

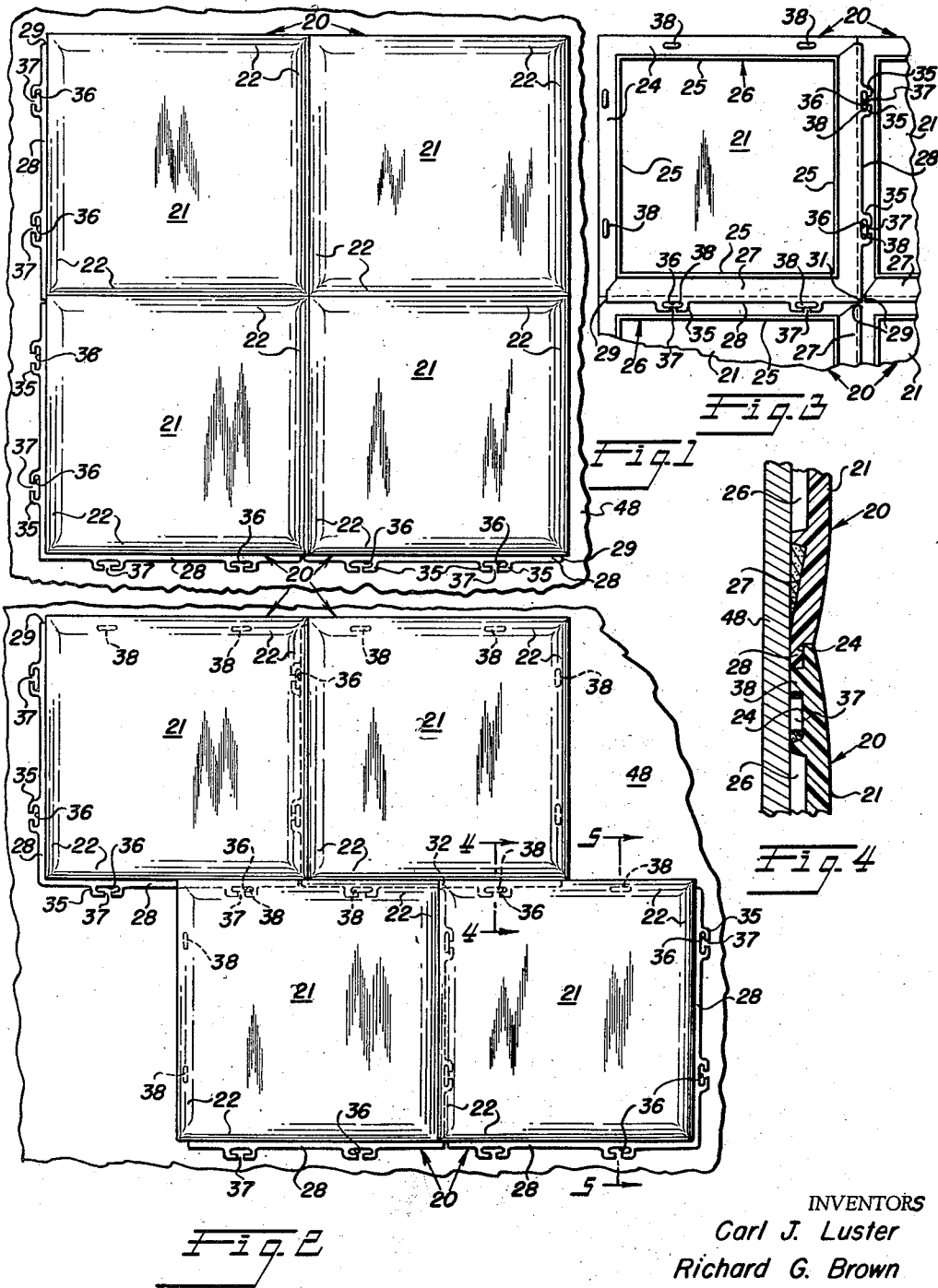
Nov. 2, 1954

C. J. LUSTER ET AL
INTERLOCKING WALL TILE

2,693,102

Filed April 21, 1950

2 Sheets-Sheet 1



INVENTORS
Carl J. Luster
Richard G. Brown
BY *Strauch, Nolan & Diggins*
ATTORNEYS

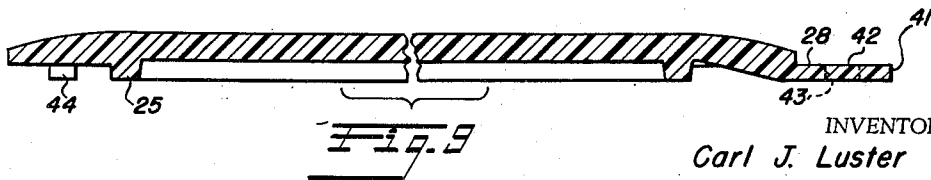
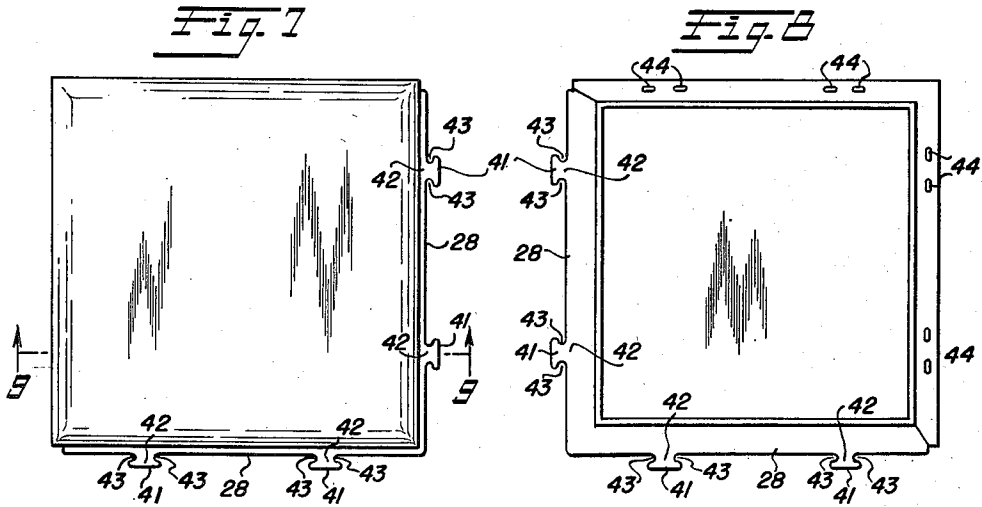
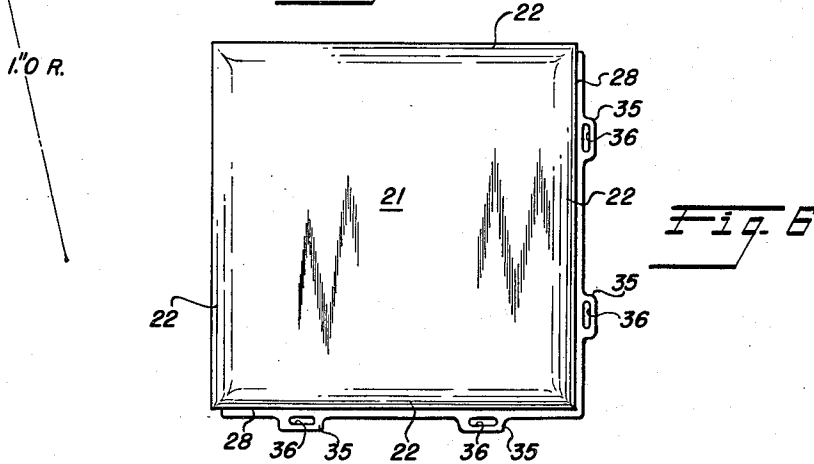
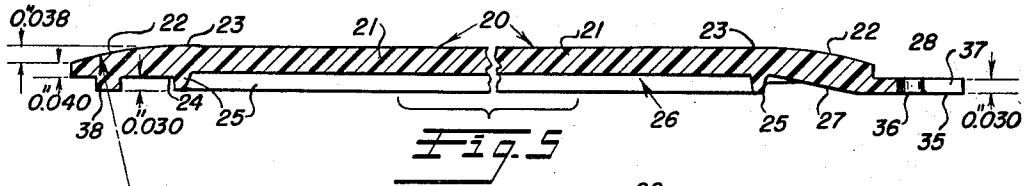
Nov. 2, 1954

C. J. LUSTER ET AL
INTERLOCKING WALL TILE

2,693,102

Filed April 21, 1950

2 Sheets-Sheet 2



INVENTORS
Carl J. Luster
Richard G. Brown

BY *Strauch, Nolan & Diggins*
ATTORNEYS

1

2

2,693,102

INTERLOCKING WALL TILE

Carl J. Luster, Cambridge, Ohio, and Richard G. Brown, Wilkinsburg, Pa., assignors, by mesne assignments, to Pittsburgh Plastic Products, Inc., a corporation of Indiana

Application April 21, 1950, Serial No. 157,224

12 Claims. (Cl. 72—25)

The present invention relates to interlocking wall tile and more particularly to improvements in the construction and shape of the tile and the interlocking formations thereof.

Interlocking tile as heretofore commercialized is illustrated by United States Letters Patent 2,323,417, issued July 6, 1943, to Charles D. Pauli, Jr., and 2,490,577, issued December 6, 1949, to Richard G. Brown. The prior art tiles are characterized by sharply changing surface areas, a thick cross-sectional dimension, deep mastic receiving recesses, and relatively sharp V-shaped interlocking flanges extending continuously along all four sides and cut off across the corners. As a consequence of these characteristics, the prior art tile require considerable amounts of material in its manufacture, necessitate relatively sharply angled forming dies which create localized stresses rendering breakage and cracking likely, are incapable of producing wholly adequate sealing at the corners, utilize substantial quantities of expensive mastic to assure a proper bond with the supporting wall, produce in the finished wall pronounced crevices between adjacent tiles which are subject to collection of dust and are difficult to clean, and provide sharp juncture lines between the intersecting surface areas of the front surfaces which result in a wall surface having a relatively stiff, cold appearance.

It, accordingly, is the primary object of the present invention to provide an interlocking wall tile of relatively thin, light weight, reinforced construction having shallow mastic receiving recesses and relatively smoothly intersecting surface areas.

A further important object of the present invention resides in providing a wall tile with an improved interlock structure.

Still another object of the present invention resides in the provision of a wall tile of novel construction wherein the interlocking structure is normally disposed in slightly spaced relation from the supporting wall and is thereby relieved of bending pressure forces in applying the tile.

Another object of the present invention resides in the provision of a wall tile having a surface contour characterized by a flat central panel-like area and a smoothly joined, curvilinear, marginal surface area backed along the line of juncture by a peripherally closed combined reinforcing and supporting rib.

A still further object of the present invention resides in providing a wall tile along two intersecting sides only with relatively flat peripherally protruding flanges provided at longitudinally spaced points with interlock slots and formed at spaced points inwardly of the peripheral edges of the remaining sides with rearwardly protruding interlock tongues or bosses adapted to cooperate with the interlock slots of an adjacent tile.

A further object of the present invention resides in providing the rear face of two side edges of a plastic wall tile comprising a rearwardly curving, peripheral, marginal surface with relatively flat, peripherally protruding flanges the inner edges of which merge smoothly into inwardly and forwardly sloping wall sections defining marginal areas of thickened cross sectional area to assure an adequate, smooth flow of plastic into said flanges during the formation of said tile.

Still further objects of the invention will appear from the following description and appended claims when read in conjunction with the attached drawings wherein:

Figure 1 is a front elevational view of a wall section

having a preferred form of tile made in accordance with this invention applied thereto;

Figure 2 is a view similar to Figure 1 illustrating a different manner of applying the tile of Figure 1 and the details of the interlocking formations and their cooperation;

Figure 3 is rear elevation of a portion of the wall section of Figure 1;

Figure 4 is a cross-sectional view on a scale roughly three times actual size through one of the interlocking joints of Figure 2 taken substantially on line 4—4 of Figure 2 and showing how adjacent tiles overlap to form watertight joints and effect the desired interlock;

Figure 5 is a sectional view on a scale roughly three times actual size through one of the preferred tiles of Figures 1 through 4 taken substantially on line 5—5 of Figure 2;

Figure 6 is a front elevational view of a tile similar to the tiles illustrated in Figures 1 through 5 but having a slightly different form of interlock slot;

Figure 7 is a front elevational view of a further modified form of tile made in accordance with this invention;

Figure 8 is a rear elevational view of the tile of Figure 7; and

Figure 9 is an enlarged cross-sectional view similar to Figure 5 taken on line 9—9 of Figure 7.

With continued reference to the drawings wherein like reference characters are employed throughout the several views to indicate the same parts, the numeral 20 is used to indicate a preferred form of interlocking tile made in accord with the present invention from synthetic resin plastics such as polystyrene, urea, phenol condensation products, polyesters, alkyds, and similar materials. It is to be understood, however, that any suitable material such as wood or paper base laminated plastic materials or even metal may be used. Furthermore, the synthetic resin tiles can be formed by molding, casting, or extrusion processes well known in the art.

Each tile 20 comprises a main body section 21 of suitable configuration, preferably rectangular, presenting a polished face flat in the center and surrounded by marginal borders 22 uniformly, curved in cross section and receding from a line of substantial tangency 23 (Figures 1, 4 and 5) with the flat center portion to the peripheral edges which are spaced about 4.25 inches apart and located at a level approximately in a plane midway between the back face of the body section 21 and the front face thereof as will be clear from an inspection of Figure 5 of the drawings. The radius of curvature of borders 22 is in actual practice about 1 inch and is relatively great compared to the overall body thickness of the tile, which is maintained at about 0.108 inch to decrease the weight and conserve material. This results in a total vertical dimension of approximately 0.038 inch between the ends of the arc forming borders 22 as indicated by the construction lines at the left of Figure 5.

As a result of this slight curvature of the marginal borders 22, the polished face of each tile, when viewed straightaway, appears to be bounded by bevelled marginal borders. However, due to the degree of curvature described and the tangential juncture with the central body portion 22, these marginal borders are barely discernible when the tile is viewed from other angles. As a consequence of this construction and the novel interlocking structure to be presently described, a wall provided by these tiles will present a warm rich appearance substantially like that illustrated in Figure 1 of the drawings because the line of juncture between adjacent tile is rendered barely noticeable by the marginal borders of adjacent tile softly blending with each other and with the flat central body sections 21.

This improved appearance has not been obtainable in either the prior conventional non-interlocking tile or the prior interlocking tile since the grout filled joints required in the former and the interlock structure of the latter have necessitated relatively wide lines of juncture and additionally, in the case of the prior interlocking tile, relatively great overall cross-sectional dimensions and sharply inclined relatively deep bevel edges to accommodate the interlock structure and afford the necessary strength. The result of these requirements in the prior

art tile is a stiff, sharply defined multi-block appearance lacking the warmth and rich appearance of walls formed of the tile of the present invention.

Referring now to the novel interlock structure of the present invention, the cross sectional dimension of the peripheral tile edges is of the order of 0.040 inch and the marginal underwall 24 along two intersecting sides extends inwardly to a reinforcing rib 25 completely encircling the central portion 21. As clearly seen in Figure 5, rib 25 lies immediately below the lines of tangency 23 and defines a central recess 26 (Figures 3, 4 and 5) approximately 0.046 of an inch deep underlying the body section and fixing the wall thickness of body section 21 at approximately 0.062 inch.

Along the opposite two intersecting edges the marginal underwall 27 (Figures 3, 4 and 5) is preferably inclined with respect to the body section 21 between the respective peripheral walls of flange 25 and a line lying in the plane of the free end of rib 25 and inset slightly from the respective intersecting peripheral tile edges. As a result of this inclined wall the cross-sectional thickness of the marginal borders 22 along the last mentioned respective intersecting tile edges is appreciable greater than the body thickness at any other area of the marginal borders. This greater dimension is maintained primarily throughout these areas for the purpose of assuring an adequate free flow of the plastic material during the forming process to form the peripherally extending interlocking flange structure 28. While this greater dimension has been found desirable, for the reason stated when the tile is molded from plastic material, it is not essential and may, in the case of laminated materials, metal, and even case or extrusion plastic processes, not be desirable.

As clearly seen in Figures 1 to 3, the flange structure 28 extends along the two intersecting edges, around the included corner, and terminates short of the adjacent corners as indicated by numeral 29. This is done to provide a clearance at the corner juncture of each set of four adjacent assembled tile to receive the flange extension at the included corner as illustrated at 31 in Figure 3 or a right angularly disposed flange of an adjacent tile as shown at 32 in Figure 2.

Referring in particular to Figure 5, it will be seen that underwall 24 intersects rib 25 in a plane parallel to the plane of the free end of rib 25 and 0.030 inch away therefrom and that flange structure 28 is disposed so that its opposed faces respectively lie in the plane of underwall 24 and the free end of rib 25. The lateral extension of flange 28 beyond the peripheral edge of the tile is substantially less than the lateral dimension of underwall 25 for a purpose to be presently pointed out.

Each peripheral edge extension of flange 28, as clearly shown in Figures 1, 2 and 5, is provided with longitudinally spaced, laterally projecting slot defining projections 35 preferably in the form of cooperating pairs of oppositely facing L-shaped tangs of the same thickness as flange 28 and lying in the plane of flange 28. The respective pairs of tangs define elongated interlock slots 36 intersected at right angles approximately midway of their length by cross slots 37 the outermost ends of which are open. In the illustrated embodiment of Figures 1 through 5, each peripheral edge run of flange 28 is provided with two such slots 36 the transverse center lines of which are located one fourth of the edge length inwardly from the opposite corners of the tile.

Each of the respective intersecting underwalls 24, as clearly shown in Figures 2, 3 and 5, is provided with longitudinally spaced, right angularly projecting, elongated tabs or lugs 38 the free end faces of which lie in the plane of the free end of rib 25. As illustrated in Figures 2, 3 and 5, each of these tabs 38 is of elongated form conforming in configuration to that of slots 36 but somewhat smaller in size. Like slots 36, the transverse center line of each tab is located one fourth of the edge length inwardly from the corners of the tile. The longitudinal centerline of each tab 38 is disposed inwardly from the peripheral edge of the tile sufficiently to assure endwise insertion of tabs 38 into slots 36 of an adjacent tile in assembling the tile on a wall surface in the manner presently to be described.

The tile of the present invention may also be constructed as shown in Figure 6 wherein the only difference in structure is the form of the slot defining projections 35. As a consequence, the same reference numerals have been applied to the various like parts. Instead of providing projections 35 in the form of co-

operating pairs of oppositely facing L-shaped tangs providing the intersecting slot 37, the free ends of the L-shaped tangs are integrally connected thereby defining a completely closed slot 36. This form of interlock slot is substantially as effective as that of Figures 1 through 5. The only objection noted in connection with the structure of Figure 6 is that the securing mastic cement, preferably a vinyl resin base heavily filled with titanium dioxide produced by Armstrong Cork Company according to a secret formula and sold by them as Mastic Cement #1402, is extruded upwardly through slots 35, outwardly between the mating surfaces of underwall 24 and flange 28 opposite slot 35, and into the line of separation between the opposing edges of adjacent assembled tile marring the otherwise clean and subdued juncture lines. Cross passage 37 of the preferred interlock structure prevents this extrusion of mastic by providing an escape passage leading to the large area cement cavity between the free edge of flange 28 and the peripheral wall of rib 25.

The further modified embodiment of the invention disclosed in Figures 7 to 9 is likewise identical to that of Figures 1 to 5, except for the interlocking slot and tab structure and the same reference characters have again been applied to the parts corresponding to those of Figures 1 to 5. In place of the slot defining projections 35 and elongated tabs 38 of the previous embodiments, this embodiment provides T-shaped flange projections 41 the stems 42 of which extend laterally from the edges of flange 28. These projections, together with the opposed edge portions of flange 28, define oppositely facing, open ended, related pairs of slots or notches 43. As is the case with slots 35, each pair of slots 43 are equidistantly spaced on either side of a transverse center line located one fourth of the edge length from the opposite tile corners.

In lieu of the elongated tabs or lugs 38 of the previous forms of the invention, the present embodiment provides longitudinally spaced, related pairs of axially aligned, relatively short elongated tabs or lugs 44 equidistantly spaced on either side of a transverse center line located one fourth of the edge length from the opposite tile corners. The dimensions of tabs 44 are somewhat smaller in size than those of notches 43 and the longitudinal center line passing through the respective aligned pairs of tabs is disposed inwardly sufficiently to assure endwise insertion of tabs 44 into the respective notches 43 in assembling the tile on a wall surface in the manner now to be described.

The tile of this invention is primarily intended for use as a wall tile for covering the walls of bathrooms, kitchens, and the like without the need of skilled labor and at substantially less expense than conventional ceramic tile or the prior art interlocking or non-interlocking plastic tile. To this end, suitable footing tile, stripe tile, and corner tile (not shown) embodying the appropriate tab and slot structure of this invention are provided for use in conjunction with the illustrated tile. Any suitable colors and color combinations can be produced by utilizing colored plastic material in well known manner.

The desired tile is preferably applied by applying a thick coating of the mastic cement heretofore mentioned to the undersurface of the tile delimited by the peripheral edge and rib 25 or to the area of the support wall 48 over which this marginal area of the tile will lie when applied. Since this mastic cement is quite expensive this preferred method of cement application will alone effect a substantial saving. However, the entire rear surface of the tile or the entire area of wall 48 to be covered may, if desired, be coated with cement. In either case, the tile is pressed into the body of cement until the free end of rib 25 engages the support wall 48 the excess cement being extruded either into the central recess 26 or outwardly from the peripheral edges. The next adjacent tile is then prepared for assembly and the tab containing edge of the new prepared tile is placed in overlapping relation to the flange 28 of the previously laid tile with tabs 38 or 44 engaging in their respective slots 36 or 43 as indicated in Figures 1 to 4. This mode of assembly is continued until the desired area of wall 48 is covered. As clearly shown by Figures 1 and 2 of the drawings, the described spacing of the tabs and slots permits assembly of the tile in aligned rows or in staggered relation.

The mass of each tile is quite small compared to prior

molded plastic tile and the overall height or thickness as well as the depth of the cement receiving recesses are substantially less as a result of the provision of the relative narrow supporting rib and the cross-sectional shape of the tile which relieves the interlocking structure from all mechanical stresses in assembling the tile. As a consequence, concentration of heavy masses of plastic in the peripheral interlocking structure to resist the mechanical assembling stresses, the incident thickening throughout the remainder of the body to assure proper flow of plastic to the peripheral structure, and the incident relatively deep cement cavities, all necessities of prior art interlocking tile, are all avoided by the tile of the present invention. The resulting wall formed with this shallower and lighter tile has a lesser mass acting to pull the tile covering from wall 48 and, therefore, requires substantially less cement to hold it in place. In fact, the saving in cement and material going into the tile of this invention is shown by actual records to reduce installation cost about \$0.20 per foot.

Furthermore, the interlock between adjacent tile, due to the snug engagement between underwall 24 and flange 28 and the interengaging tab and slot structure, is so secure that individual tile cannot fall out of the wall structure or noticeably loosen in the wall. Yet the necessary expansion and contraction due to temperature changes and necessary misalignment of adjacent tile due to irregularities and distortions of wall 48 are readily permitted by the clearance tolerances between the tab and slot structures.

The snug overlapping engagement between underwall 24 and flange 28 of adjacent tile and the uninterrupted overlap at the respective corners of each group of neighboring tile due to the continuity of flange 28 around the included corner together with the close abutting relation of the peripheral edges provide a particularly effective seal assuring a practically waterproof wall structure after assembly. The absence of grout joints and deep crevices between adjacent assembled tile, both resulting from the novel interlock structure of this invention, materially reduce the dust accumulating crevices generally found in the prior art plastic and ceramic tile walls and assure a wall that will remain clean longer and be more readily cleaned when necessary.

Replacement of individual tile for any reason may also be readily accomplished without injury to adjacent tile or the adhesion thereof to wall 48. In this connection, the cement recommended is characterized by its retention of elasticity for indefinite periods. As a consequence, a thin bladed instrument may be readily inserted beneath the underwall 24 of any particular tile, preferably at the included corner of the intersecting underwalls, so as to raise the tile along these two sides to disengage the tabs thereon and force the opposed flanges into contact with wall 48 thereby raising the tabs of the adjacent tile sufficiently to permit disengagement of the slots therein from the tabs of the adjacent tile by sliding the tile to be removed from under the adjacent tile at an angle. A replacement tile is inserted merely by reversing the steps just described.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. An ornamental wall tile comprising a body section having a relatively flat centrally disposed exposed surface; longitudinally extending laterally protruding flanges having longitudinally spaced interlock slots, disposed in substantial axial parallelism to certain intersecting side edges of said body section and meeting at the included corner of said body section to provide an uninterrupted overlap at the respective corners when assembled with adjacent tile; longitudinally spaced interlock tabs equal in number to said interlock slots protruding from the surface of said body section opposite said exposed surface along the remaining intersecting edges of said tile and disposed inwardly from said remaining intersecting

edges in position to freely enter the interlock slots of adjacent tile when disposed in overlapping relation to the flanges of said adjacent tile.

2. The tile of claim 1 wherein said slots comprise longitudinally extending openings and transversely extending intersecting slots extending to the peripheral edge of said flanges and said tabs comprise longitudinally extending protuberances.

3. The tile of claim 1 wherein said centrally disposed exposed surface is surrounded by a relatively narrow, convex marginal surface tangentially intersecting said flat surface; a supporting rib disposed inwardly from the peripheral edge of said marginal surface and protruding from the face of said body opposite said exposed surface sufficiently to engage a supporting base wall upon which said tile is mounted and space the marginal area of said opposite face out of contact with said base wall; said flanges protrude from said opposite face and extend longitudinally along two intersecting peripheral edges of said tile and said longitudinally spaced interlock slots therein comprise spaced pairs of longitudinally oppositely facing open end notches; and said tabs comprise spaced pairs of longitudinally extending protuberances.

4. The tile of claim 1 wherein said slots comprise longitudinally extending openings and said tabs comprise longitudinally extending tabs.

5. The tile of claim 1 wherein said slots are formed along the peripheral edges of said flanges by opposed L-shaped tangs.

6. The tile of claim 1 wherein said slots are formed along the peripheral edges of said flanges by substantially T-shaped tangs.

7. The tile of claim 1 wherein said slots are formed along the peripheral edges of said flanges by substantially U-shaped projections the legs of which are integrally joined to the peripheral edges of said flanges.

8. A wall tile comprising a rectangular, thin, substantially flat body whose front surface tapers rearwardly at its marginal portions; a supporting rib spaced inwardly from each edge of said body and projecting rearwardly, said ribs having rear edges lying in a plane spaced from and parallel to said body; a laterally outwardly projecting flange rearwardly off-set from said body at two adjacent marginal portions thereof and lying wholly between the plane of the rear face of said body and the plane of the rear edges of said ribs, said flanges each having a plurality of hook portions lying in the plane of the flanges; and tabs projecting rearwardly from said body at the two remaining marginal portions spaced inwardly from the edges of the body and located for interlocking engagement with the hook portions of the flanges of adjacent tiles.

9. A wall tile comprising an exposed face formed by a flat, exposed central surface and a peripherally extending convex marginal surface tangentially intersecting the flat exposed surface; a reinforcing, supporting and securing rib underlying substantially the line of intersection of said surfaces and extending in longitudinal parallelism to all peripheral edges of said wall tile and protruding from the under face of said tile opposite said exposed face sufficiently to assure a slight spacing of the tile from a supporting surface to which the tile is to be attached and for the embedding of the rib in securing mastic for firmly securing the tile in the mastic along lines located inwardly of but adjacent all peripheral edges of said tile; laterally protruding, slotted interlock flanges extend beyond certain of said peripheral edges of said tile and having their upper surfaces substantially in the plane of the under face of the edges of said peripherally extending convex marginal surface; and rearwardly protruding tabs formed on the under face of the remaining peripheral edges of said tile inwardly from said remaining peripheral edges but outwardly from said ribs adjacent said remaining peripheral edges.

10. A wall tile adapted to be mounted against a wall supporting surface comprising a four sided body providing an exposed ornamental face and a rear face; a longitudinally extending supporting rib disposed inwardly of and parallel to each side edge on said rear face and of a height sufficient to space all portions of said rear face from the supporting surface for said tile and having adjacent ribs intersecting inwardly from the corners to form a marginal cement confining recess; and an inter-

7

locking structure comprising slotted flanges disposed along two side edges only and provided along their respective outer edges with a pair of longitudinally spaced T-shaped formations the cross-bar of each of which parallels the flange edge and defines a pair of oppositely facing open ended slots located equidistant on opposite sides of a median line extending longitudinally of the stem of said T-shaped formation and disposed inwardly from the opposite ends of its respective side edge a distance equal to one fourth the total length of said side edges; and rearwardly protruding tabs disposed in respective opposed alignment to said slots along the sides opposite said respective flanged sides and comprising longitudinally spaced pairs of longitudinally elongated protuberances located to freely receive the stem of said respective T-shaped formations therebetween and of a width to be freely received in said open ended slots.

11. The tile of claim 9 wherein the slots in said flange and said tabs are two in number spaced inwardly from the ends of the remaining peripheral edges in longitudinal spaced alignment located at a distance equal to

8

one fourth the length thereof whereby said tile may be applied to provide a wall having either a continuous division line between adjacent tile rows or alternately staggered division lines between adjacent tile rows.

12. The tile of claim 11 wherein the flange portion defining the outermost wall of each of said slots is longitudinally discontinuous thereby forming a right angularly disposed vent passage through which mastic filling said slots may be displaced upon insertion of mating tabs into said slots.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
466,742	Lanyon	Jan. 5, 1892
587,263	Lanyon	July 27, 1897
606,532	Furness	June 28, 1898
2,148,858	Freeman et al.	Feb. 28, 1939
2,156,277	Corbin, Jr.	May 2, 1939
2,490,577	Brown	Dec. 6, 1949