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WALL PANEL

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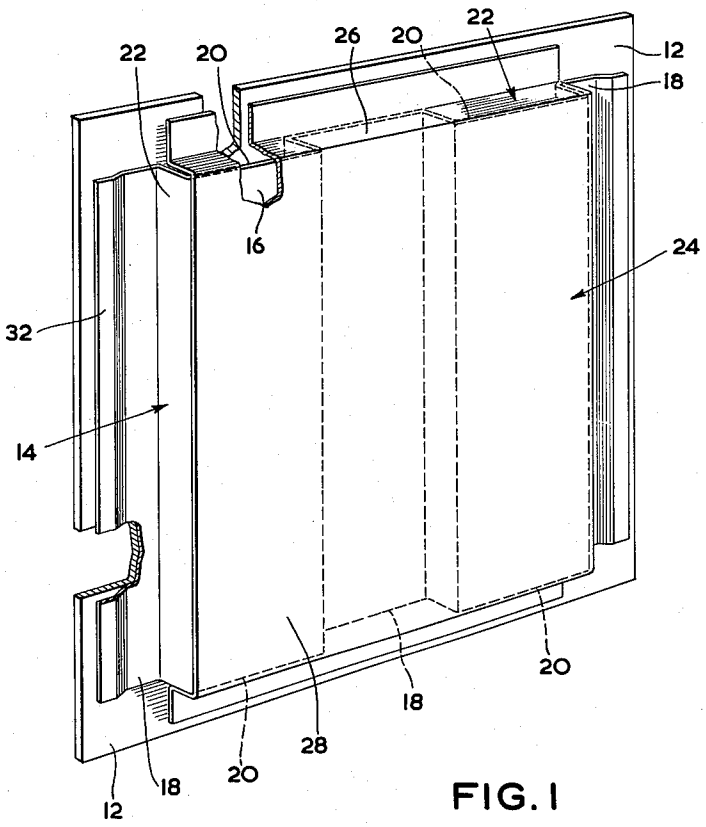


FIG. 1

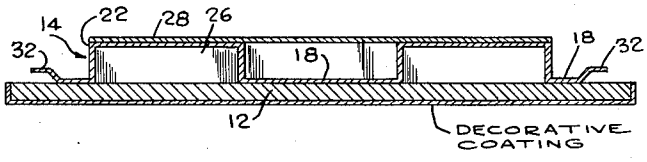


FIG. 2

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WALL PANEL

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This invention relates to a reinforced wall panel or tile of the type commonly used on outer wall surfaces of buildings. Panels or tiles of this type are made from a variety of weatherproof and durable materials such as enameled steel, stainless steel and aluminum.

Such panels or tiles are often in the course of their production, warped or bent, and as they are used in planar form they must be forcibly straightened prior to use and must be provided with means for preventing any re-assumption of their warped shape under cold bending stresses existing in the straightened tile. In addition to this it is advisable that the tiles be structurally reinforced so that they will not bend under structural stresses during application to a building or while in position on the building.

These panels or tiles have, in the past, been reinforced in the space between the face panel and the reinforcing backing member by solid materials such as plywood or a cellular glass composition and by cellular materials such as honeycombing.

A great source of difficulty with the panels of the prior art in use has been experienced because of the difference in co-efficient of expansion between the panel facing material and the reinforcing material. As the result of different expansions or contractions between these two the adhesive securement between them is broken. Further in the case of honeycombing, water absorption between the panels causes difficulty. In the case of woods, fungus growths often set in. Fire is particularly damaging in the case of honeycombing in the event that air should get between the face panel and the back panel so that combustion takes place.

Applicant has provided a combination of corrugated and flanged sheet metal members which are adhesively attached to each other and/or to the tile backing while it is forcibly straightened, the corrugation and flanges being arranged in such a manner as to oppose the tendency of the tile to reassume a warped and bent shape. there is provided a corrugated member formed of sheet metal, the corrugations defining crest surfaces which are co-planar with each other and trough surfaces which are co-planar with each other, the plane of the trough surfaces being parallel to the plane of the crest surfaces and the trough surfaces being adhesively attached to the back face of the tile face panel while it is forcibly held in a straightened position. The corrugated member thus opposes the normal bending tendencies of the tile. There is also provided a backing member of sheet metal including a surface which is adhesively secured to such crest surfaces while the tile and the corrugated member are forcibly straightened against normal bending parallel to the corrugations in the corrugation members.

It is therefore an object of this invention to provide a tile and a sheet metal reinforcing therefore wherein the metal opposes the normal bending and warping of the tile and also reinforces the tile structurally during application and use.

It is a further object of this invention to provide a tile wherein a first corrugated member is adhesively attached to a cold stressed tile to oppose its normal bending tendency and wherein a backing member is adhesively attached to the corrugated member to oppose the normal bending tendencies of the corrugated member and the tile.

It is a further object to provide a tile in which the adhesively secured surfaces have similar coefficients of expansion.

A preferred embodiment of the invention is illustrated in the attached drawings wherein:

FIG. 1 is a perspective view of a reinforced tile which can have a stainless steel or enamel on steel front face or an aluminum front face. The view is taken looking from the rear of said tile.

FIG. 2 is a longtudinal cross-section of the tile shown in FIG. 1, showing the decorative coating on its face.

The tile has a face panel **12** the back of which only is shown in the drawings.

In many methods of forming this face panel there is a tendency for it to be warped or bent. In particular in the production of steel tiles with an enamel face it is necessary that the enamel be backed or fused on the steel at a very high temperature. Such temperatures result in warping or bending of the steel which must be returned to planar form before it is of commercial, structural or ornamental value.

Such a face panel is forcibly returned to planar form by one of a number of known methods, such as by the use of plywood presses and while forcibly held against its normal tendency to warp or bend, the reinforcing member is adhesively secured by a suitable adhesive, such as one of the contact resin type to the back thereof to maintain the planar tile shape.

In accordance with the invention one of the members forming the reinforcement comprises a corrugated member **14** formed of sheet metal, the corrugations defining crest surfaces **16** which in the embodiment shown are co-planar with one another, and trough surfaces **18** which are also co-planar with one another and where in the trough surfaces **18** are parallel to the crest surfaces **16**.

The dimensions of the corrugated member **14** are preferably slightly smaller than the outer dimensions of the tile and the corrugated member is preferably provided with edges **20** perpendicular to the direction of the crests and troughs.

The surfaces of troughs **18** are, as already stated, adhesively attached to the tile back **12** while it is forcibly held in planar form and after the adhesive is set, the corrugated member **14** prevents warping or bending of the tile in any direction other than a direction parallel to the corrugation direction. It will also be noted that bending or warping is substantially reduced in this direction also. The ribs **22** of member **14** in addition to opposing the normal bending stresses, supply structural strength to the tile against structural bending loads encountered during application of the tile to a wall or while the tile is in use on such wall.

To strengthen the tile and the corrugated member **14** against bending parallel to the ribs **22** a backing member **24** is provided and adhesively secured to the crest surfaces **16** of the corrugated member. The backing member **24** has flanges **26** which have a toe flange that overlays the back face of the tile for the purpose of attaching an edge securing means. The flange also stiffens the back against bending.

The backing member has a surface **28** for adhesive attachment to the crest surfaces **16**.

The flanges **26** of backing member **24** extending from opposite sides of the surfaces **28** and spaced and oriented so that when surface **28** is adhesively attached to crest surfaces **16** the flanges **26** extend over the edges **20** of the corrugated member toward the back of face panel **12**.

In the construction of the reinforced tile, the tile with the corrugated member **14** adhesively attached thereto is again straightened by one of a number of known methods, such as by presses or rolls, and the backing member **24** is adhesively applied to the crest surfaces **16**. When

the adhesive is set, the structural panel or tile is ready for use, the backing member **24** when so adhesively secured opposing any tendency of the tile and the corrugated member to bend under cold stresses parallel to the corrugations.

The tile may be supported in position or attached to adjacent tiles by any of a number of well known means. In the drawings it will be seen that the corrugated member **14** is provided with contiguously extending surfaces **32** located just outside each of the outer trough surfaces **18** which are spaced from the back of face panel **12** for purposes of mounting an attachment means. Along the other edges flanges overlying the back of the face panel are provided on the end of flanges **26**. These flanges **26** are also in spaced parallel relation to the back of face panel **12** and are for the purpose of securing adjacent panels together.

I claim:

1. A reinforced wall tile comprising a rigid, metal face panel having a decorative front face, a back face; a metal reinforcing member having corrugations, said corrugations defining planar crest surfaces, said corrugations also defining planar trough surfaces; an adhesive between said trough surfaces and the back face of said face panel securing said trough surfaces to the back face of said face panel; a metal reinforcing backing member overlying said crest surfaces; and an adhesive securing said backing member to said crest surfaces, the metals of said face panel, said reinforcing member and said backing member all having substantially the same coefficient of expansion.

2. A wall tile as claimed in claim 1 wherein said reinforcing member comprises three planar trough surfaces adhesively secured to said back face, said trough surfaces alternating with two planar crest surfaces adhesively secured to said backing member.

3. A wall tile as claimed in claim 1 wherein said reinforcing member has a pair of boundary edges abutting the back face of said panel and wherein said backing member comprises a central panel adhesively secured to said crest surfaces, said backing member being of a dimension to extend beyond the ends of said boundary edges and said reinforcing member and extend therefrom towards said back face.

4. A structural panel as claimed in claim 1 wherein the metal of said face panel, said reinforcing member and said backing member is steel.

5. A reinforced wall tile as claimed in claim 1 wherein said crest surfaces are co-planar and said trough surfaces are co-planar.

6. In a wall comprising a plurality of metal tiles having an enameled coating on their front faces arranged in edge abutment, the front faces of said tiles being substantially co-planar to define a substantially planar wall surface, that improvement in reinforcing each tile comprising a metal reinforcing member having corrugations defining planar crest surfaces and planar trough surfaces, an adhesive between said trough surfaces and the back face of said tile to secure said reinforcing member to the back face of said tile, a metal reinforcing backing member overlying said crest surfaces, and an adhesive securing said backing member to said crest surfaces, the metals of said face panel, said reinforcing member and said backing member all having substantially the same coefficient of expansion, whereby said tiles present and retain an unwarped planar front face.

7. A wall as claimed in claim 6 wherein said reinforcing member comprises three trough surfaces adhesively secured to the back face of said tile, said trough surfaces alternating with two planar crest surfaces adhesively secured to said backing member.

8. A wall as claimed in claim 6 wherein said reinforcing member has a pair of boundary edges abutting the back face of said tile and wherein said backing member comprises a central panel adhesively secured to said crest surfaces, said backing member being of a dimension to extend beyond the ends of said boundary edges and said reinforcing member and extend therefrom towards the back face of said tile.

9. A wall as claimed in claim 6 wherein the metal of the tile, the backing member and the reinforcing member is steel.

10. A reinforced wall tile comprising a rigid, metal face panel having a decorative front face, a back face; a metal reinforcing member having corrugations, said corrugations defining planar crest surfaces, said corrugations also defining planar trough surfaces; an adhesive between said trough surfaces and the back face of said face panel securing said trough surfaces to the back face of said face panel; a metal reinforcing backing member overlying and secured to said crest surfaces; the metals of said face panel, said reinforcing member and said backing member all having substantially the same coefficient of expansion.

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