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RESILIENT FLOOR AND WALL TILE AND METHOD OF
PREVENTING OBJECTIONABLE CURLING THEREOF
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Fig. 1

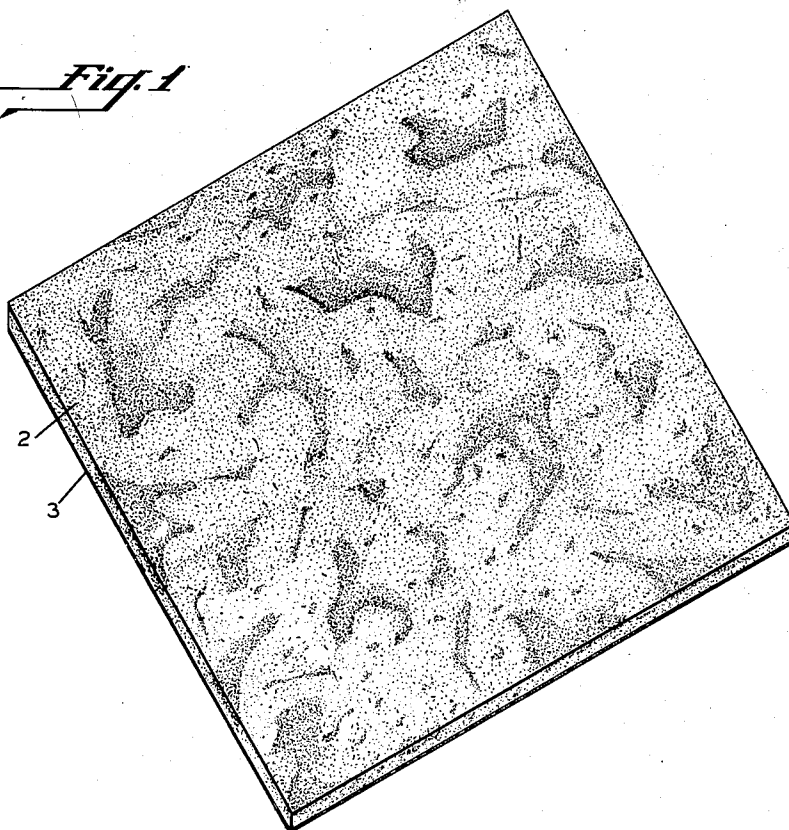
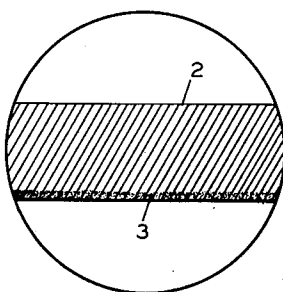


Fig. 2



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RESILIENT FLOOR AND WALL TILE AND METHOD OF PREVENTING OBJECTIONABLE CURLING THEREOF

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6 Claims. (Cl. 117—138.8)

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This invention relates to a resilient floor and wall tile and to a method of preventing objectionable curling thereof. The invention is concerned more particularly with a resilient floor or wall tile which may be installed in areas where moisture may be present and which might cause objectionable curling of ordinary resilient tiles and to a method of preventing such objectionable curling.

Resilient tiles are used extensively in residential and business buildings where the tiles are installed on concrete supporting foundations on or below grade. Basement areas of homes and stores are frequently covered with tiles which are known in the trade as "asphalt" tiles. Such tiles when installed in such areas are subject to moisture which penetrates the concrete supporting foundation and eventually comes into contact with the under or back surface of the tiles which are adhesively joined to the supporting foundation. The trend in architectural design of houses is to provide a concrete slab on grade which may be provided with heating pipes for the radiant heating of the house. Resilient tiles are commonly used in covering such concrete slabs, and the problem of curling is prevalent in such structures.

The curling problem is also present where the tiles are installed above grade with an adhesive containing water. In such installations the moisture present in the adhesive is capable of penetrating the back surface of the tiles and objectionable curling often results.

It is an object of the present invention to provide a method of preventing objectionable curling of resilient floor and wall tiles, particularly when installed on or below grade or when secured in position by means of an adhesive containing water.

Another object of the invention is to provide a resilient floor and wall tile which may be installed in any location where the tile is suitable for use, including surfaces below grade or on grade and regardless of the type of adhesive employed for bonding the tiles in place.

According to the present invention, the tiles are formed by mixing filler particles and a binder, such as a plasticized coumarone-indene resin type binder, sheeting the mass, and dieing tiles therefrom which are substantially flat and free from any objectionable curling. The back surface of the tiles is provided with a coating of waterproofing material such as asphalt or coumarone-indene resin in solution, said coating rendering the surface to which it is applied impervious to water.

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In accordance with the method of the present invention, the tiles so coated on the back surface are then adhesively joined to a supporting foundation with the adhesive engaging the surface of the tiles which has been treated with the coating of waterproofing composition. Preferably, of course, the tiles are coated with the composition prior to the time of installation at the place of manufacture of the tiles, but the coating composition may be applied at the place of installation.

In order that the invention may be readily understood, certain specific examples will be described in conjunction with the attached drawing, in which:

Figure 1 is a perspective view of a resilient tile embodying the present invention, and

Figure 2 is a magnified sectional view of the tile of Figure 1.

Referring to Figure 1, the resilient tile comprises a body 2 and a coating 3, the coating 3 preferably penetrating the body of the tile to a minor degree at least so as to render the surface to which the coating is applied impervious to moisture.

Example I

Tile composition:	Pounds
Coumarone-indene resin —C5_____	105
Plasticizers _____	51
Fillers and pigments_____	444

The tile body may be formed by mixing together for thirty minutes in a mixer having a heated mixing chamber, the temperature of which is about 275° F., a batch of the foregoing formulation. After complete distribution of the binder over the filler particles, the batch may be formed into a sheet $\frac{1}{8}$ " thick which is severed into tiles 9" x 9", for example. The tiles will be substantially smooth-surfaced and free from objectionable curling.

The tiles so prepared may then be coated on their back surface with a coating composition 3 prepared in accordance with the following formula:

Example II

Coating composition:	Pounds
Coumarone-indene resin —C5_____	70
Petroleum oil _____	30
Solvent (carbon spirits) _____	87

This coating composition contains approximately 60% solids. The preferred practice is to coat the entire undersurface of the tiles with the coating composition which may be applied by brush, spray, or roll coater. The carbon spirits is a partial solvent at least for the binder of the tiles, and

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this insures satisfactory penetration of the coating composition into the body of the tiles. The quantity of coating composition applied is relatively small. One gram, dry weight, of coating composition of the formula of Example II has been found satisfactory for a 9" x 9" tile of the formula of Example I.

In order to determine the curl-resistance of the finished product, a standard test has been established which is briefly as follows:

The test tile is heated to about 125° F. This tile is placed between two glass plates and a weight of about 20 pounds is applied, preferably in engagement with the glass plate on the upper surface of the tile. The weighted tile is then conditioned at a temperature of about 70° F. for a period of twenty-four hours in a room maintained at such temperature. A metal pan is provided containing 5 gallons of water to which has been added a buffer solution to adjust the pH of the water to about 9.6. This is the approximate pH of moisture penetrating a concrete supporting foundation. A 10" x 10" x 1/4" plate glass support is provided disposed within the pan but above the level of the water therein. A cotton cloth is disposed on the glass plate and draped so that its edges lie within the body of the water in the pan, and it serves as a wick to convey water from the pan to the portion of the cloth disposed on the glass plate. A tile conditioned as mentioned above is placed upon the wet fabric on the glass plate, and a period of one-half hour is permitted for the tile to reach an equilibrium condition. Initial curling is then measured.

The amount of curl is measured by a gauge which has a central indicator foot and two flat surfaces or feet for engagement with the tile adjacent to two of the diagonal corners thereof. The indicator is zeroed when the two flat surfaces for engagement with the corners of the tile and the central foot of the gauge are parallel. The gauging is accomplished in both directions, that is, diagonally across each pair of corners.

After the initial test, a final test is made after the test tile has been in engagement with the wet cloth for seventy-two hours. In order to secure a reasonable average, three tiles are normally tested across the opposite diagonal corners, thus providing six readings. The average of these six readings is considered the average curl for the particular tile formulation with its particular coating formulation.

Tests have been made on tiles made in accordance with Example I given above, coated with the coating composition of Example II. As a control, tiles made in accordance with Example I, but uncoated, have been tested under identical conditions. The control specimens had an average curl of .0268". The tiles made in accordance with the present invention, Example I, and including the water-impervious coating of Example II on the back surface had an average curl of 0.0008".

Any curling in excess of .015" is considered objectionable. Minor curling below such limit can be tolerated, and it is preferred, of course, to have substantially no curling. By the term "objectionable curl" as used in the specification and claims, it is intended to include curling of .015" or more when determined in the manner described above.

The particular coating composition applied to the tiles may vary. The essential characteristic is that the coating renders the surface to which it is applied impervious to moisture.

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Example III

The following example illustrates a coating applied to a tile having the formulation of Example I above, produced in the same manner as Example I except that the mix was permitted to remain in the mixer at 275° F. for about 120 minutes and was then sheeted and died into tiles. Petroleum oil was then rubbed onto the back surface of the tiles by use of a cloth saturated with the petroleum oil. About 1.13 grams of oil were picked up by each 9 x 9" tile so treated.

The standard curl test described above was applied to a number of tiles so treated and to another group of untreated tiles made exactly in the same manner with the same composition but not treated with the petroleum oil. The control specimens had an average curl of .0306", a very objectionable curl. The treated specimens had an average curl of .0029", an insignificant curl.

The following example gives the formulation for a further tile composition:

Example IV

Tile composition:	Pounds
Coumarone-indene resin —C5-----	47
Plasticizer -----	31
Mix in (scrap from a prior run of the same composition)-----	300
Filler and pigment-----	222

The batch was mixed for thirty minutes in an internal mixer heated to a temperature of about 275° F. Upon complete mixing the batch was discharged, formed into a 1/8" sheet, and died into 9" x 9" tiles. The backs of some of the tiles so formed were coated with a composition of the following formulation:

Example V

Coating composition:	Pounds
Asphalt—35 penetration-----	1938
Asphalt (safety) solvent-----	1111

The asphalt in solvent was applied to the tiles on the back surfaces thereof by brush application and about one gram, dry weight, of the composition was applied to each 9" x 9" tile over the entire surface. After the solvent had evaporated, the tiles so treated were tested for curl and untreated specimens of the same composition were tested as controls. The control specimens had an average curl of .0373"; the treated specimens showed a zero curl.

Example VI

Tiles made in accordance with Example I were coated with the asphalt coating composition of Example V, and curl tests were made thereon as well as on control specimens. The control specimens had an average curl of .0268", the same as Example I, and the asphalt-coated specimens had a curl of .0007".

While the invention is particularly applicable to tiles made with a binder of plasticized coumarone-indene resin, the invention is not limited thereto, for the problem is present with tiles having various binders where the tile is subject to objectionable curl upon moisture pickup. Tiles made with some binders are less subject to such curl than others. For example, a binder including a substantial portion of asphalt will not be subject to as great a curling tendency as the examples given above. The coating materials are not limited to those which have been given for illustration purposes. Any coating composition which renders the surface to which it is applied

impervious to moisture will be acceptable. It is preferred to use a coating composition which will present a surface to which the adhesive used in installing the tile will bond, and it is preferred to have the coating composition in a solvent which will tend to penetrate the surface of the tile to a minor extent, at least sufficient to secure the requisite water imperviousness. Paraffin, for example, may be used with very good results insofar as curl resistance is concerned, but the adhesives which may be used for securing tiles so coated into position on a support or base are rather limited. The particular adhesive used for securing the tiles is not critical. Asphalt cut with a solvent is generally preferred where the tiles are installed on or below grade. Sulphite liquor adhesives may be used in installations above grade with the treated tiles described above, even though such adhesives contain water and might with ordinary tiles cause objectionable curling.

The particular foundation to which tiles are applied will vary. While coumarone-indene resin bound tiles are most commonly used in on-grade and below-grade installations, they are also used in other areas; and where moisture pickup is a factor, the tiles of the present invention are resistant to curling regardless of the foundation to which the tiles are applied.

We claim:

1. A method of preventing objectionable curling of moisture-absorbent, resilient floor and wall tiles composed of a composition comprising filler particles and a binder of plasticized coumarone-indene resin, which tiles tend to curl when subjected to contact with moisture on the back surface thereof and curl objectionably when they are installed and come into contact with moisture on the back surface, comprising providing flat tiles of said composition free of objectionable curling, coating the back surface of the tiles with a solution of coumarone-indene resin in a solvent which has a solvent action on the coumarone-indene resin binder for the tiles, and drying the coating to provide a water-impervious coumarone-indene resin film on the back surface of the tiles and penetrating below the surface thereof, whereby objectionable curling of the tiles will be prevented upon contact with moisture on the back surface.

2. A method of preventing objectionable curling of moisture-absorbent, resilient floor and wall tiles composed of a composition comprising filler particles and a binder of plasticized coumarone-indene resin, which tiles tend to curl when subjected to contact with moisture on the back surface thereof and curl objectionably when they are installed and come into contact with moisture on the back surface, comprising providing flat tiles of said composition free of objectionable curling, coating the back surface of the tiles with a solution of asphalt in a solvent which has a solvent action on the coumarone-indene resin binder for the tiles, and drying the coating to provide a water-impervious film of asphalt on

the back surface of the tiles and penetrating below the surface thereof, whereby objectionable curling of the tiles will be prevented upon contact with moisture on the back surface.

3. A method of preventing objectionable curling of moisture-absorbent, resilient floor and wall tiles composed of a composition comprising filler particles and a binder of plasticized coumarone-indene resin, which tiles tend to curl when subjected to contact with moisture on the back surface thereof and curl objectionably when they are installed and come into contact with moisture on the back surface, comprising providing flat tiles of said composition free of objectionable curling, coating the back surface of the tiles with a coating composition comprising a solution of a bituminous substance selected from the group consisting of asphalt and coumarone-indene resin in a solvent which has a solvent action on the coumarone-indene resin binder for the tiles, and drying the coating to provide a water-impervious film of bituminous substance on the back surface of the tiles and penetrating below the surface thereof, whereby objectionable curling of the tiles will be prevented upon contact with moisture on the back surface.

4. A resilient floor or wall tile comprising a moisture-absorbent body of filler particles and a binder of plasticized coumarone-indene resin, which tile normally tends to curl when subjected to contact with moisture on the back surface thereof and curls objectionably when it is installed and comes into contact with moisture on the back surface, and a coating composition comprising the dried residue of a solution of a bituminous substance selected from the group consisting of asphalt and coumarone-indene resin in a solvent which has a solvent action on the coumarone-indene resin binder for the tile disposed as a water-impervious film of bituminous substance on the back surface of the tile and penetrating below the surface thereof and rendering said tile water impervious and providing a tile which may be installed upon a supporting foundation in contact with moisture without objectionable curling resulting.

5. A resilient floor or wall tile as set forth in claim 4 in which the bituminous substance is asphalt.

6. A resilient floor or wall tile in accordance with claim 4 in which the bituminous substance is coumarone-indene resin.

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