# United States Patent [19]

**Harman**

[11] **3,708,940**

[45] **Jan. 9, 1973**


## [54] CEILING TILE


[76] Inventor: **James D. Harman,** R.D. No. 1, Hegins, Pa. 17938



[22] Filed: **July 6, 1970**

[21] Appl. No.: **52,411**

[52] **U.S. Cl.** .....**52/588,** 52/509, 52/531, 52/591

[51] **Int. Cl.**.....**E04b 1/54,** E04f 13/08

[58] **Field of Search**.....52/588, 674, 671, 222, 521, 52/531, 391, 539, 478, 537, 509, 591



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 945,682 | 1/1910 | Berg | 52/588 |
| 2,786,556 | 3/1957 | Constance | 52/588 |
| 3,131,794 | 5/1964 | Bender | 52/588 |
| 3,555,762 | 1/1971 | Costanzo | 52/588 |

FOREIGN PATENTS OR APPLICATIONS

| | | | |
|---|---|---|---|
| 334,532 | 1/1954 | Switzerland | 52/588 |
| 401,422 | 3/1966 | Switzerland | 52/588 |



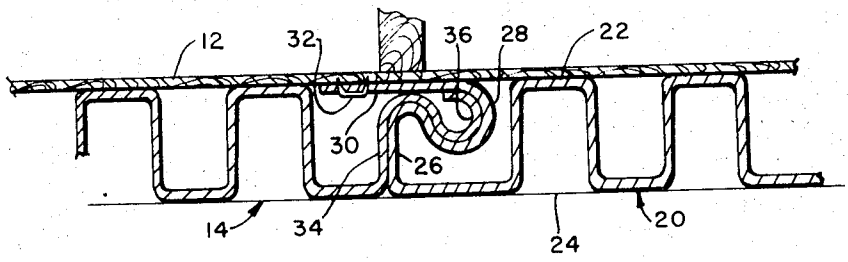
*Primary Examiner*—Alfred C. Perham
*Attorney*—Zalkind, Horne & Shuster



[57] **ABSTRACT**

A thin sheet plastic tile for covering ceilings, walls and other structural surfaces is molded with edge portions, at least one of which has an anchoring flap adapted to be stapled to the covered surface underlying the interlocked, abutting edge portion of an adjacent tile. The tile is molded in a vacuum forming device having a loop forming member which is removable with the molded tile from the mold body.


**1 Claim, 5 Drawing Figures**



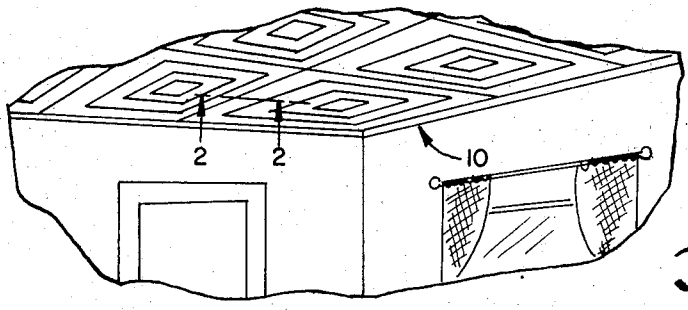



Fig. 1

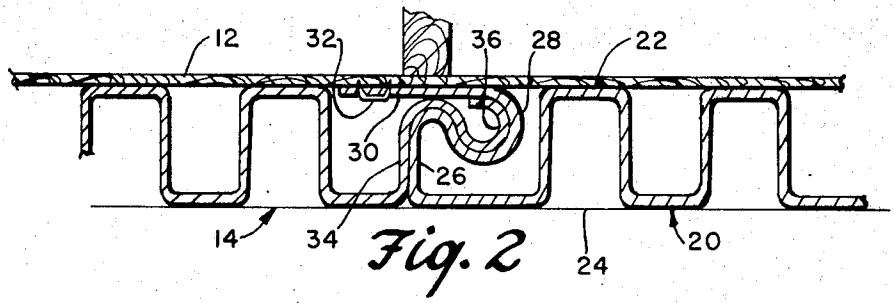



Fig. 2

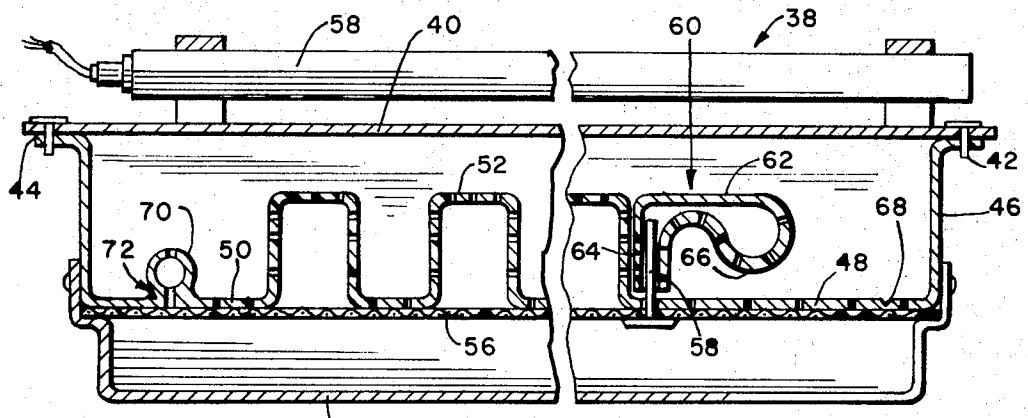



Fig. 3

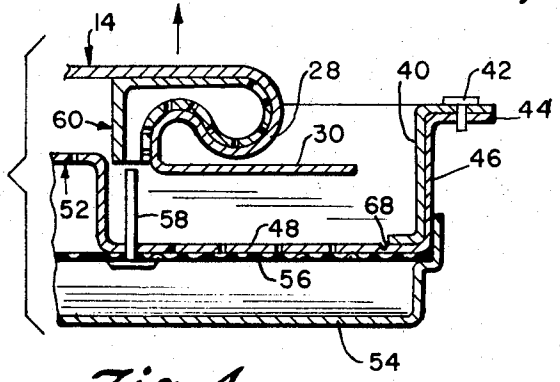



Fig. 4

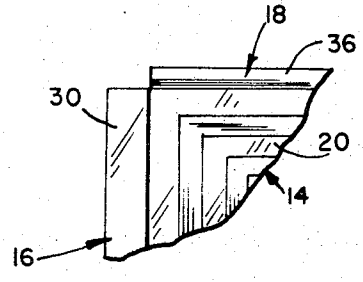



Fig. 5

INVENTOR
JAMES D. HARMAN

BY Zalkind, Horne & Shuster
ATTORNEYS

# CEILING TILE

Surface covering tile members made of non-metallic material such as plastic, are well known. Although a relatively thin sheet plastic material is desirable in fabricating such tiles because of material cost and reduced loading on the covered surface, there are problems in preventing separation of abutting tile edges due to stress and strain on the mounting surface and the flexibility of the thin sheet material. It is therefore an important object of the present invention to make the use of thin sheet plastic for surface covering tiles, practicable.

In accordance with the present invention the body of a thin sheet plastic tile is corrugated in any desired pattern and formed with two different types of edge portions adapted for interlocking engagement with dissimilar edge portions of adjacent abutting tiles. Toward this end, the edge portions are formed with interlocking loop formations and anchoring flaps that are concealed when the tiles are assembled in place. Further, fabrication of each tile with combined loop formations and flaps is made possible by use of a removable loop forming member in a special vacuum forming apparatus within which the tile is molded.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a partial perspective view showing a typical installation for an assembly of tiles in accordance with the present invention.

FIG. 2 is an enlarged sectional view taken substantially through a plane indicated by section line 2—2 in FIG. 1.

FIG. 3 is a partial transverse sectional view through a vacuum forming apparatus within which a tile is to be molded.

FIG. 4 is a sectional view through a portion of the vacuum forming apparatus as illustrated in FIG. 3, showing removal of a loop forming member with a molded tile.

FIG. 5 is a plan view of a corner portion of a tile made in accordance with the present invention.

Referring now to the drawings in detail, a surface covering assembly of tiles, generally referred to by reference numeral 10, is shown in FIG. 1 installed on a ceiling. It will, however, be appreciated that this tile assembly could also be installed on a wall or other structural surfaces and that a ceiling installation is illustrated merely as an example. Thus, the ceiling is provided with a mounting surface on a panel 12 as shown in FIG. 2 to which the tile assembly is secured including adjacent and abutting tile members 14. Each tile member may be identical in shape. In the illustrated embodiment, the tile members are generally rectangular and adjacent perpendicular edge portions 16 and 18 as shown in FIG. 5 are dissimilar, whereas opposite edge portions are similar. Thus, adjacent tile members are assembled, as more clearly shown in FIG. 2, with dissimilar edge portions interlocked.

Each tile member 14 has a corrugated body portion 20 with the corrugations extending between a mounting surface plane 22 and an exposure plane 24 parallel thereto. The corrugations may be arranged in any desired pattern whether it be a concentric rectangle pattern as shown or a concentric circle pattern, in order to impart some rigidity to the tile member. In view of the flexibility resulting from the small thickness of the sheet material from which the tile member is formed, it will be apparent that the tile member will require corrugations if they are to cover any substantial surface area without buckling. The flexibility of the sheet material, however, accommodates interlocking of dissimilar edge portions 16 and 18 of adjacent, abutting tile members.

As more clearly seen in FIG. 2, the edge portion 16 includes an abutment flange extending at a right angle from the plane 24 of the body portion 20. A cup or loop formation 28 of reentrant curvature in cross-section, projects inwardly between the planes 22 and 24 from the flange 26. The loop formation 28 continues into a relatively flat, anchor flap 30 that projects substantially in the plane 22 overlapping or underlying the adjacent tile member. Thus, the tile member from which flap 30 extends may be secured to the mounting panel 12 by staples 32 placed longitudinally along the flap 30.

The edge 18 as shown in FIG. 2 also includes a flange 34 abutting flange 26 so as to conceal the flap 30 and loop formation 28 receiving a dimensionally smaller loop formation 36. The loop formation 36 projects from the flange 34 overlapping the adjacent tile member between planes 22 and 24 for interlocking reception within loop formation 28. Hence, after one tile member is secured in place along two opposite edge portions 16 by staples through the flaps 30, tile members are properly orientated so as to press dissimilar edge portions 18 into place and once assembled, the adjacent tile members may be stapled before additional tile members are again installed adjacent thereto.

FIG. 3 illustrates a typical vacuum molding apparatus generally denoted by reference numeral 38 modified in accordance with the present invention for molding a tile member 14 from a thin sheet of plastic material 40 removably anchored by pins 42 to the top flange 44 of an open-top mold box 46. Secured to the bottom of the mold box are perforated, surface forming portions 48 and 50 interconnected with a perforated, corrugating mold body 52. A vacuum manifold 54 is secured to the bottom of the mold box and separated therefrom by a screen 56. Accordingly, when the plastic sheet 40 is heated to a plastic state by heater 58 and vacuum pressure is applied to the manifold 54, the plastic sheet will be drawn onto the mold body 52 and the surface forming portions 48 and 50 to mold the tile member.

Secured in any suitable fashion to the surface forming portion 48 adjacent the mold body 52 is a positioning pin 58 removably positioning a loop forming member 60. The loop forming member is adapted to mold a loop formation 28 on each tile member and includes an outer surface portion 62 at right angles to flange 64 positioned adjacent the mold body 52. A perforated, curved underside portion 66 is thereby positioned to form the curvature of loop formation 28 when the plastic sheet 40 is drawn over the portions 62 and 66 onto the surface forming portion 48 along which the flap 30 is molded. The flap 30 may be cut off at 68 from the excess plastic material.

The loop formations **36** are molded over tubular, perforated rods **70** fixed to the surface forming portions **50**, and are cut off at **72**. Although the molded plastic sheet may be readily removed from the mold body **52** and the rods **70** by upward withdrawal, this is not possible with respect to loop forming members **60**. Hence, the loop forming members **60** are withdrawn with the molded tile from the mold box as illustrated in FIG. **4**. The loop forming members **60** may then be laterally separated from the molded tile member and repositioned over the pins **58** in the mold box in preparation for another molding operation.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact arrangement and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

**1.** In an assembly of surface covering members made of thin and flexible sheets of non-metallic material formed with corrugations extending between a surface mounting plane and a parallel spaced exposure plane to resist buckling, each of said members having an interlocking edge portion spaced from the corrugations thereof including a flange extending transverse to said planes and a loop formation with reentrant curvature projecting from each of the flanges and terminating substantially at the surface mounting plane, a portion of the reentrant curvature extending from each of the flanges toward the exposure plane, the loop formation projecting from one of the flanges on one of the members being received within and in continuous contact throughout with the loop formation projecting from the other of the flanges of an adjacent member, and an anchor flap extending from the loop formation of said adjacent member substantially in said surface mounting plane, said flanges extending in abutment with each other from the exposure plane in closer adjacency to the anchor flap to cooperate with the interlocked loop formations in rigidifying the assembly along the interlocking edge portions between the corrugations of the respective covering members.

* * * * *