

[54] **TILE AND MANUFACTURING PROCESS THEREFOR**
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[51] **Int. Cl.**..... **E04d 3/35**
[58] **Field of Search** **52/478, 519, 522, 523, 52/549, 615, 588, 582, 524, 535, 619, 309, 710, 483, 550, 618, 511, 512, 540, 518, 24**

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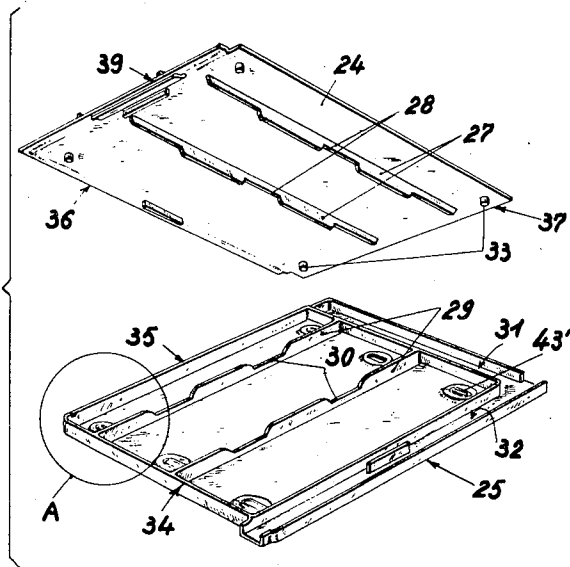
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Assistant Examiner—Carl D. Friedman

[57] **ABSTRACT**
A hollow tile with independent means permitting its attachment to the usual battens and means of mutual attachment which keep said tiles from being raised by the action of the wind, and which do so with no exterior fixation device such as nails and the like.

3 Claims, 18 Drawing Figures



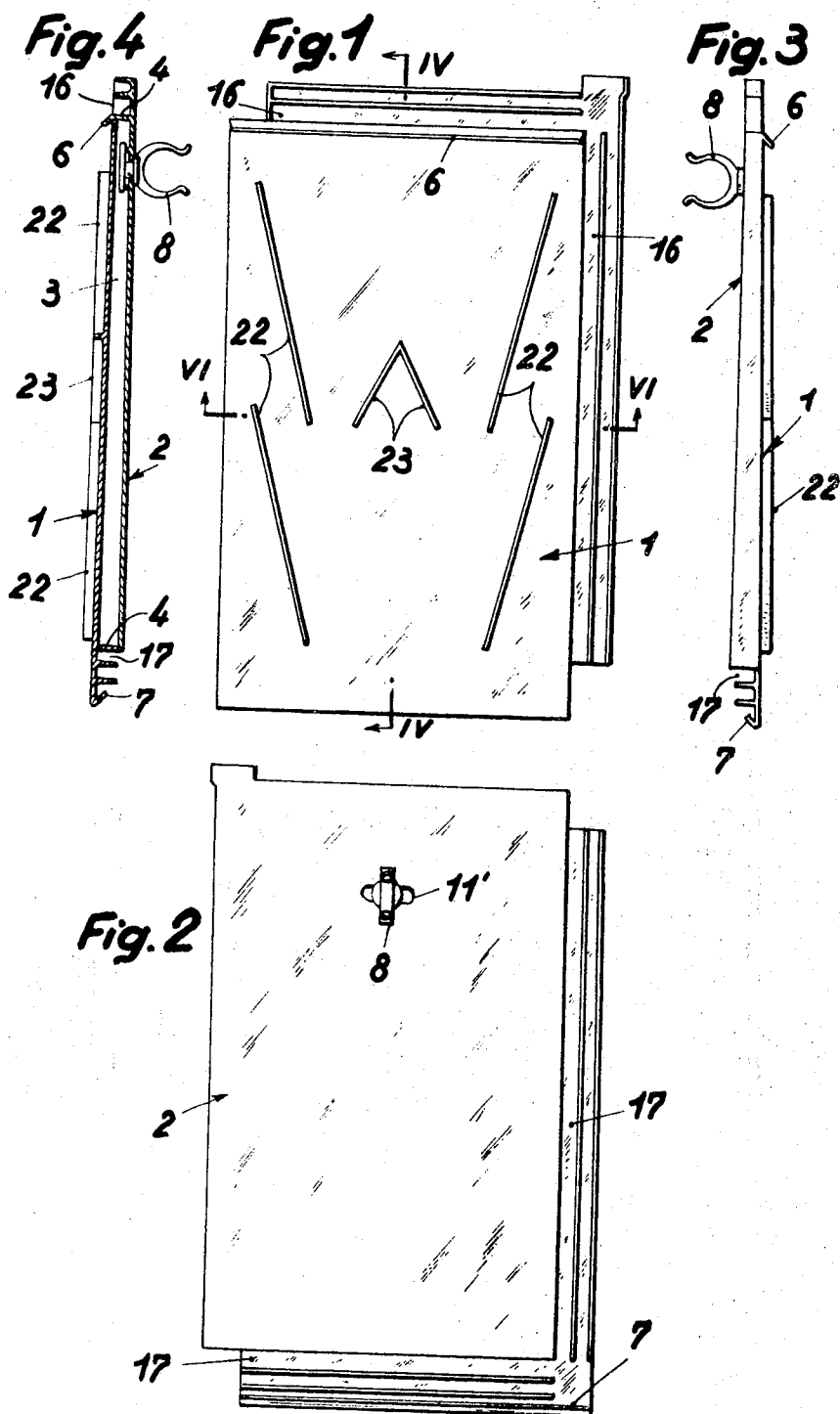


Fig. 5

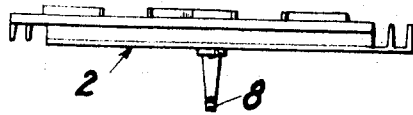


Fig. 6

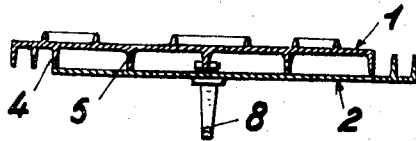


Fig. 7

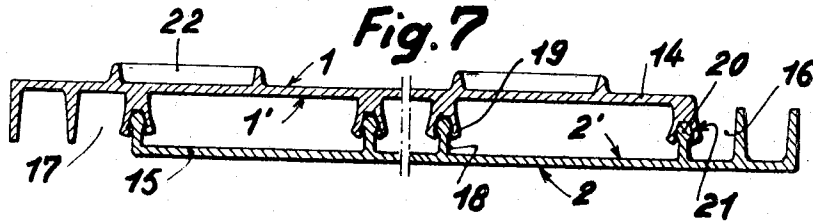


Fig. 9

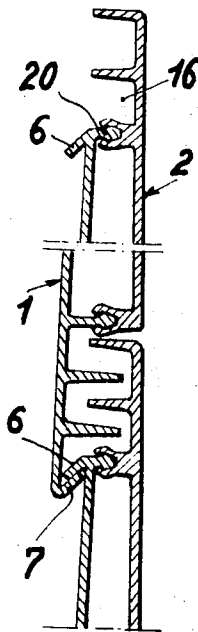


Fig. 8

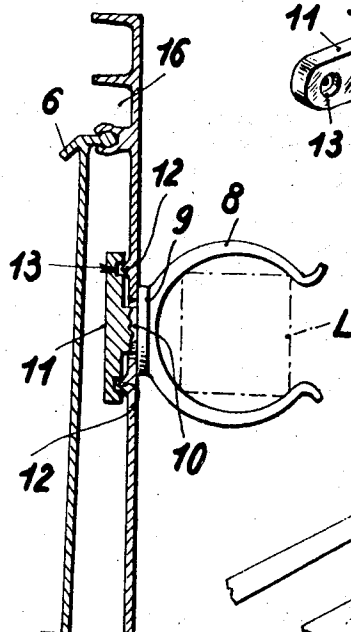


Fig. 10

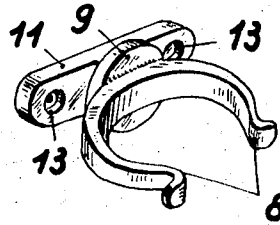


Fig. 11

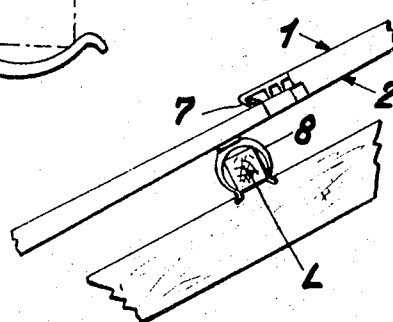


Fig.12

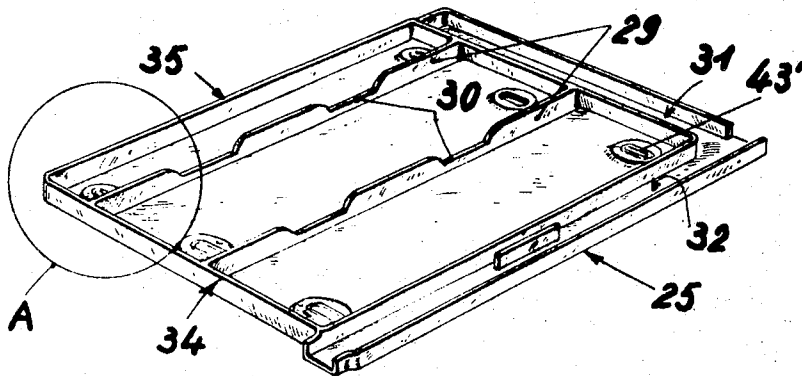
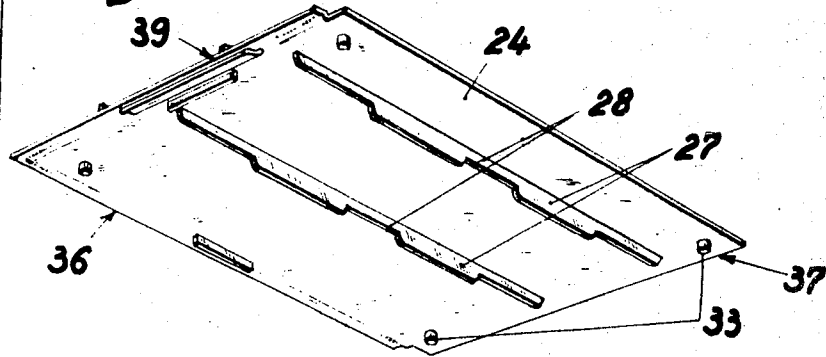


Fig.13

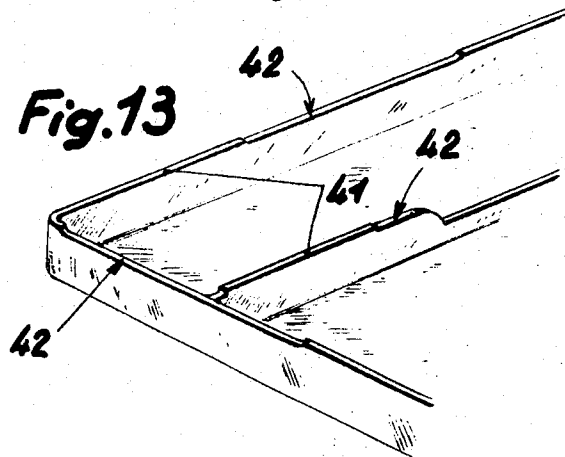


Fig.14

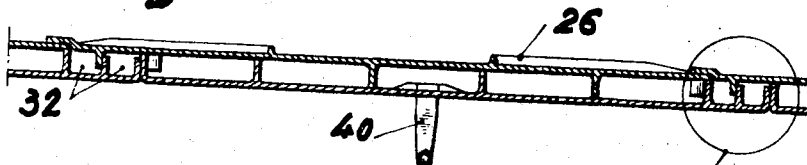


Fig.15

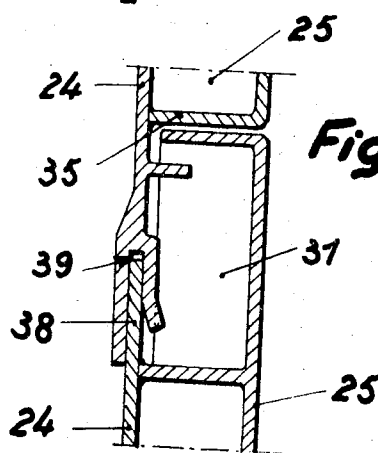
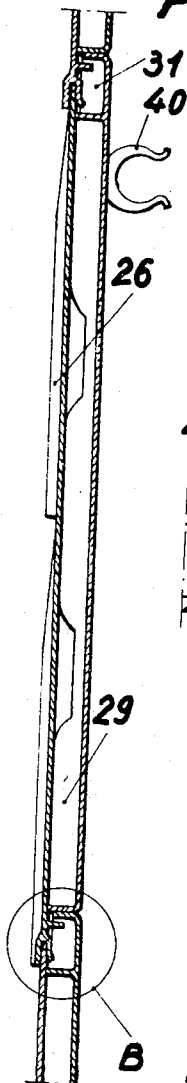


Fig.16

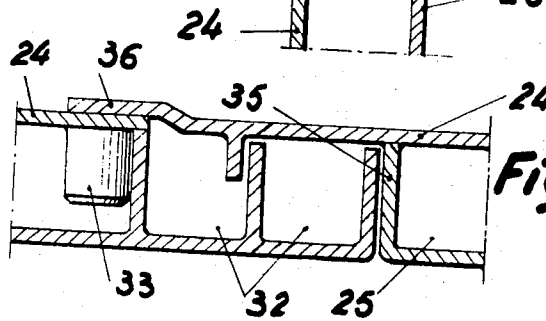


Fig.17

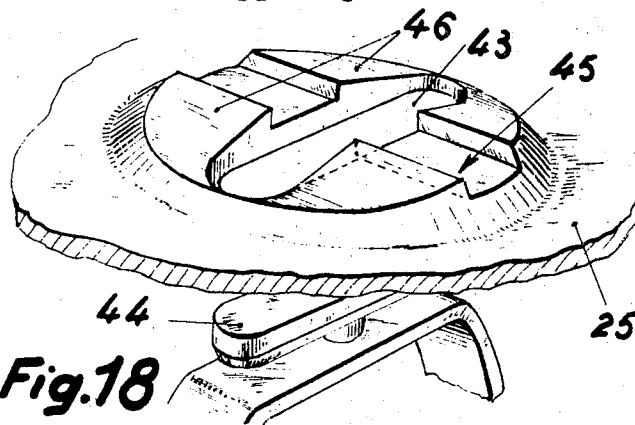


Fig.18

TILE AND MANUFACTURING PROCESS THEREFOR

The present invention relates to a tile made of plastic.

Such tiles are not satisfactory, because they are very flexible and have to be laid on a rigid surface and fixed thereon by nailing or any other means, in order to resist the action of wind.

The tile which is the subject of the present invention, and which, by its method of juxtaposition, is related to the usual mechanical tiles of terra-cotta, is remarkable in that it has a double wall, in that its lower and upper edges have means of mutual attachment and in that it is fixed to the battens of the roof with the aid of a removable hook with two elastically deformable arms, which can surround said battens.

The present invention also relates to a manufacturing process which consists in embodying the tile in two parts which can be assembled.

Other characteristics and advantages will appear more clearly from the description which follows, made in reference to the drawings attached by way of indicative example only, in which:

FIG. 1 is the view from above of a tile according to the present invention.

FIG. 2 shows the same tile as seen from below.

FIG. 3 is a left hand view of FIG. 1.

FIG. 4 is a sectional view taken along the line IV—IV of FIG. 1.

FIG. 5 is the view from below of FIG. 1.

FIG. 6 is a sectional view taken along the line VI—VI of FIG. 1.

FIG. 7 is a view on a larger scale, similar to FIG. 6, showing, among other things, a device for fastening the two parts forming the tile.

FIG. 8 is a view in partial section and on a large scale, similar to FIG. 4.

FIG. 9 is a view similar to FIG. 8, showing the attachment of two adjoining tiles.

FIG. 10 is a view in perspective of a removable fastener for attaching the tiles to the battens.

FIG. 11 is a partial side view on a smaller scale showing a roof made with the aid of the tiles of the invention.

FIG. 12 is an exploded view in perspective, showing a variation of the embodiment.

FIG. 13 is a view in perspective on a larger scale of detail A in FIG. 12.

FIG. 14 is a view in cross-section showing the assembly of several tiles.

FIG. 15 is a view in longitudinal section showing the assembly of several tiles.

FIG. 16 is a view in partial section showing, on a larger scale, detail B in FIG. 15.

FIG. 17 is a partial view in section showing, on a larger scale, detail C in FIG. 14.

FIG. 18 is a partial view in perspective showing a method of embodiment of the independent means making it possible to fix the tile on the battens.

Referring to FIG. 1 and 2, in particular, it can be seen that the tile of the invention, preferably formed of polyvinyl chloride, has substantially the appearance of a mechanical tile with double embedment.

According to the present invention, the tile has two smooth faces 1 and 2, which are not parallel, separated by an empty space 3 which can advantageously be filled with a fibrous and fireproof material with thermal and acoustical insulation properties.

Faces 1 and 2 are connected by a peripheral frame 4. The tile preferably has longitudinal, inside ribs 5 which increase its rigidity.

The tile has, along the upper edge of its working face 1, a tab 6 inclined downward, and along the lower edge of the said face, a second tab 7 curving toward face 2.

As shown in FIGS. 9 and 11, these two tabs make it possible to fasten the upper tile to the lower one, which it covers in classic fashion.

The fixation of each of the tiles to the battens L is done with the aid of hooks, each assuming the form of an open collar whose two elastically deformable arms 8 can embrace said batten. These hooks are removably attached under face 2. With this in mind, arms 8 are made solid with a base 9 which is prolonged by a collet 10 provided with a flattened head 11.

Head 11 can be engaged in an oblong opening 11' in face 2, the locking being done after a rotation of 90° of said head, with the aid of two studs 12 provided inside the tile on said face 2. The distance separating head 11 from base 9 is less than the sum of the thickness of face 2 and the height of studs 12. Alveoles 13, provided under the head 11, and in which studs 12 can penetrate, insure the positioning of arms 8 with respect to the longitudinal axis of the tile. These removable hooks make it possible to limit the volume of the tiles to a maximum, and this facilitates storage and transportation.

The device as a whole, constituted by tabs 6-7 and hooks 8, makes it possible to fix and install the tiles with no additional tools or members. Moreover, the length of the tabs longitudinally to the tile permits a relative displacement, in this direction, between two tiles, of at least 2 millimeters, which is sufficient to absorb variations in length due to expansion or differences in spread between the battens; the latter can also be absorbed by elastically deformable arms 8.

According to one method of manufacture, the tile is embodied in two parts 14 and 15, assembled in such a way as to leave visible, along two adjacent parts of the tile, at least one groove 16 and at least one groove 17 along the other two sides with groove 16 extending, in part, along the upper edge of the tile and opens toward face 1, while groove 17 extends in part along its lower edge, and opens toward face 2.

The device for assembling the two parts 14 and 15 consists in providing ribs 18 and 19 on opposing faces 2' and 1', ribs 18 having a flange 20 which can be engaged by elastic deformation in a groove 21 provided on the edge of ribs 19 on the other face. Ribs 18 and 19 can alternate from one face to the other, they can be parallel or not and the flange means and grooves can extend over all or part of the length of said grooves. Preferably, ribs 18 and 19 extend parallel to the longitudinal axis of the tile but they can extend crosswise to the latter, or both longitudinally and crosswise.

The face 1 of the tile has ribs 22 and 23 on the outside, ribs 22 being disposed obliquely to the longitudinal axis of the tile, and coming together toward the bottom, while ribs 23 are disposed in the reverse direction. The purpose of these ribs is to form rough spots to anchor the foot of the tiler, to channel rainwater toward the center of the tile and to hold the snow and prevent it from sliding massively in times of thaw.

In a general fashion, this tile has the advantages of tiles embodied in plastic material, and of ordinary mechanical tiles, but without their drawbacks.

We will now describe a method of embodiment which makes for a tile according to the invention, from simpler components, and is designed for the application of a more advantageous method of assembly.

Referring to FIG. 12, in particular, it can be seen that the hollow tile is made by means of two parts, designated generally, by references 24 and 25, the upper and lower parts respectively. Part 24 is constituted by an essentially rectangular plate with oblique ribs 26 (FIGS. 12, 14 and 15) on its upper face, and longitudinal ribs 27 which have notches 28, the use for which will appear hereinafter, on its lower face.

Part 25 is constituted by a rectangular case with longitudinal ribs 29 which have notches 30 identical to notches 28. The height of ribs 27 is equal to that of ribs 29, the upper parts of which are contained in the plane of the open face of the case 25.

Case 25, along two of its dies, has two adjacent grooves, 31 and 32, respectively, substantially identical to those found on the usual mechanical tiles.

Plate 24 has positioning means, constituted, for example by nipples 23 disposed in such a way that said plate 24, as it closes case 25, extends beyond sides 34 and 35 opposite grooves 31 and 32 of said case in such a way as to completely cover the corresponding grooves on adjacent tiles (FIGS. 16 and 17).

As shown, in particular in FIG. 17, the plate 24 has a lateral border 26 offset upward, designed to partially cover the upper face of the adjacent tile. The upper edge 37 of plate 24 extends above groove 31 of case 25 to constitute a crosswise tab 38 designed to be engaged in a groove 39 in the lower edge of the upper tile (FIG. 16). In this way, and as shown in FIG. 15, the lower edge of the upper tiles is held by tab 38 of the lower tile, which is fixed to the roofing by means of a hook 40.

The two parts 24 and 25 can be assembled by gluing, welding, etc. It is preferable, however, to use a process of ultra-sonic welding and with this in mind the edges of ribs 27 and 28, and that of casing 25 have slight partial super-thicknesses 41 (FIG. 13).

In order to fix the two parts of the tile, we apply said two parts against one another under pressure, and with the aid of the selected welding process we fuse the superthicknesses 41 by spot action.

In this way it is possible to apply a logical manufacturing process which makes for tiles whereof the thickness is strictly constant, since the parts of the edges, such as 42 in FIG. 13, which do not have superthick-

nesses, will not warp.

In order to improve the qualities of the tile thus obtained, there is injected an aqueous solution of synthetic foam with a base of thermosetting resins which do not harden very quickly. This is why ribs 27 and 29 are notched, the injection being advantageously carried out with the use of orifice 43 which permits the fixation of hook 40.

It should be noted that the bottom of case 25 can have several emplacements designed to permit the fixation of hook 40 (FIG. 12), orifices 43 being masked by a thin layer of material 43'.

FIG. 18 illustrates a method of fixation of hook 40, whose head 44 can be locked by a rotation of 90° in a groove 45 provided on the bottom of case 25, and formed by the abrupt sides of ramps 46.

What I claim is:

1. Roofing tile comprising a tile of plastic material having a rectangular shape and an upper face having a groove on a lateral edge to be normally covered by an edge of an adjacent tile and a lower edge for covering the upper part of a subjacent tile, a rectangular plate providing said upper face, a tab along the upper edge of said plate, a lower tile face constituted by a case closed by said plate, notched longitudinal ribs in said case, notched longitudinal ribs under said plate, means for positioning said plate with respect to said case, said case having a superthickness localized on edges of said case and on the edges of said ribs and an open collar with elastically deformable arms detachably mounted on said case.

2. Roofing tile as claimed in claim 1 wherein said plate and case are fused together at spots thereof, and said superthickness on the edges of said case and said ribs.

3. Roofing tile comprising a tile having a first part providing the upper face of said tile and a second part providing the tile lower face, means holding said parts separated from one another, attachment means being provided along the upper edge and the lower edge of said parts, an open collar detachably mounted through and under the lower face of said tile, one of said two parts being constituted by a case provided with notched longitudinal ribs, the other of said parts being constituted by a rectangular plate provided on its lower face with notched longitudinal ribs identical with said case ribs and means being provided positioning said plate with respect to said case.

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