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(54) **IMPROVEMENTS RELATING TO CEILING TILES AND EXPOSED GRID SUSPENSION SYSTEMS.**

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FR-A- 1 512 496
GB-A- 2 163 787

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EP 0 344 164 B1

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Description

The invention relates to the edge detail of ceiling tiles designed to fit into standard exposed grid suspension systems such as is known from GB-A-2 163 787. More particularly, the invention relates to a ceiling system comprising a suspended lattice grid including inverted tee main runners and inverted cross tees, and ceiling tiles carried by the suspended lattice grid, the tiles having a width corresponding to the centre distance of the inverted tee main runners and a length corresponding to the centre distance of the inverted cross tees, each tile on two opposite sides having slots for receiving the flanges of opposite inverted tee main runners such that the downwardly facing slot surfaces of the tile rest on the upper flange surfaces such that the lower side portions of the tile below the downwardly facing slot surfaces form first tongues concealing the inverted tee main runners, the upper portions of said two opposite sides adjacent the slots being cut back enabling, together with said slots, the tile to be positioned on the inverted tee main runners, the upper portions of the remaining two opposite ends of the tile also being cut back allowing the back of the tile to fit between the inverted cross tees while leaving lower tongues to conceal the inverted cross tees, the tiles being symmetrical about their centreline axis thus having slots being mirror images.

The object of the invention is to improve a ceiling system of this kind such that when the ceiling tiles are fitted they conceal the grid and are fully demountable.

This object is achieved by the ceiling system being that characterized in that the upper portion adjacent each slot has a single step, the thickness of the portion being reduced by the step at the end closer to the cut-back, the upper step surface, in the plane of the tile, being flat over its width for resting on the upper flat flange surfaces of the associated inverted tee main runner and having a depth ensuring that the tile is equally supported on the two associated upper flange surfaces by engagement between the edges of the flanges, and the bottoms of the steps, and

the dimensions of each slot are such that a first tongue of a tile can pass into the slot of an adjacent tile, thereby enabling a tile to be fully independently demountable without disturbing adjacent tiles.

The invention will now be described in more detail with reference to the accompanying drawings, wherein:

Figure 1 is a schematic view of a known ceiling system,

Figure 2 is a schematic view taken along the line B-B in figure 1.

Figure 3 is a schematic view of an other known ceiling system.

Figure 4 is a schematic view taken along the line D-D in figure 3.

Figure 5 is a schematic view of a ceiling system according to the invention.

Figure 6 is a schematic view taken along the line F-F in figure 5.

Figures 7-9 are schematic views illustrating, the mounting of a tile in a ceiling system according to the invention.

There are two basic forms of suspended ceilings:

1/ Concealed Grid Systems

The object is to conceal the suspension grid from view when the ceiling tiles are fixed in position. A typical concealed fix ceiling tile edge detail is shown in figures 1 and 2. The concealed grid suspension section is fixed to a channel sub-grid with wire clips, in turn the sub-grid is suspended on wire hangers fixed to the structural soffite. The ceiling tiles are then slid along the grid into position.

2/ Exposed Grid System

Figures 3 and 4 show a typical exposed grid system consisting of inverted tee sections. The main tee is suspended from the structural soffite on wire hangers and cross tees are fixed to the main tee in various ways so as to form a fairly rigid accurated lattice-work with the flanges of main and cross tees at the same level. The ceiling tiles are simply laid on the inverted tee section grid leaving the flange of the grid exposed to view.

FR-A-1 152 496 discloses a ceiling system comprising concealed inverted tee runners and ceiling boxes suspended on the runners. No cross tees are provided. Instead on the two corresponding sides, each celing box has vertical walls which are to be in direct stabilizing contact with the walls of the adjacent boxes. The remaining two sides of the box also have vertical walls which are to be in direct stabilizing contact with the walls of the adjacent boxes. In addition thereto, the first mentioned walls have thin supporting end hooks for cooperation with ribs at the edges of the flanges of the inverted tee runners.

The trend in the suspended ceiling market is moving away from concealed suspension systems mainly because the various patented methods with exposed grid systems of connecting main tees to cross tees has led to a quick, accurate and easy to install system popular with on-site operatives and less expensive to the customer.

Suspended ceiling tiles currently produced for either concealed or exposed grid systems cannot be fixed to standard exposed grid systems such as to conceal the grid and be fully demountable. However, a ceiling tile manufactured in accordance with the invention incorporating edges as shown in figure 5 can be fixed to a standard exposed grid system and will conceal the grid from view and each tile will be independently demountable.

Figure 5 shows a ceiling tile 1 where the dimension 'X' equals the width of the upper part of flange 2 of the inverted tee grid 3. The detail of the ceiling tile

1 below the the flange 2 shows a bevelled edge 4. (This detail can vary to correspond with current concealed type ceiling tiles and could be square, channeled or any desired shape).

The depth of the slots 5 & 6 related to the ceiling tile edges 7 & 8 is critical and must also correspond to the dimension of the flange 2 of the inverted tee 3 (small tolerances will have to be allowed for practical purposes).

The overall dimension of the ceiling tile 1 below the flange 2 of the inverted tee 3 will be the same as the centres of the tee 3 whereas the overall dimension of the back of the ceiling tile 1 will be reduced by 'X' (2 x 0.5 'X' at either edge). The depth of slot 5 will be 'X' to allow the tile to be slid fully onto the R.H. flange 2 of the inverted tee 3 (cf. also figs. 7 & 8). Thereafter the ceiling tile 1 is pushed upwards until the slot 6 is level with the L.H. flange 2 of the inverted tee 3. The ceiling tile 1 is then slid onto the left hand flange 2 of the inverted tee (3) (cf. also figs. 8 & 9). The depth of the top section of slot 6 0.5 'X' will ensure the ceiling tile 1 is equally supported on half of the available flange 2 i.e. half the possible bearing available.

Figure 6 shows the ceiling tile 1 with a cut-out section 9 on the back right and left hand sides and an overall rear dimension which is -2 'X' (2 x 1 'X') less than the inside stalk of the inverted tee 3. This allows the back portion of the tile 1 to fit between the flanges of the inverted tee grid 3.

The detail of figure 6 below the flange 2 is not critical and can be any of the afore metioned details and could incorporate a slot to receive a spline similar to the standard concealed ceiling grid ceiling tiles (figure 2).

Ceiling tiles manufactured in accordance with the invention incorporating edges shown in figure 5 have the following advantages:-

- Fully demountable
- Combines the advantages of exposed grid systems (economic, popular, accurate) with the asthetic advantage of a concealed grid system ceiling.
- Quicker therefore cheaper to install than conventional concealed systems.
- Existing exposed grid system ceilings can be changed to concealed type ceilings at will or when normal re-placement occurs (approx every 10 years) without removing the existing exposed grid system.
- The new edge detail concealed ceiling tiles are fixed to the exposed grid system within the depth of the exposed grid (impossible with an exposed grid type tile), a great advantage where suspension depth is limited.

Claims

1. A ceiling system comprising a suspended lattice grid (3) including inverted tee main runners and inverted cross tees, and ceiling tiles (1) carried by the suspended lattice grid, the tiles having a width corresponding to the centre distance of the inverted tee main runners and a length corresponding to the centre distance of the inverted cross tees, each tile on two opposite sides having slots (5, 6) for receiving the flanges (2) of opposite inverted tee main runners such that the downwardly facing slot surfaces of the tile rest on the upper flange surfaces such that the lower side portions of the tile below the downwardly facing slot surfaces form first tongues concealing the inverted tee main runners, the upper portions of said two opposite sides adjacent the slots (5, 6) being cut back (7, 8) enabling, together with said slots, the tile to be positioned on the inverted tee main runners, the upper portions of the remaining two opposite ends of the tile also being cut back (9) allowing the back of the tile (1) to fit between the inverted cross tees while leaving lower tongues to conceal the inverted cross tees, the tiles (1) being symmetrical about their centreline axis thus having slots (5, 6) being mirror images, characterized in that the upper portion adjacent each slot (5, 6) has a single step, the thickness of the portion being reduced by the step at the end closer to the cut-back, the upper step surface, in the plane of the tile, being flat over its width for resting on the upper flat flange surfaces of the associated inverted tee main runner and having a depth ensuring that the tile (1) is equally supported on the two associated upper flange surfaces by engagement between the edges of the flanges (2), and the bottoms of the steps, and

   the dimensions of each slot are such that a first tongue of a tile can pass into the slot of an adjacent tile, thereby enabling a tile to be fully independently demountable without disturbing adjacent tiles.

Patentansprüche

1. Deckensystem mit einem aufgehängten Gitterrost (3), der Hauptschienen in umgekehrter T-Form und umgekehrt-T-förmige Querkörper aufweist, sowie mit Deckenplatten (1), die vom aufgehängten Gitterrost getragen sind, wobei die Platten eine Breite aufweisen, die dem Mittenabstand der Hauptschienen in umgekehrter T-Form entspricht, sowie eine Länge, die dem Mittenabstand der umgekehrt-T-förmigen Querkörper entspricht, jede Platte an zwei gegenüberliegenden Seiten Schlitze (5, 6) zur Aufnahme der Flansche

(2) gegenüberliegender Hauptschienen in umgekehrter T-Form so aufweist, daß die abwärtsgewandten Schlitzflächen der Platte auf den oberen Flanschflächen so aufsitzen, daß die unteren Seitenabschnitte der Platte unter den abwärtsgewandten Schlitzflächen erste Zungen bilden, die die Hauptschienen in umgekehrter T-Form verbergen, die oberen Abschnitte der genannten beiden gegenüberliegenden Seiten neben den Schlitzen (5, 6) gekürzt (7, 8) sind, was es der Platte zusammen mit den genannten Schlitzen gestattet, auf den Hauptschienen in umgekehrter T-Form angeordnet zu werden, die oberen Abschnitte der verbleibenden beiden gegenüberliegenden Enden der Platte ebenfalls gekürzt (9) sind, was es der Rückseite der Platte (1) gestattet, zwischen die umgekehrt-T-förmigen Querkörper hineinzupassen, während untere Zungen belassen sind, um die umgekehrt-T-förmigen Querkörper zu verbergen, und die Platten (1) um ihre Mittelachse symmetrisch sind und somit Schlitze (5, 6) aufweisen, die spiegelbildlich ausgebildet sind,

dadurch gekennzeichnet, daß der obere Abschnitt neben jedem Schlitz (5, 6) eine einzelne Stufe aufweist, wobei die Dicke des Abschnitts durch die Stufe an dem der Verkürzung nähergelegenen Ende verringert ist, und wobei die obere Stufenfläche in der Ebene der Platte über ihre Breite hinweg eben ist, um auf den oberen, flachen Flanschflächen der zugeordneten Hauptschiene in umgekehrter T-Form aufzusitzen, und eine Tiefe aufweist, die sicherstellt, daß die Platte (1) auf den beiden zugeordneten oberen Flanschflächen gleichartig durch den Eingriff zwischen den Kanten der Flansche (2) und die Böden der Stufen getragen ist, und

daß die Abmessungen eines jeden Schlitzes so sind, daß eine erste Zunge einer Platte in den Schlitz einer benachbarten Platte eindringen kann und es hierdurch einer Platte gestattet, in vollem Grade unabhängig ausgebaut werden zu können, ohne benachbarte Platten zu stören.

Revendications

1. Ensemble de plafond comprenant une grille suspendue (3) en forme de treillis ayant des longerons principaux en T retourné et des organes transversaux en T retourné, et des carreaux (1) de plafond portés par la grille suspendue en treillis, les carreaux ayant une largeur qui correspond à la distance entre les centres des longerons principaux en T retourné et une longueur qui correspond à la distance au centre des organe transversaux en T retourné, chaque carreau des côtés opposés ayant des fentes (5, 6) destinées à loger les flasques (2) des longerons principaux opposés en T retourné de manière que les surfaces des fentes du carreau qui sont tournées vers le bas soient en appui sur les surfaces supérieures des flasques, si bien que les parties des côtés inférieurs du carreau, au-dessous des surfaces des fentes tournées vers le bas, forment des premiéres languettes qui cachent les longerons principaux en T retourné, les parties supérieures des deux côtés opposés adjacents aux fentes (5, 6) étant découpées (7, 8) et permettant, avec les fentes, le positionnement du carreau sur les longerons principaux en T retourné, les parties supérieures des deux extrémités opposées restantes du carreau étant aussi découpées (9) et permettant à l'arrière du carreau (1) de s'ajuster entre les organes transversaux en T retourné tout en laissant des languettes inférieures qui cachent les organes transversaux en T retourné, les carreaux (1) étant symétriques par rapport à leur axe central et ayant ainsi des fentes (5, 6) qui sont des images spéculaires, caractérisé en ce que la partie supérieure adjacente à chaque fente (5, 6) a un gradin unique, l'épaisseur de cette partie étant réduite par le gradin à l'extrémité la plus proche de la découpe, la surface supérieure du gradin, dans le plan du carreau, étant plate sur sa largeur afin qu'elle soit en appui contre les surfaces supérieures plates des flasques du longeron principal associé en T retourné et ayant une profondeur telle que le carreau (1) est également supporté par les surfaces supérieures des deux flasques associés par contact entre les bords des flasques (2) et le fond des gradins, et

les dimensions de chaque fente sont telles qu'une première languette d'un carreau puisse pénétrer dans la fente d'un carreau adjacent, si bien qu'un carreau peut être démonté de manière totalement indépendante sans perturbation des carreaux adjacents.

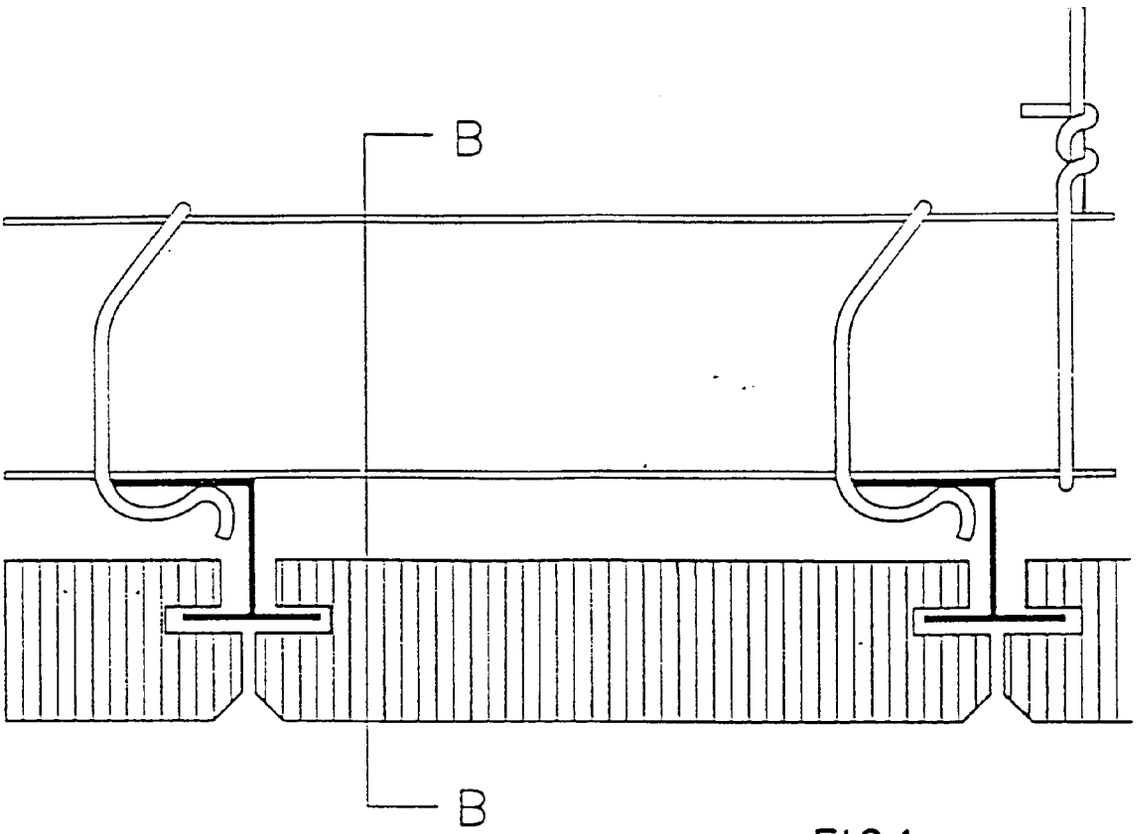

FIG.1

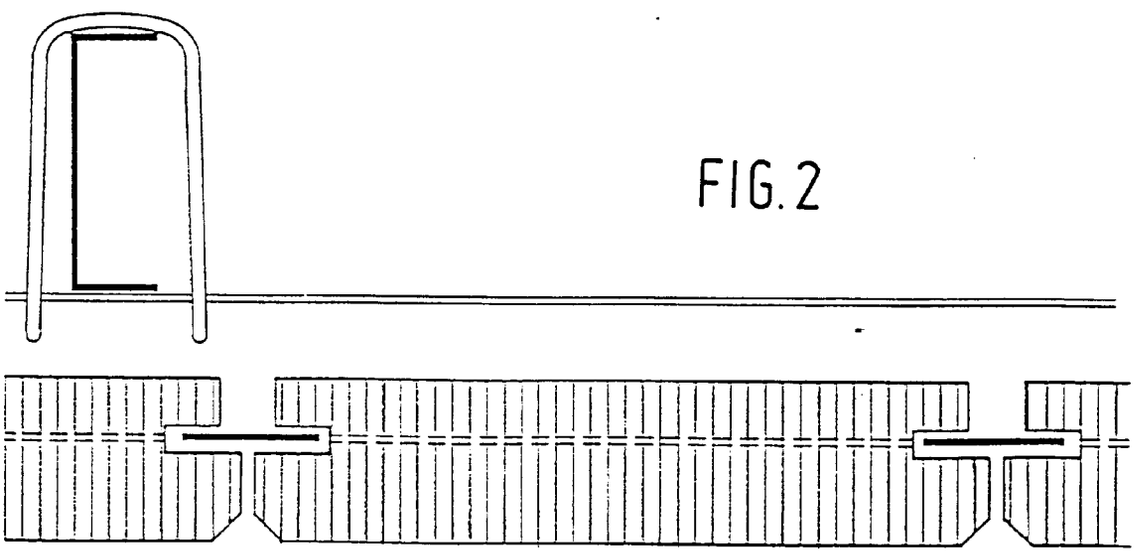

FIG.2

SECTION B–B

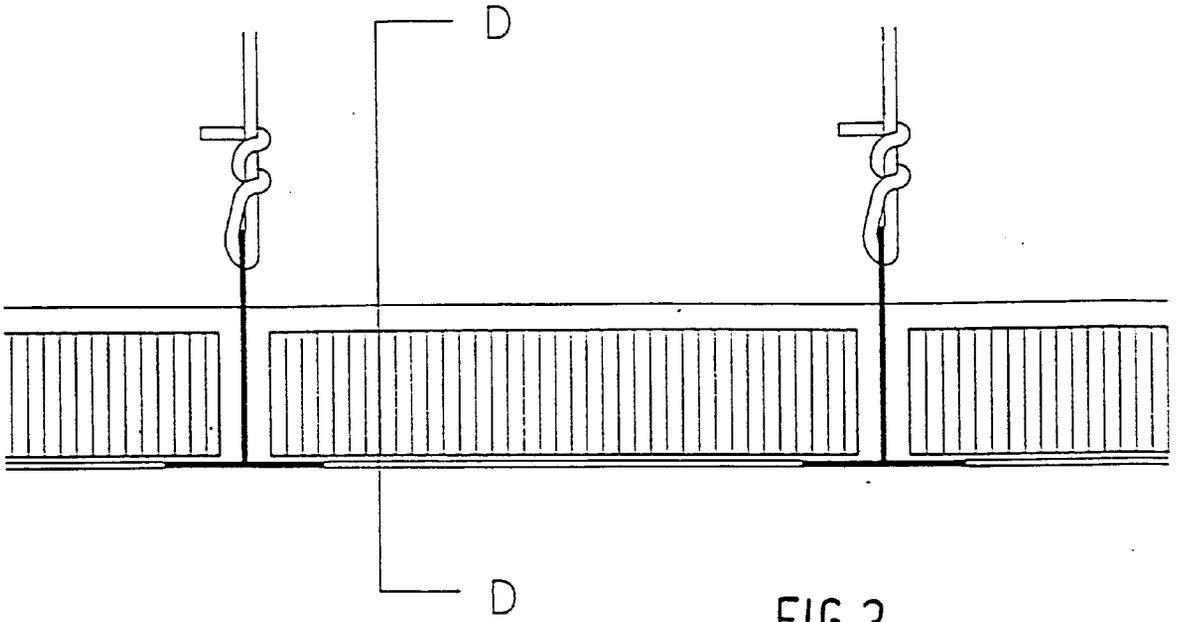

FIG.3

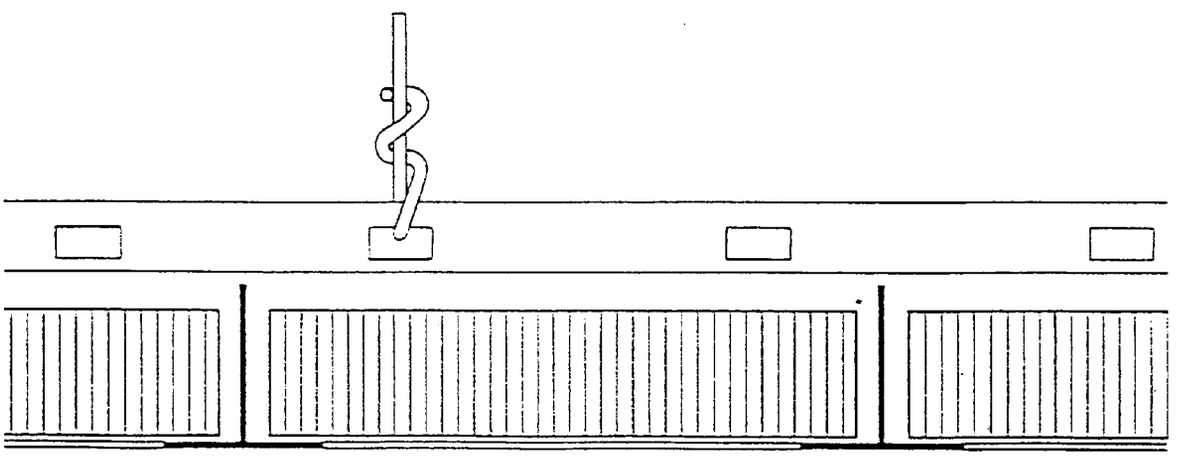

FIG.4 SECTION D—D

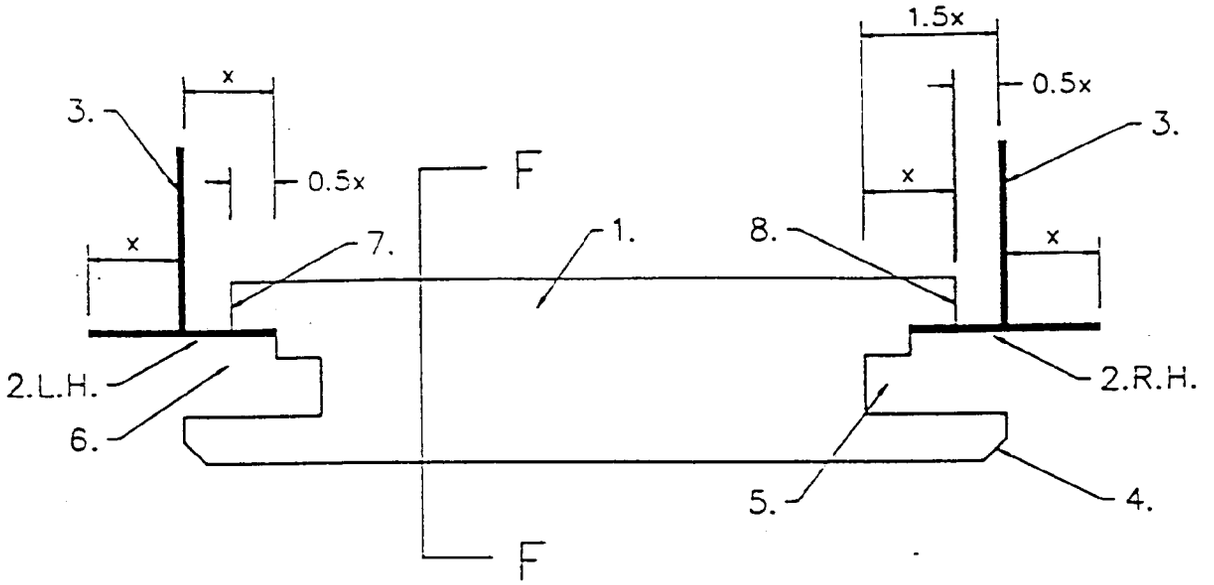

FIG.5

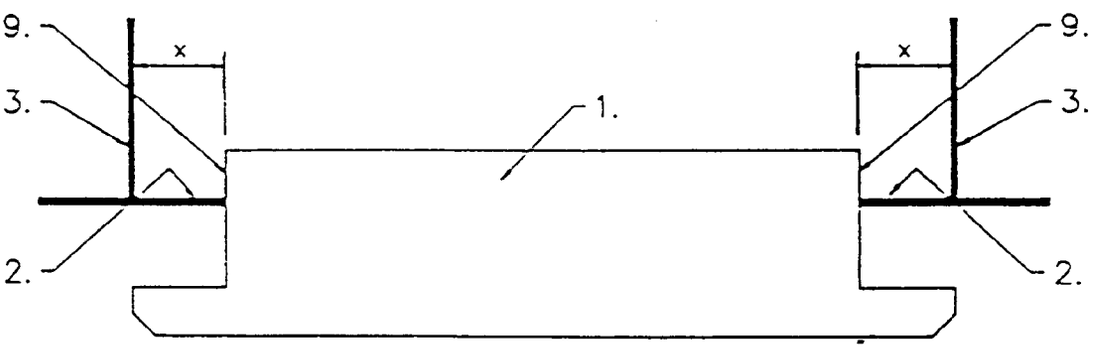

FIG.6 SECTION F—F

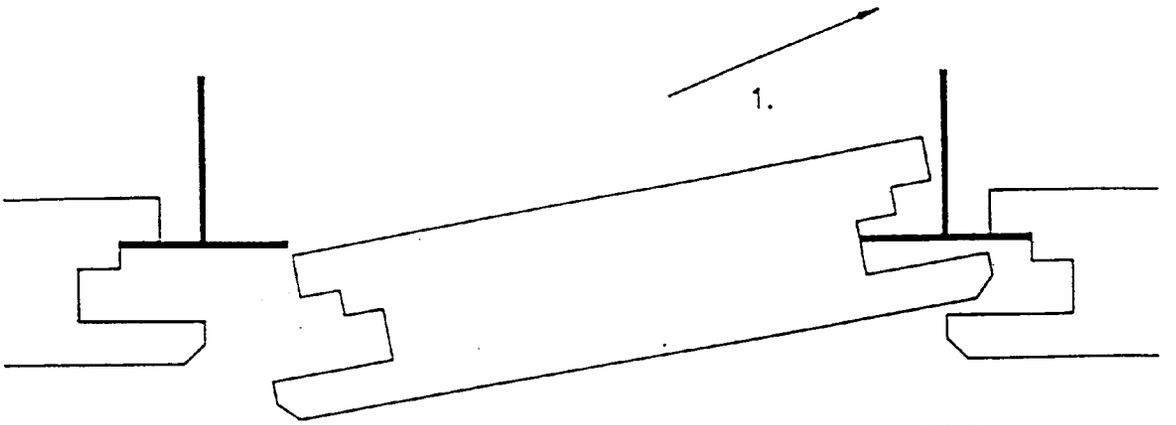

FIG.7

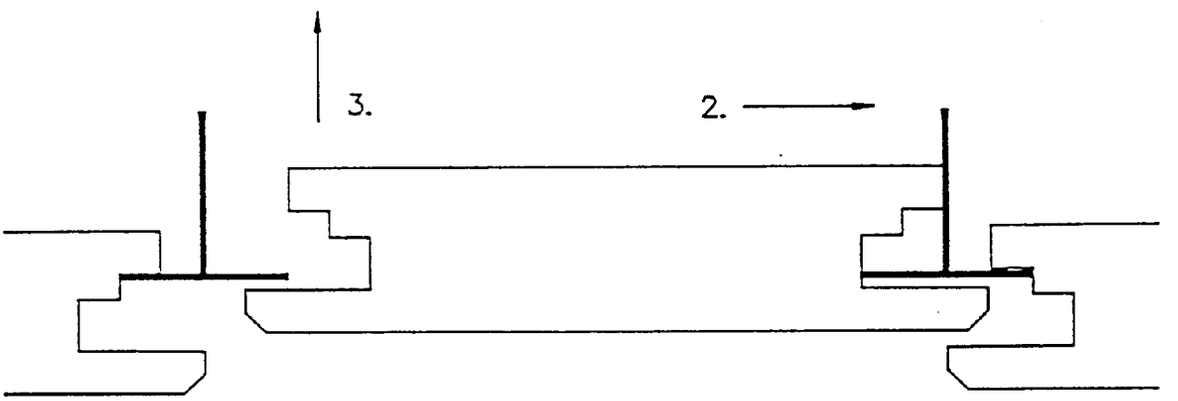

FIG.8