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TILE PANEL

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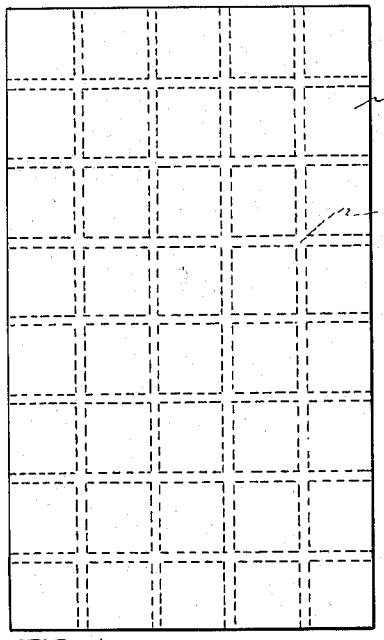

FIG. 1

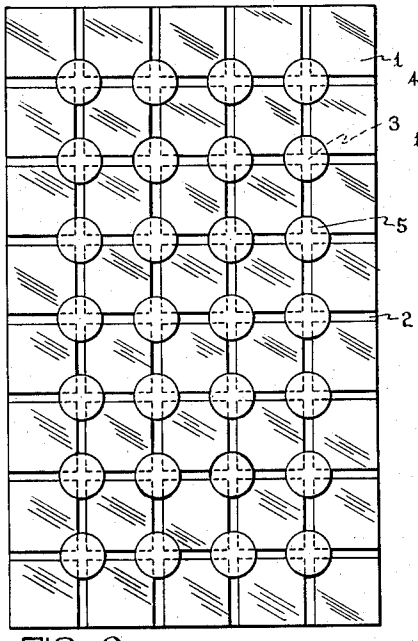

FIG. 2

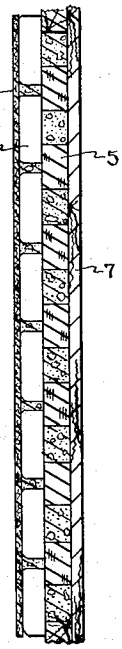

FIG. 3

FIG. 5

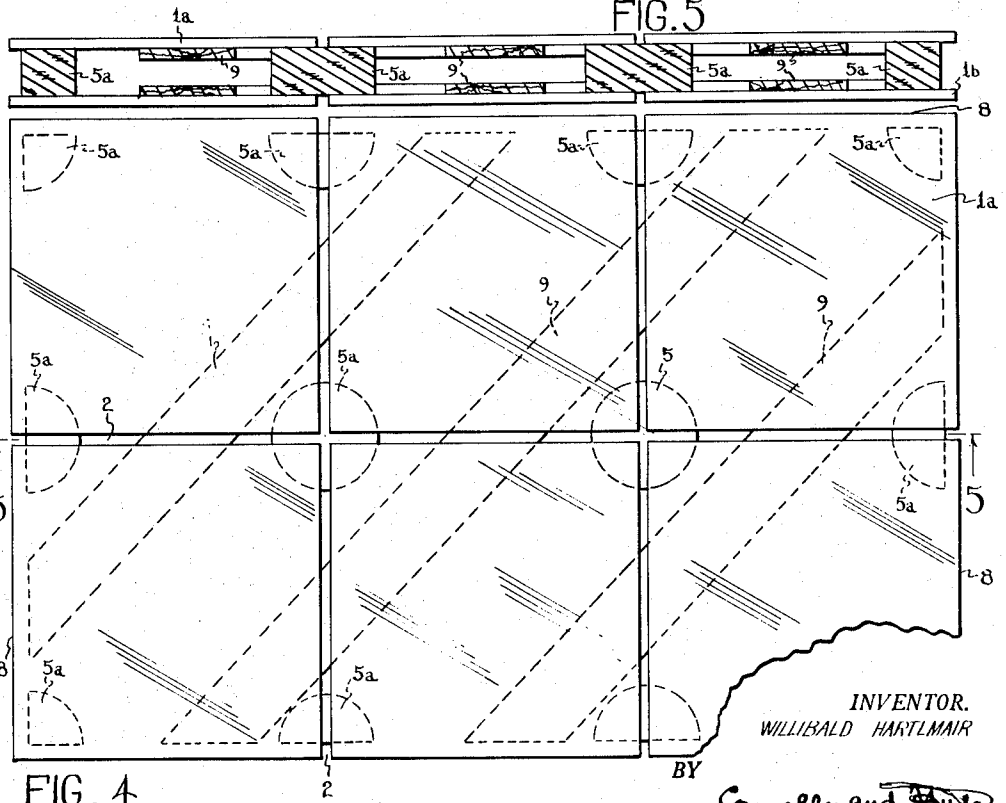

FIG. 4

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TILE PANEL

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4 Claims. (Cl. 72—23)

The present invention relates to building panels comprising a plurality of symmetrically arranged tiles. It includes a method and an apparatus for producing such tile panels.

It is already known to arrange rows of tiles in a plane to form building elements. The purpose of such a combination is to simplify and cheapen the installation of the tiles at the building site.

According to the present invention, building panels are prepared that comprise a plurality of tiles symmetrically arranged and properly spaced in a plane, that are conjoined by adhesion on one side to a sheet of flexible material. In the case of the usual glazed tiles, the flexible sheet is attached to the glazed side. The flexible sheet may be composed of any material that is strong enough to hold the tiles in place, and it is furnished with an adhesive coating on one side, in order to attach it firmly to the tiles. Particularly useful for this purpose are gummed paper, adhesive coated textiles and the like. In order to increase the strength of such tile panels, it is usually desirable to bridge the joints between adjacent tiles, on the side opposite the adhering sheet, with a relatively non-flexible, reinforcing material. For this purpose, disc-like bodies of cork or wood or similar material may be glued or otherwise firmly attached to the back of the paneling over the joints between the tiles. For maximum strength such discs should be applied at the points where several joints meet or intersect (i. e. cornerwise). The reinforcing discs serve the further purpose of spacing the tile panel from the wall to which it is applied.

The reinforced tile panels described above may be further modified to render them particularly suited for certain purposes. For instance, there may be affixed behind the aforementioned reinforcing discs a sheet of suitable material, such as fibre board, that will form a shell into which a filling and cementing material may be poured or squirted. When casting mortar, cement or the like in the interior of this composite paneling, such filling and cementing material will flow from the back of the tiles into the joints between them, and the gummed paper or other flexible material adhering to the front of the tiles will prevent its leaking out and marring the front of the tiles. After the building panel has been affixed in the desired position on a wall or floor at the building site, the adhering flexible material can readily be removed from the front of the tiles. Until then, it affords valuable protection to the exterior surface of the tile panel while it is being handled and installed.

Another desirable modification of my tile panel resides in the preparation of tile partition elements. In this case, the back of one of my tile panels is joined, for example, by means of the above described reinforcing and spacing discs, to the back of another of my tile panels. This results in two spaced layers of tiles, each with its glazed side turned outwardly. The interior may be filled and cemented in the same manner as the composite paneling previously described.

The building panels of my invention are particularly well suited for covering the walls, ceilings or floors of bathrooms, kitchens, chemical laboratories and the like. The partition elements are especially valuable for building partitions between two rooms, both of which are to be tiled. It is obvious that these panels can be much more quickly and inexpensively installed than the usual hand-laid tiles.

The process and apparatus for producing my new panels may be continuously and automatically operated in a manner which has not heretofore been possible. According to my process the tiles are symmetrically arranged and properly spaced, each with its glazed side upward, on a moving horizontal surface. The upper surfaces of the tiles are then continuously conjoined by means of an adhesive sheet of flexible material while on such moving horizontal surface. The continuous strip of paneling so produced is finally cut into convenient lengths, after which it may be used directly or reinforcing members may be added.

According to a specific and preferred embodiment of my process and apparatus, the tiles are symmetrically arranged and properly spaced on a moving conveyer belt, after which their upper surfaces are brought into contact with a strip of gummed paper or adhesive textile sheet. In order to effect rapid and thorough adhesion of the adhesive strip to the tiles, the adhesive surface of the strip is usually first moistened, and the tiles are first warmed by a heating element. When the moistened sheet and the warmed tiles are brought into contact, the tiles are immediately and firmly conjoined. The resulting, continuous strip of paneling is then drawn off the conveyer belt over a large drum or similar device, which serves to reverse the direction of travel of said tile strip and to guide it to an inclined roller path below the conveyer belt. By thus reversing the direction of the tile strip a great deal of space is saved. Furthermore, the weight of the tile strip after passing over the reversing drum is only partly supported by the inclined roller path and serves to exert a strong pull on the tile strip as it rests on the conveyer belt. This pull may be sufficient to actuate the entire apparatus so that no further driving means are required. The roller path leads to a collecting zone, such as a depositing table or carriage, where the tile strip is cut into convenient lengths. At this point the reinforcing and spacing discs may be affixed over the exposed joints as herein before described.

It will be readily apparent that my process and apparatus are fully suited for automatic operation and hence for a tremendous increase in output as compared with conventional methods. In addition, the little labor that is required to serve the apparatus, i. e. feed the materials and remove the product, need not be skilled. Furthermore, the product is of uniformly good quality, which is not dependent, as in the case of hand-laid tiles, upon the skill of the individual worker.

Having generally described my invention it will now be more fully explained and illustrated by reference to the accompanying drawings, in which

Fig. 1 shows a front view of a simple tile panel according to my invention.

Fig. 2 is a back view of such tile panel to which reinforcing and spacing discs have been attached.

Fig. 3 is a cross section of a composite tile panel, including a backing sheet, that has been filled with a cementing material.

Fig. 4 is a front view of a partition element according to my invention prior to filling, the flexible adhesive strip having been removed in order better to show the underlying details.

Fig. 5 is a cross section of the partition element shown in Fig. 4.

Figs. 1 to 5 illustrate various modifications of my tile panels. Figs. 1 through 3 also show several steps in constructing the composite type of panel, while Figs. 4 and 5 serve to explain the partition type.

The panels of Figs. 1 through 3 are composed of five rows of tiles **1**, eight tiles in each row, the tiles having properly spaced joints **2**. The points at which these joints intersect are represented by **3**. The tiles **1** are conjoined in the proper arrangement and spacing by means of a flexible sheeting **4**, preferably gummed paper. The reinforcing discs **5** are applied to the back of the tiles over the joint intersection points **3**. These discs are preferably made of a relatively non-flexible material, such as cork, wood or the like. The reinforced panel of Fig. 2 may be applied directly to the building wall or floor, in which case the reinforcing discs **5** serve to maintain a proper spacing between the tiles **1** and the surface to which the panel is applied. All of the spaces between such a reinforced panel and the building surface should be filled with the required amount of cement, mortar or the like which will penetrate into the joints **2**, but not beyond the adhering flexible sheet **4**. Thus a firm seating of the panel and uniform filling of the joints is assured. This is illustrated by the composite panel of Fig. 3 that includes a backing sheet **7** which serves to form a shell for the filling and cementing material. When affixing the composite panel to the building surface nails or screws are used which preferably pass through joint intersection points **3** and the underlying reinforcing and spacing discs **5**. Their heads may later be covered with mortar or cement.

Figs. 4 and 5 show a partition type of panel composed of two layers of tiles **1***a* and **1***b*, each layer consisting of two rows of three tiles each. These two layers are attached to each other, back to back with their glazed sides outwards, by means of the reinforcing and spacing discs **5**. The discs **5** near the center of the panel are arranged at the joint intersections **3**, each coming into contact with eight tiles. These discs are attached to the tiles by means of a suitable adhesive, for example, one containing a synthetic resin. At the edges **8** of the paneling, it is preferable to position the reinforcing and spacing discs somewhat differently, as indicated by **5***a*. These outer discs are best moved somewhat inwardly from the edges **8**, so that there may be room between them and the outer edges within which to fit a suitable framework or supporting elements of the partition wall. A further modification of my invention shown in these two figures is the use of continuous diagonal strips **9** of some suitable stiffening material. These strips are affixed to the back of the tile layers **1***a* and **1***b* across the joints **2** and serve as reinforcements. They preferably run in such a direction as to contact or almost contact tangentially the discs **5** and **5***a*.

Many further modifications and embodiments of my

invention will immediately become apparent to those skilled in the art. Obviously the number of tiles in each panel may be varied within wide limits. Not only square tiles but also other shapes capable of being symmetrically arranged, such as hexagonal and octagonal, may be employed. This will entail obvious rearrangement and modification of the feeding bins and the spacers, but such are well within the skill of the ordinary mechanic. All such modifications and embodiments are included within the spirit and scope of my invention, except as definitely excluded by the language of the appended claims.

I claim:

1. A composite building panel comprising a layer of symmetrically arranged spaced polygonal tiles, one sheet of flexible material adhering to one side of said layer, a plurality of separate reinforcing and spacing members smaller than the tiles affixed corner-wise only to adjacent tiles on the other side of said layer and bridging the spaces between adjacent tiles, and a backing sheet affixed to said reinforcing and spacing members, said panel being positioned to permit insertion of mortar between the back side of the tiles and the backing sheet.

2. A rigid panel element comprising two layers of spaced polygonal tiles symmetrically arranged back to back, flexible sheets adhering to the outer surface of said layers, and a plurality of separate reinforcing and spacing members smaller than the tiles between said layers, each of said members being secured to the tiles and partly bridging the spaces between adjacent tiles in each of said layers corner-wise only.

3. The rigid panel element of claim 2 wherein the reinforcing and spacing members are disc-like.

4. A rigid panel element comprising two layers of spaced polygonal tiles symmetrically arranged back to back, and a plurality of separate reinforcing and spacing members smaller than the tiles between said layers, each of said reinforcing and spacing members being secured to adjoining tiles in each of said layers and bridging the spaces between adjacent tiles of each layer corner-wise only.

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