# United States Patent [19]

**Hoffmann et al.**

[11] **3,731,445**

[45] **May 8, 1973**


## [54] JOINDER OF FLOOR TILES


[75] Inventors: **Rudolf Hoffmann**, Laudenbach/Bergstrasse; **Wolfgang Winkler**, Mannheim, both of Germany

[73] Assignee: **Carl Freudenberg**, Postfach, Germany



[22] Filed: **Aug. 3, 1970**

[21] Appl. No.: **60,232**

[30] **Foreign Application Priority Data**

May 2, 1970 Germany ..... P 20 21 503.6

[52] **U.S. Cl.** ..... **52/391**, 52/471, 52/492, 52/582

[51] **Int. Cl.** ..... **E04f 13/08**

[58] **Field of Search** ..... 52/391, 390, 385, 52/309, 461, 465, 469, 471, 492, 493, 509, 582, 386–389; 46/25, 31



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 3,066,773 | 12/1962 | Raidel | 52/470 |
| 2,877,877 | 3/1959 | Davis, Jr. | 52/509 X |
| 681,946 | 9/1901 | Bennett | 52/582 |
| 2,190,818 | 2/1940 | Wysong | 52/493 |
| 2,388,297 | 11/1945 | Slaughter | 52/309 X |

FOREIGN PATENTS OR APPLICATIONS

| | | | |
|---|---|---|---|
| 647,812 | 12/1950 | Great Britain | 52/392 |
| 584,750 | 11/1958 | Italy | 52/309 |
| 1,175,582 | 11/1958 | France | 52/591 |
| 422,082 | 6/1947 | Italy | 52/582 |



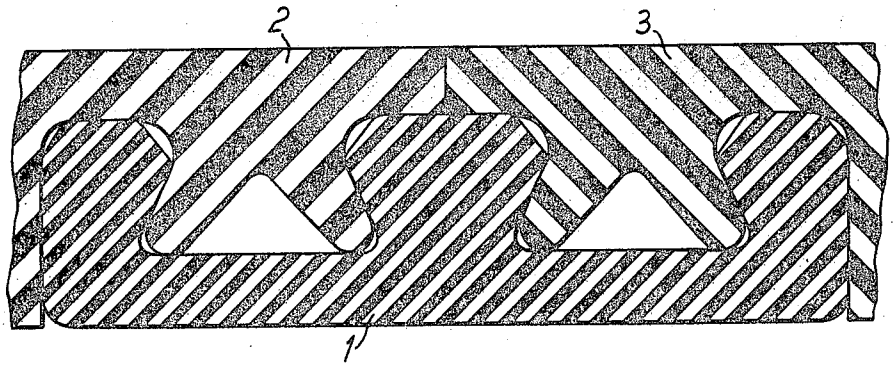
*Primary Examiner*—Alfred C. Perham
*Attorney*—Burgess, Dinklage & Sprung



[57] **ABSTRACT**

Floor tiles are joined by cutting away material along the edges so as to leave undercut projections extending downwardly from the bottom of the tiles. Joining of tiles is effected by using a strip provided with a pair of parallel channels into which extend the projections from two different tiles. The undercut configurations prevent the tiles from being removed by a simple vertical pull.


**2 Claims, 10 Drawing Figures**



Patented May 8, 1973 3,731,445



FIG. 1

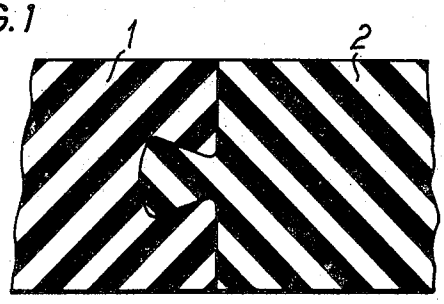



FIG. 2

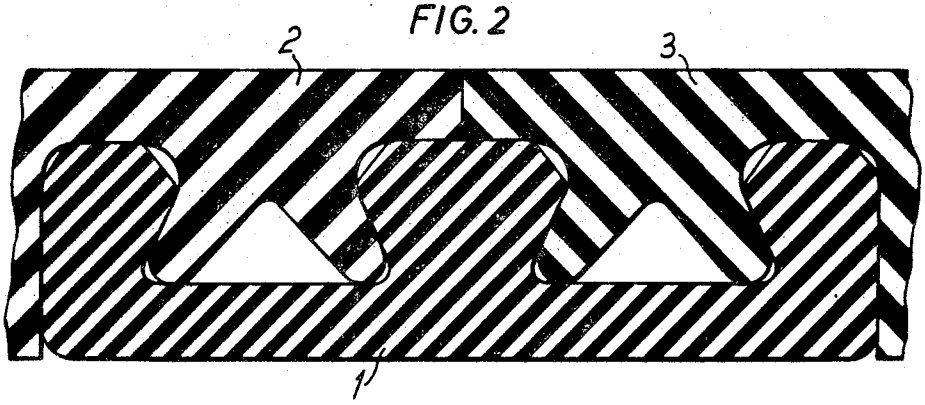
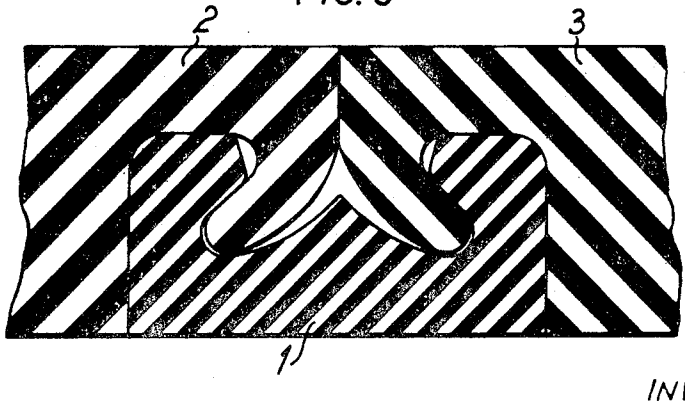



FIG. 3

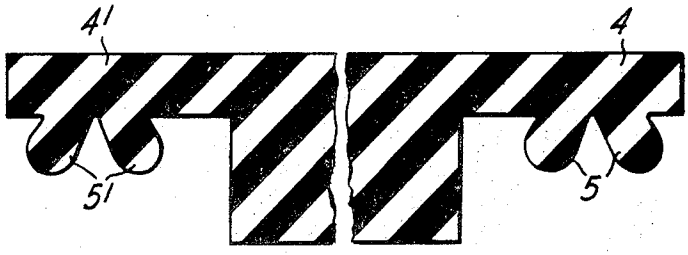



INVENTORS
RUDOLF HOFFMANN
WOLFGANG WINKLER

BY

BURGESS, DINKLAGE & SPRUNG
ATTORNEYS.

FIG. 4



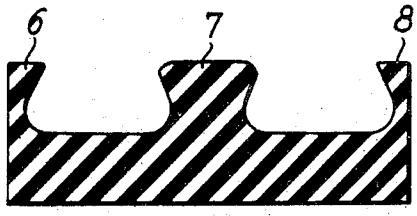
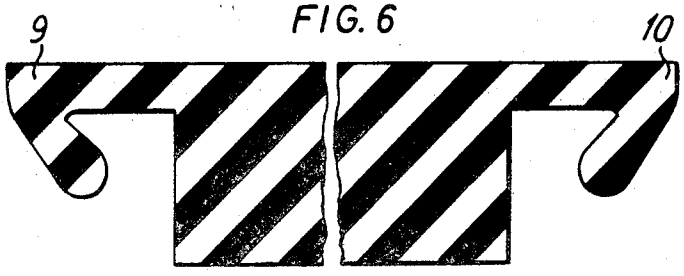




FIG. 5

FIG. 6



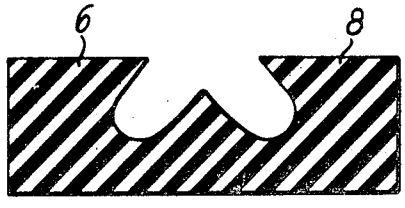




FIG. 7

INVENTORS
RUDOLF HOFFMANN
WOLFGANG WINKLER

BY

BURGESS, DINKLAGE & SPRUNG

ATTORNEYS.

FIG. 8

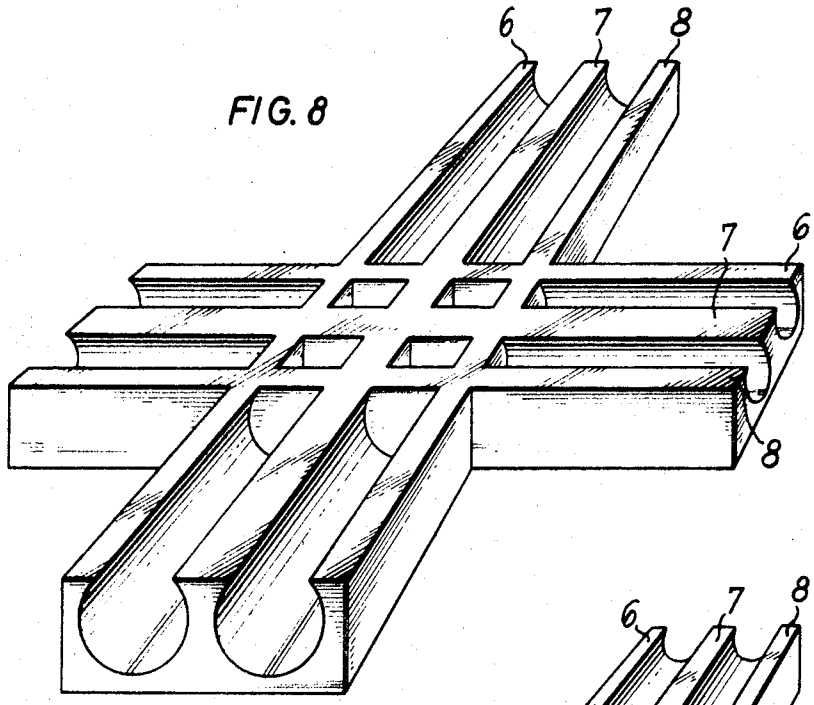
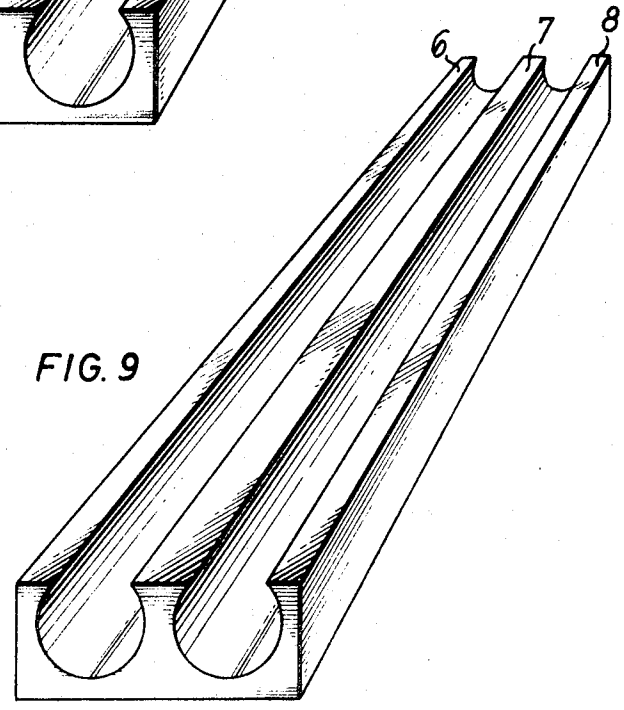
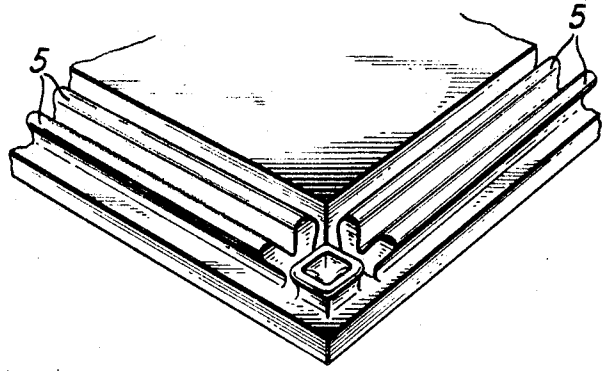



FIG. 9




INVENTORS
RUDOLF HOFFMANN
WOLFGANG WINKLER
BY
BURGESS, DINKLAGE & SPRUNG
ATTORNEYS

FIG. 10




INVENTORS
RUDOLF HOFFMANN
WOLFGANG WINKLER
BY

BURGESS, DINKLAGE & SPRUNG
ATTORNEYS.

# JOINDER OF FLOOR TILES

The invention relates to the joining of individual flooring tiles or slabs of rubber or the like.

Hitherto, in order to prevent individual floor tiles or slabs from shifting, they have been joined together by insertion into one another, for example as shown in FIG. 1, where one floor tile is provided with a recess and the adjacent floor tile is provided with a matching projection.

This method of joinder, however, has the disadvantage that the removal of individual tiles or slabs, when they are damaged for example, is made very difficult by the fact that the slabs or tiles are inserted into one another. Instead, the entire floor assembly has to be removed until the damaged tile is reached.

It is accordingly an object of the invention to provide an improved method of joinder or tiles, such as floor tiles, which permits easy removal of individual tiles, as desired, irrespective of their location in the assembled structure.

This and other objects and advantages are realized in accordance with the present invention which provides a tile, having undercuts along its edges so shaped as to leave downwardly facing projections, together with joining strips or tracks provided with parallel channels for receiving the projections of two adjacent tiles.

The invention will be further described with reference to the accompanying drawings, wherein:

FIG. 1 is a vertical section through two abutting tiles joined in accordance with prior art teaching;

FIG. 2 is a vertical section through one embodiment of the present invention;

FIG. 3 is a vertical section through another embodiment of the invention;

FIG. 4 is a vertical section through one of the tiles shown in FIG. 2;

FIG. 5 is a vertical section through the joining strip of FIG. 2;

FIG. 6 is a vertical section through one of the tiles shown in FIG. 3;

FIG. 7 is a vertical section through the joining strip of FIG. 3;

FIG. 8 is a perspective view of a different embodiment of a joining strip;

FIG. 9 is a perspective view of still another embodiment of a joining strip; and

FIG. 10 is a bottom perspective view of the corner of a tile suitable for joinder by strips such as shown in FIG. 8.

Referring now more particularly to the drawings, in FIG. 2 there is shown an assembly of two tiles or slabs 2 and 3 and a joining strip or track 1.

The joining strip 1, which may be made of rubber and which may be about 3 cm. wide, is first placed on the floor. As can be seen in FIG. 5, it comprises a base from which there extend projections or elevations 6, 7 and 8; elevations 6 and 7, and 7 and 8 define therebetween a pair of channels which in cross-section are undercut, i.e. they are wider near their bottom than near their tops and they extend laterally below a shoulder.

FIG. 4 shows one embodiment of the tiles according to the invention, profiled for use with the strip of FIG. 5. The usually rectangular or square tiles have on each side a projecting edge 4 and 4', from which a double tongue 5 and 5', respectively, projects. As viewed from the bottom surface of the tile there is a peripheral projection extending toward but terminating short of said surface. The projection defines a recessed channel with and about the bulk of the tile. In order to lay these tiles, the double tongue 5 of one tile is forced into the left track-like channel between the elevations 6, 7, and the double tongue 5' of another tile is forced into the right track-like channel between the elevations 7, 8.



In FIG. 6 another embodiment is shown. Here the tile again has a projecting edge at the margins, but only one bent tongue projects therefrom, which is identified in FIG. 6 with the reference numbers 9 and 10, respectively.

FIG. 7 shows a cross section of the strip required for the laying of the tiles of FIG. 6. It is of simpler construction than the strip according to FIG. 5 in that the center elevation does not extend upwardly as for as the lateral elevations.

The result of the joining together of the tiles of FIG. 6 by means of the strip in FIG. 7 is shown in cross section in FIG. 3. Even though only one projection is provided per tile edge, because it is canted away from the tile edge and tucks into the undercut of the channel of the locking strip, firm joinder is still achieved.

In order further to increase the resistance of the tiles laid by the above method against shifting it is desirable to use so-called crosses as shown in FIG. 8. These are a further development of the strips with the elevations 6, 7 and 8 of FIG. 5. While the strips of the above embodiment can be of any desired length, in the present case the length of the strip is limited to about one-fourth of the length of the edge of the tile. At the same time, a second strip or portion of the same length is connected medially of the first portion at an angle of 90°.

Four tiles can be joined together with a strip of this kind. To each corner of the structure produced in this manner and consisting of four tiles, these crossed strips are again attached and additional joining is performed. In this manner any desired area can be covered with tiles. The tiles laid by means of these crosses have a greater resistance to shifting on the floor.

The length of the four arms of the crosses can be made such that they extend to the middle of each tile edge. In this case the extremities of adjacent crosses meet in the middle of a tile edge. The edge of each tile is thus embedded all along its length in a strip having the elevations 6, 7 and 8.

It is also possible, however, to use crosses having shorter extremities. In this case more or less of each tile edge is free of supporting strips in its center. In this case the gaps can be filled by means of strips extending only longitudinally, according to FIGS. 5, 7 or 9, so that a contuous supporting of the tile edges on tracks or crosses is achieved all along the edge. FIG. 10 is a perspective view of the corner of a floor tile that is laid with the aid of the cross.

FIG. 9 shows another embodiment of strips in which the channels are sectors of a circl of more than 180 .° The projections on the tiles for joinder thereby will be of approximately the same shape as the channels. The shape of the channels and projections may be elliptical segments in place of circular segments, with similar effect.

Either the tiles or the joining strips or both are made of a yieldable, somewhat resilient material such as

rubber, vinyl, or the like. In this manner the projections either on the underface of the tiles near the edges or on the upper face of the joining strip can give slightly as is needed during connection or separation. The bifurcated projection of FIG. 4 makes connection easier since the components have room to move laterally. The undercut surfaces and shoulders prevent separation by a simple vertical pull. As can best be seen in FIGS. 2 and 3, at the corners there is a small amount of space between mating members, which space allows for some expansion and for release of tensions which might result from minor imperfections in the tiles, strips or surface on which the tiles are placed.

The projections may be all along two opposite spaced edges of the tile which is preferably rectangular or square. In this manner the joining strips can be continuous and parallel. If the projections are provided on all four edges of a rectangular tile, either transverse strips can be omitted or special measures taken to effect joinder cross-wise of the elongated strips or crosses such as shown in FIG. 8 may be employed. If the tiles are hexagonal, then three tiles meet at each corner and a trifurcated joining strip patterned after that in FIG. 8 may be employed.

As noted, the strips may be about 3 cm. wide in which case the channels will be approximately 1 cm. wide. The thickness of each tile may vary widely but generally will be about 0.25 to 0.75 cm. and preferably about 0.3 to 0.5 cm. and the dimensions of the projections can be approximated from FIGS. 2 and 3.

It will be appreciated that the instant specification and examples are set forth by way of illustration and not limitation, and that various modifications and changes may be made without departing from the spirit and scope of the present invention.

What is claimed is:

1. A floor covering assembly comprising a plurality of abutting rectangular tiles and joining strips, said tiles as viewed from above together making up a continuous surface, each tile comprising a solid body of predetermined thickness and undercut in its lower face substantially about its entire periphery so as to leave a projection whereby it can be held to a locking strip, each tile being provided at each corner in its underface with a projection extending toward but terminating short of the bottom surface of the tile, each strip comprising an elongated member of predetermined thickness provided in its upper face with a pair of parallel undercut channels for receiving the projections of two tiles and thereby holding them together, the joining strips including a second pair of channels extending at an angle to the first pair, the bottoms of said strips defining substantially the same plane as the bottoms of said tiles, material being provided at the intersections of the channels in a locking strip to form independent recesses for receiving the corner projections of tiles.

2. An assembly according to claim 1 wherein each tile has cut back edges, said tile as viewed from the bottom having a recessed channel about its periphery defined between said bottom surface and said projection which extends from the top surface but terminates short of said bottom surface, said projection including a portion extending toward said bottom and inwardly from the edges, whereby said tile is held into said assembly with other tiles by said locking strips which are suitably contoured to receive said projections, said tiles being in abutting relation and exclusively making up the top surface with said locking strips being hidden therebelow.

* * * * *