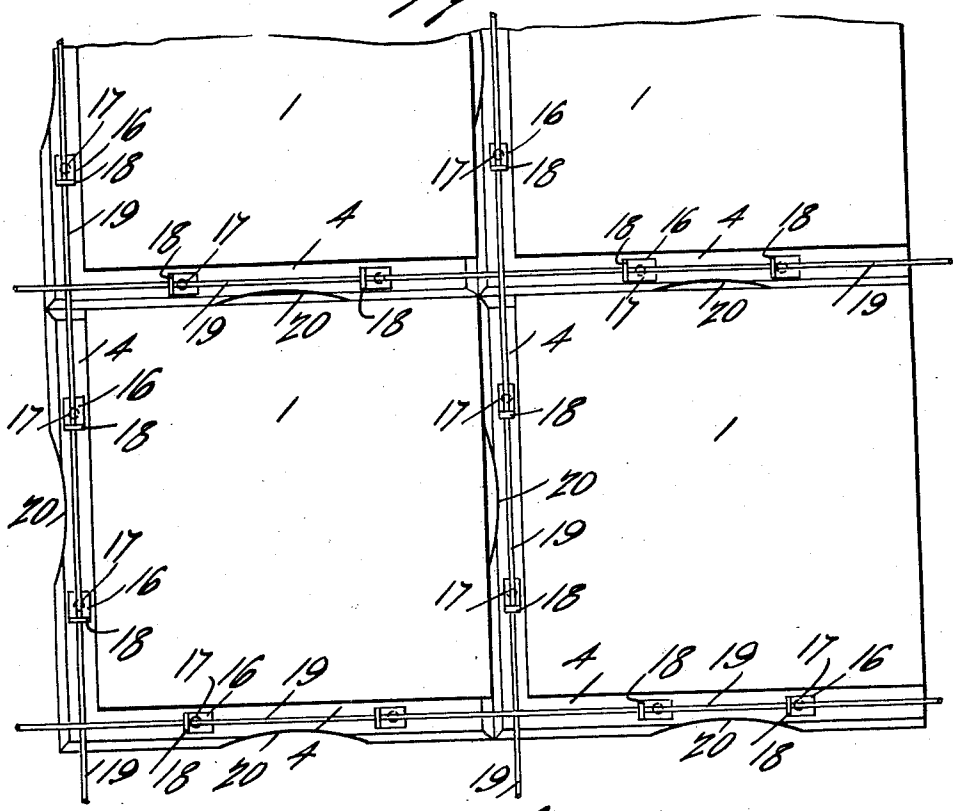


Fig. 11.

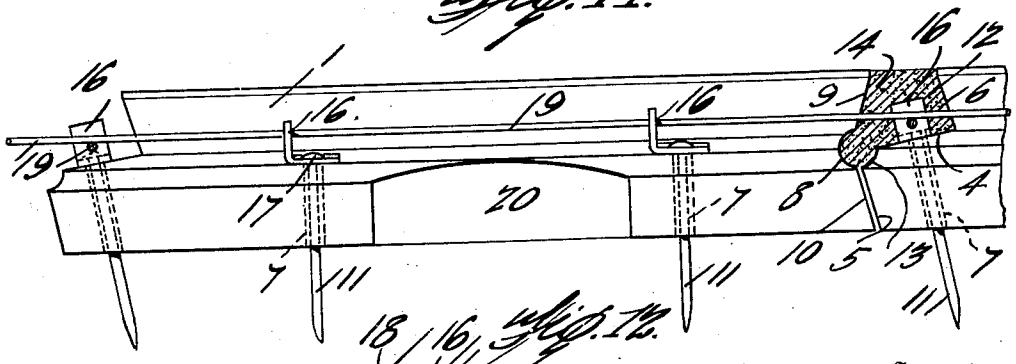
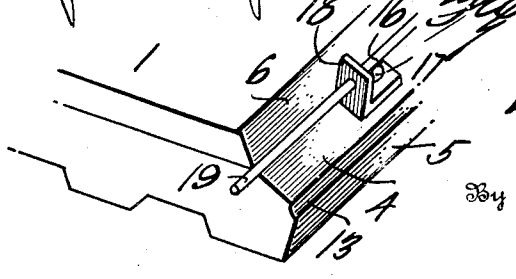


Fig. 12.



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Patented Nov. 17, 1931 1,832,397

UNITED STATES PATENT OFFICE

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TILE

Application filed October 20, 1930. Serial No. 490,025.

This invention is directed to an improvement in ceramic products, and more particularly to a wall and floor tile, wherein provision is made for a simplified method and arrangement for applying and securing the tile in position.

The well understood and conventional method of laying tile of this type is not only a laborious and tedious process, but additionally requires the employment of highly skilled labor to the end that the tile may be properly laid and leveled. Furthermore, even under the most careful work the tile are liable to an unevenness of surface, particularly where the tile may be slightly warped, and due to this unevenness such tile are liable to become more or less readily separated from their base.

The primary object of the present invention is the provision of tile of this character initially formed for nailing to their support, and with such edge formation that the tile are self-spacing as applied, together with a cement filling between the tile cooperating with such edge formation as to insure an effective holding of the tile relatively one to the other, with such filling serving at the same time to conceal the securing nails.

A further object is the edge provision in such tile as will insure that the cement filling will act not only as a binder between the adjacent tile and cover the securing nails but will also act as a wedge against the relative outward or upward displacement of adjacent tile edges, thus permitting tile which are slightly warped to be securely fixed and held in proper surface relation without possibility of rocking on the base.

A further object of the invention is the provision of means through which the cement filling or mortar arranged between adjacent tile may find its way to the bottom of the tile at a determinate point or points to materially strengthen the joint between the tile and to increase the holding power of such material.

A still further object of the invention is the provision of a reinforcing means, through the medium of which the system of tiles is tied together, thereby providing in effect a monolithic construction, insuring maximum rigidity and strength.

The invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a perspective view, showing four adjacent tile formed in accordance with the present invention, the tile having their respective edges designed for cooperation when laid in spaced relation to indicate the formation of such edges.

Figure 2 is an enlarged sectional view through cooperating edges of adjacent tile.

Figure 3 is a plan view, showing two adjacent tile in cooperating relation, the filling being omitted.

Figure 4 is an edge view of the same on the line 4—4, viewed in the direction of the arrows.

Figure 5 is an edge view of the same on the line 5—5, viewed in the direction of the arrows.

Figure 6 is an edge view of the same on the line 6—6, viewed in the direction of the arrows.

Figure 7 is a broken perspective of one corner of the tile, the similar formation of adjacent edges being shown.

Figure 8 is a broken perspective, showing the relative formations of interlocking edges of adjacent tile.

Figure 9 is an edge view, illustrating the meeting ends of tile when used as wall tile for walls of angular relation.

Figure 10 is a plan view of several associated tiles illustrating the reinforcing means.

Figure 11 is an edge view showing a tile and a portion of an adjacent tile and illustrating the means of connecting the reinforcing element thereto and the formation of a notch therein.

Figure 12 is a broken perspective view of a tile showing the mounting for the reinforcing means and the reinforcing means therein.

The improved tile, while generally rectangular in shape, are obviously to be in any desired dimensions, and aside from the particulars hereinafter specifically noted, of any appropriate material, ornamentation, color or thickness.

The tile of this invention comprise the usu-

al tile body, formed in the usual manner or in any appropriate or desired manner, such body 1 having what may be termed side edges 2 and end edges 3. As a particular tile must cooperate with four adjacent tile, and as all tile must have similar edge formation, it follows that a particular tile must have two adjacent edges of one formation and the remaining two adjacent edges of a different formation. Thus one side edge and one end edge of the tile will have a particular characteristic formation, and the remaining side edge and end edge a different formation.

One such edge formation is provided by cutting away, either actually or in molding, the upper half of the tile body to leave coextensive with the particular side and end edges a ledge 4. This ledge is downwardly and outwardly inclined relative to the tile body and its outer face, as 5, is downwardly and inwardly inclined. The end of the tile body rising from the ledge 4 is upwardly and outwardly inclined relatively to the tile body, as at 6. The respective ends or walls 5 and 6 are thus substantially parallel, both inclined relative to the plane of the upper surface of the tile. At determinate points throughout the ledges 4, there is formed nail-receiving openings 7, and these openings extend at approximately right angles to the surface of the ledge 4. The entrant ends of these openings open through the ledges immediately adjacent the walls 6, and the openings 7 range downwardly at an inward inclination relative to the body 1. Thus the nail-receiving openings extend through the body of the tile, wholly beyond the ledges 4, to afford maximum strength, and by the inclined position of the nails inserted therethrough, a more effective holding against direct upward movement of the tile relative to the supporting surface is insured.

It is to be particularly noted that the nail-receiving openings 7, while inclined with respect to the vertical, are substantially at right angles to the inclined upper surface of the ledge 4. This provides for a more convenient application of the nail and for driving it farther into the surface of the tile without liability of tile breakage than would be possible if the opening and ledge surface were at an angle. Another advantage of the inclined position of the nail in its driving relation with respect to the plane of the tile is the fact that under the final nail action the tile is drawn in the direction in which the nail is being driven. This insures that the tile is forced into intimate contact with the adjacent tile, thus overcoming the possibility of slight inaccuracy in fitting the tile together.

The remaining edges of the tile body are formed to cooperate with the ledge formation just described, though, of course, of adjacent tile. In such additional formation, the edge of the tile body is formed throughout its longitudinal median line with a semi-circular depression 8, though obviously other sectional form of this depression might be used and is contemplated. From the depression 8, the upper and lower sections 9 and 10 of the body edge incline outwardly from the body, the degree of inclination relative to the vertical of the section 10 corresponding to the degree of inclination of the wall 6 of the other edge formation, while the degree of inclination of the section 9 relative to the vertical corresponds to that of the wall 5 of the other edge formation, the relative inclinations are reversed.

The tiles are laid with the non-similar edges in abutting relation, and when thus arranged it will be seen that the ledges 4 serve as spacing elements holding the walls 5 of the ledge of one tile and the sections 9 of adjacent tile in such spaced relation to receive a proper cement filling to define the conventional cement layer between tiles. Thus the tiles by reason of this ledge 4 are self-spacing, and if laid with regard to this contact will insure even spacing and regular appearance even in the hands of the unskilled operator.

The tiles, if laid as floor tiles, are preferably laid on a pitch or asphalt base, if laid over an ordinary floor, a tile applied, and nailed in place by driving nails through the openings 7, as shown at 11. A second tile is then applied, one of its formed edges being arranged adjacent to the non-similar edge of the laid tile. If the laid tile is assumed to be the tile so shown in the drawings as nailed in place, the ledge 4 of such tile will provide a spacing for the application of the second tile, it being understood that in this application the section 10 of the tile being laid is brought into contact with the wall 6 of the laid tile. This arrangement presents the depression 8 of the tile being laid in line with the ledge 4 of the laid tile, while the section 9 of the tile being laid extends above the plane of the ledge 4 of the laid tile in spaced non-parallel relation with the wall 5 of the laid tile, that is, the section 9 and wall 5 define an upwardly converging mortar or cement receiving space, indicated at 12. It is advisable to cut away the extreme edge of the ledge 4 as a continuation of the depression 8, as at 13, to permit free access of the holding material to the recess 8 and to create a further holding effect.

Of course, in the laid tile, there will be two adjacent edges formed with the recess 8 and sections 9 and 10, and the tiles to be laid adjacent such edges will cooperate therewith, as described above. After the tiles are laid, being spaced throughout by cooperation of the ledges 4 with the sections 10 of adjacent tile, the mortar or cement is applied between the tile. This filling, indicated at 14, overlies and rests on the ledges 4, completely concealing the nails 11, fills the de-

pressions 8 and is trowled off at the surface, as indicated. This filling serves to maintain the rigidity of cooperation between the tile and prevent their relative upward movement. This is apparent from the fact of the wedge formation of such material between the walls 5 and sections 9 of adjacent tile, and the lateral extension of the integral filling into the recesses 8. Furthermore, the relative inclinations and interfit of the sections 10 and walls 6 of adjacent tile edges also tend to prevent relative upward movement of the tile. Of course, any particular tile may be removed on occasion by cutting out the filling and removing the nails.

With the tiles thus constructed, proper laying as to spacing and uniform surface may be readily had without the use of skilled tile layers, as the tiles are self-spacing and so relatively interfitting and interlocking that it is impossible, with ordinary care, to fail of a reasonably perfect job. All that is required is the ability to fit the tile, one to the other, nail them in place, and fill the intervening spaces with the filling. The tiles interlock and interfit, and thus position themselves, and the application of the filling conceals the mechanical fastenings and serves to further interlock the connection.

In using the tile as wall tile, the formation is the same and the application of the respective tile identical. Here, of course, the tile may be of different form and coloring from the floor tile. Furthermore, if the tile, as wall tile, are to be used to cover angularly related wall sections, certain of the tile may have one edge mitered, as indicated at 15 to form meeting edges of properly interfitting relation to present a proper tile edge. The mitering is, of course, to be at such relative angles as will afford a proper meeting angle of the tile of the respective wall sections.

It may be found desirable to provide metallic reinforcement in order to tie the whole system of tiles together, particularly where great rigidity and strength are required as, for example, with the tiles used in refrigerator cars, bathrooms on boats and the like. The present system of tile construction readily lends itself to such reinforcement, for it will be noted that when the tiles are applied the ledge 4 presents an area below the upper surface of the tile which is exposed on regular lines throughout the tile system extending, of course, in both directions of the system.

To provide for this reinforcement, three metallic strips 16 terminally formed with openings 17 are secured to the ledges 4 in and by the application of the nails 11, the nails being passed through the openings 17 in one end of the strip. After or before the strips are secured, they are bent at an intermediate point so that when applied or after being applied they are turned into a position to present an upstanding section 18 of less height than the depth of the body above the ledge 4, with such upstanding section 18 having one of the openings 17 at its free end. The strips are arranged so that the openings 17 in the upstanding sections 18 align longitudinally of the ledge 4, or substantially so, and a wire of appropriate gauge and strength, indicated at 19, is then threaded through the openings 17 of the upstanding sections 18 which are aligned throughout the tile system. These reinforce wires thus directly overlie the ledges 4 of each and every tile and extend continuously throughout the aligned ledges 4 of the entire series of tiles.

Of course, when the cement or other filling 14 is applied, as previously described, the reinforcing wires 19 which are tied to the respective tiles by the strips 16 and extend throughout aligned tiles in both directions of the entire tile surface are embedded in the cement or filling and thus effectively brace and reinforce each tile with respect to every other tile in a manner to secure maximum rigidity and strength. Furthermore, either with or without the reinforcing feature, the rigidity and strength of the filling between the tiles may be substantially increased and the holding effect of such material on the tiles materially improved by forming in the ledges 4 at any one or more points a recess, indicated at 20 in Figure 11, through which the cement filling finds its way to the bottom of the tile and to the base on which the tile is supported and thus materially aids in strengthening the effect of such filling and increasing the tile-holding power thereof.

While it is to be understood that the tile of this invention may be used independently of the reinforcing means described and of the recesses 20, yet nevertheless these features are to be considered a more or less important detail of the invention to be incorporated with the tile where the requirements of the particular laying necessitate such use, and particularly where the tile, incident to its place of use, is subjected to unusual strain.

The improved tile is thus formed to be self-spacing, nail receiving for initial securing, interlocking through contact, and firmly held relative to each other and to the underlying surface by cementitious filling between tiles.

While I have shown and described a tile with four formed edges, two of which are provided with flanges and two of which are formed to cooperate with the flanges, it is to be understood that no specific limitation is intended thereby. That is to say, the tile may be made with but one edge formed with a flange and one edge formed to cooperate with the flange or formed with one edge with the flange and the remaining three edges with the angular formation to cooperate therewith, or any relative disposition of these

formed edges in order to adapt the tile for relative cooperation in any selective system of laying.

I claim:—

1. A tile forming one of a similar series, each tile having two of its edges formed with a self-spacing projection with an undercut face, the edge of the tile above the projection being downwardly and inwardly inclined relative to the body of the tile, the remaining edges of the tile being oppositely inclined from the longitudinal median line of such edge, the edges of the tile having the self-spacing projection cooperating with the non-similar edges of adjacent tile and interlocking with the lower inclined portion of such non-similar edge, the upper inclined portion of such non-similar edge and the inclined portion of the edge above the self-spacing projection defining a wedge-shaped filling receiving space between adjacent tile.

2. A tile forming one of a similar series, each tile having two of its edges formed with a self-spacing projection having an undercut face, the edge of the tile above the projection being inclined relative to the body of the tile, the remaining edges of the tile being formed with upper and lower oppositely inclined sections vertically coextensively respectively with the inclined portion of the tile body above the self-spacing projection and of the self-spacing projection of the remaining edges.

3. A tile forming one of a similar series, each tile having two of its edges formed with a self-spacing projection having an undercut face, that portion of the tile above such projection forming an inclined wall, the remaining edges of the tile having upper and lower inclined sections vertically coextensive with the inclined wall and with the self-spacing projection of the other edges, the edges of the tile formed with the upper and lower inclined sections being further formed with a longitudinally ranging rounded channel at the juncture of such sections.

4. A tile forming one of a similar series, each tile having two of its edges formed to provide a self-spacing ledge having an undercut face, the wall of the tile above such ledge being inclined relative to the vertical, the body of the tile being formed with an inclined nail-receiving opening leading through the ledge, the remaining edges of the tile being formed with a central longitudinally ranging channel and projected in oppositely inclined sections above and below the channel, the lower inclined section interlocking with the undercut face of the ledge of adjacent tile and the upper inclined section defining with the inclined wall above the ledge of adjacent tile a wedge-shaped filling receiving space.

5. A tile having two of its edges formed to provide a projecting portion to define a self-spacing relation with non-similar edges of adjacent tile, the remaining edges of the tile being formed for interlocking with the self-spacing projection of adjacent tile, and a reinforcing element secured to the aligned projecting portions of the tile.

6. A tile having two of its edges formed to provide a projecting portion to define a self-spacing relation with non-similar edges of adjacent tile for the reception of a filling, the upper surface of the projecting portion being below the upper surface of the tile, and a reinforcing element secured to the aligned projecting portions of adjacent tile, said reinforcing element extending across the juncture between adjacent tile.

7. A tile having two of its edges formed to provide a projecting portion to define a self-spacing relation with non-similar edges of adjacent tile, holding means passing through said projecting portion into the surface on which the tile rests, and a reinforcing element secured above said projecting portion by said holding means, said reinforcing element extending throughout the aligned projecting portion of adjacent tile.

8. A tile having two of its edges formed to provide a projecting portion to define a self-spacing relation with non-similar edges of adjacent tile, the upper surface of the projecting portion being below the upper surface of the tile to define with adjacent tile a filling receiving space, a holding means passed through the projecting portion and into the surface on which the tile rests, and a wire reinforce secured to the aligned projecting portions of adjacent tile by said holding means, said wire reinforce being positioned above the projecting portion and below the upper surface of the tile.

9. A tile having two of its edges formed to provide outstanding ledges to define a self-spacing relation with non-similar edges of adjacent tile, the upper surface of the ledges being below the upper surface of the tile, nails passed through said ledges to engage in the surface on which the tile is supported, and a reinforcing wire held by said nails immediately above the projecting portion and below the upper surface of the tile, said reinforcing wire extending throughout the projecting portions of adjacent tiles.

10. A tile having two of its edges formed to provide outstanding ledges to define a self-spacing relation with non-similar edges of adjacent tile, the upper surface of the ledges being below the upper surface of the tile, nails passed through the ledges to engage the tile supporting surface, strips secured to the ledges by said nails, and a reinforcing wire passed through the cleats of aligned ledges of adjacent tiles.

11. A tile having two of its edges formed to provide outstanding ledges to define a self-spacing relation with non-similar edges

of adjacent tile, the upper surface of the ledges being below the upper surface of the tile, nails passed through the ledges to engage the tile supporting surface, strips secured to the ledges by said nails, and a reinforcing wire passed through the cleats of aligned ledges of adjacent tiles, the reinforcing wire being above the surface of the ledge but below the upper surface of the tile.

12. A tile having two of its edges formed to provide ledges to define a self-spacing relation with non-similar edges of adjacent tile, the upper surface of the ledges being below the upper surface of the tile to provide, when adjacent tile are assembled, a filling receiving space, the free edges of the ledges being formed with a recess of the full height of the said ledge to permit the filling to extend through said recess to the bottom of the tile.

In testimony whereof I affix my signature.

VICTOR J. HULTQUIST.