

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 561 875 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.08.2005 Bulletin 2005/32

(51) Int Cl.7: **E04B 9/12**, E04B 9/30,
 E04B 9/16

(21) Application number: **04447029.2**

(22) Date of filing: **06.02.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR
 Designated Extension States:
AL LT LV MK

(72) Inventor: **Borgers, Stéphane**
2640 Mortsel (BE)

(74) Representative: **Luys, Marie-José et al**
Gevers & Vander Haeghen,
Holidaystraat 5
1831 Diegem (BE)

(71) Applicant: **CHICAGO METALLIC CONTINENTAL**
2110 WIJNEGEM (BE)

(54) Bandraster system

(57) This invention relates to a bandraster system (1) comprising a plurality of bandrasters (10) and splices (20) for connecting successive bandrasters to each other, each bandraster (10) comprising a substantially U shaped portion with two upright side walls (11, 12) on opposite longitudinal sides of a bottom wall (15) and an open top, each splice (20) comprising a bottom wall (25) and at least one upright side wall (21, 22), the splice (20) being provided to be received at least partly in an end part of the bandraster (10), the bandraster (10) and splice (20) comprising mutually co-operating connecting means. The connecting means (13, 14, 23, 24) comprise mutually co-operating first (13, 14) and second (23, 24) connecting means positioned at an end part of each of the bandraster and splice (10, 20), connecting

means on opposite end parts pointing in opposite directions. The first connecting means comprise an elongated slot (14) and a slit (13) spaced apart from each other in longitudinal direction, the slit (13) extending in height direction of the upright side wall (11, 12), the elongated slot (14) being positioned at a distance d with respect to the bottom wall (15, 25) at a position shifted towards the bottom wall. The second connecting means (23, 24) comprise a resilient longitudinal tongue (24) provided to be received in the slot (14), at such a position that an upper edge of the tongue (24) abuts against an upper edge (51) of the slot (14), an end part of the tongue comprising a protruding lip (23) which is provided to engage the slit (13) upon engagement of a splice (10) and a bandraster (20).

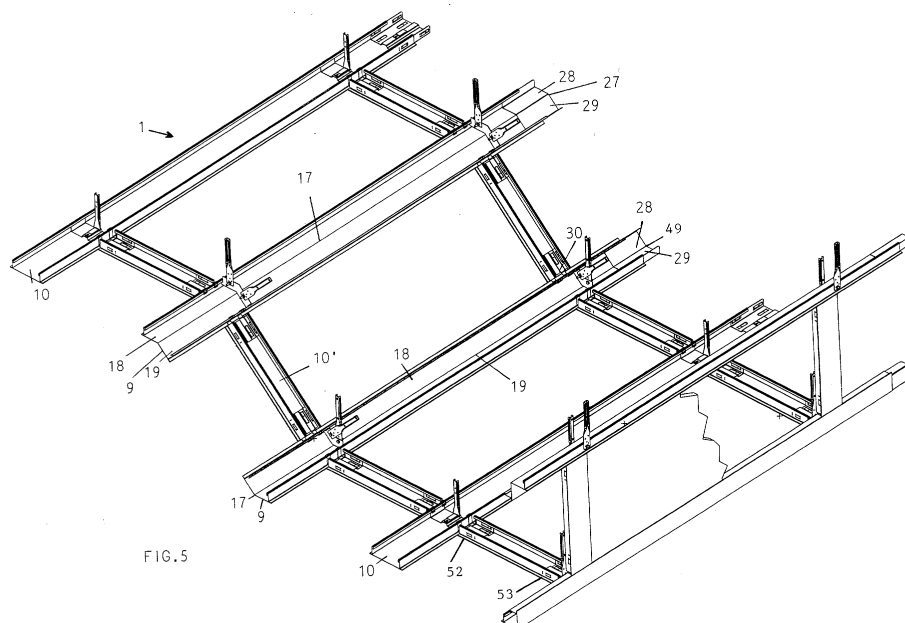


FIG. 5

EP 1 561 875 A1

Description

[0001] The present invention relates to a bandraster system comprising a plurality of bandrasters and splices for connecting successive bandrasters to each other, each bandraster comprising a substantially U shaped portion with two upright side walls on opposite longitudinal sides of a base wall and an open top, each splice comprising a base and at least one upright side wall, the splice being provided to be received at least partly in an end part of the bandraster, the bandraster and splice comprising mutually co-operating connecting means, as described in the preamble of the first claim.

[0002] From GB-A-22661736 a support grid is known which comprises a plurality of base rails and transverse rails, each rail comprising a C shaped sheet steel section with a base and two upright side walls, which C-section is open at the top, the top edges of the side walls being inwardly angled. The bottom side of the base is the visible side which gives access to the visible side of the ceiling plates suspended to the support grid. The base rails are suspended to the building construction by means of suspension plates inserted into the base rails. Extension of base rails in longitudinal direction is achieved by means of U-shaped splices, which are inserted into the facing ends of two successive rails, between the side walls thereof.

[0003] To prevent successive base rails from being displaced with respect to each other, the base rails and splices comprise mutually co-operating connecting means. In particular, the splices comprise outwardly facing projections, which are provided to engage corresponding slots in the base rails. It has however been observed that the accuracy of the positioning of the slots in the splice is often insufficient and that the tolerance in height direction of the slots is too large. When connecting several base rails, this has the consequence that the bases of consecutive base rails are badly aligned. This is unwanted not only from an aesthetic point of view, but also from a technical point of view, for example for fire safety reasons. The bad alignment also has the consequence that mechanical stresses are generated in the support grid, which result therein that the bases of consecutive supporting rails for example extend at different heights with respect to the floor, or extend under an angle with respect to each other.

[0004] In one of the proposed remedies to overcome the poor alignment, consecutive base rails are aligned by screwing them to each other. This proposed remedy is however unsatisfactory as it is laborious and time consuming and more important, as it introduces assembly problems as not all buildings are equipped with dilatation utilities and unwanted additional mechanical stresses and deformations in the grid.

[0005] Connection of a bandraster and a transverse rail is achieved by tongues which project from the inwardly angled edges of the side walls of the transverse rails. Each tongue comprises at the end of the trans-

verse rail a downwardly extending projection to be received in a corresponding opening in the longitudinally extending edge of a bandraster. This type of connection however has the disadvantage that the alignment of the visible bases is also insufficient and thus the positioning of connected rails in height direction is also insufficiently accurate.

[0006] There is thus a need to a bandraster system in which an improved positioning of consecutive bandrasters with respect to each other may be achieved as well as an improved connection. There is also a need to a bandraster system in which an improved positioning and connection may be achieved of spaced apart, parallel extending bandraster units by means of transversally extending bandraster connecting parts.

[0007] It is therefore the aim of the present invention to provide an improved bandraster system, in which the alignment of successive bandraster units with respect to each other may be optimised.

[0008] This is achieved in the present invention with the technical features of the characterising part of the first claim.

[0009] The bandraster system of this invention is characterised in that it comprises a plurality of bandraster and splice units, the splices functioning as a connecting piece for connecting successive bandrasters to each other. The bandraster and splice comprise mutually co-operating connecting means. The connecting means comprise first and second connecting means, which are mounted to opposite end parts of the side walls of respectively the bandraster and the splice. The connecting means mounted to opposite end parts point in opposite directions.

[0010] The splice is provided to be received in facing end parts of two consecutive bandrasters, in such a way that the at least one upright side wall of the splice extends along the corresponding side wall of the bandraster, and the bottom wall of the splice is received on top of the bottom wall of the bandraster. In case the splice comprises two upright side walls, the upright side wall on the opposite side of the base of the splice extends along the corresponding opposite side wall of the bandraster, so that both side walls of the splice are received between the upright side walls of the bandraster.

[0011] The first connecting means comprise a longitudinally extending elongated slot and slit, which are spaced apart in longitudinal direction. The slot is provided at a distance d from the base wall taken in height direction of the side wall, its position being shifted in the direction of the bottom wall. The slit extends in height direction of the side wall and is positioned remote from the end part of either the splice or bandraster, as compared to the elongated slot.

[0012] The second connecting means comprise a longitudinal tongue which is resiliently mounted with respect to an outer face of the upright side wall. A first end part of the tongue comprises on a side facing the slit, a lip which protrudes from the tongue towards the slit. The

tongue is provided to engage the elongated slot in longitudinal direction, the lip is provided to engage the slit. In that way, the position of a bandraster unit and splice with respect to each other gets fixed in longitudinal direction. As a splice functions to connect two consecutive bandrasters, the position of the consecutive bandrasters with respect to each other gets fixed in longitudinal direction. A stretching effect in longitudinal direction of the bandraster is obtained by the fact that the connecting means extend in longitudinal direction, and that the connecting means on opposite end parts of the bandraster, respectively splice, point in opposite directions.

[0013] The tongue is provided to be received in longitudinal direction in the slot upon engagement of a splice and a bandraster. The tongue is positioned such that its upper edge abuts against the upper edge of the slot, when the bottom wall of the splice rests on top of the bottom wall of the bandraster. This has the effect that a stretching force is applied between the upper edge of the slot and the bottom wall of the bandraster, or in other words a stretching force in height direction of the bandraster is applied.

[0014] Thus, the above described first and second connecting means allow obtaining a bandraster system which is stretched in both longitudinal and height direction.

[0015] The mounting of the longitudinally extending elongated slot in an end part of the upright side walls at a distance d which is set with respect to the base of the bandraster, allows optimising the positioning of the slot. An analysis of the problem of getting base walls of successive bandrasters aligned has shown that the base of the bandraster proved to be the more reliable part to be used as a reference, when it is desired to position parts with respect to each other, as it is the base wall which is the visible part. In the state of the art, usually the top edges of the upright walls were used as a reference for positioning the connecting means. When using the top edge as a reference for positioning the connecting means, although the distance between the top edge and connecting means will vary within rather small limits, there is no guarantee that the distance between the connecting means and the base wall of the bandraster will be the same in every bandraster unit, the latter being a prerequisite to get the base walls of successive bandrasters aligned. This problem has now been solved.

[0016] The more accurate positioning of the slot has the consequence that the risk to the building of stresses when connecting two or more consecutive bandrasters by insertion of a splice into the end parts of the consecutive bandrasters may now be reduced. The positioning of the elongated slot shifted towards the base of the bandraster has the effect that clamping forces clamping the splice into the bandraster act in the vicinity of the bottom wall of the bandraster. As a consequence hereof the moment of the forces acting upon the bandraster and splice gets minimised, which in turn has the effect of minimis-

ing the risk to deformation of the bandraster.

[0017] Thus a bandraster system may be obtained in which an improved alignment of successive bandrasters may be obtained and an improved stretching of the bandrasters in all directions. This is attributed to the combined action of

- (1) an improved positioning of the connecting means and
- (2) stretching forces acting in longitudinal direction and height direction of the bandraster units.

[0018] To facilitate mounting, the first connecting means are provided on opposite ends of the upright side walls of the bandraster, while the second connecting means are provided on opposite ends of the at least one upright side wall of the splice.

[0019] In the bandraster system of this invention it is further preferred that the tongue of the second connecting means protrudes from the splice towards the bandraster, and that similarly the lip protrudes from the tongue towards the bandraster.

[0020] When connecting a bandraster and splice, the tongue is sled along the slot, until the lip is received in the slit. Receiving of the lip in the slot involves that the tongue engages the slot. If so desired, the tongue may be manually pushed into the slot, the resiliency of the tongue providing for the removable connection.

[0021] In a preferred embodiment of this invention, the splice is essentially U-shaped with an open top and two parallel upright side walls extending along opposite longitudinal sides of the longitudinal bottom wall. The upright side walls are provided to exert an outwardly directed force to the upright side walls of the bandraster, as a consequence of which a stretching force is exerted in width direction of the bandraster. The top edges of the opposite side walls may be bent inwardly towards the inner space in view of further fixing the position of the splice within the bandraster and thus adding to the fixation of consecutive bandrasters with respect to each other.

[0022] A preferred embodiment of the invention is characterised in that the bandraster system of this invention comprises at least one bandraster and splice having a bottom wall with a groove protruding towards the inner space of the bandraster and splice. The groove of the splice is provided to receive the groove of the bandraster, the dimensions of both grooves being adapted so as to provide a close fit. In this groove for example the top edge of a partition can be received, so that the bandraster system and the ceiling supported by the bandraster system continue over the partitions, which enhances the aesthetic appearance.

[0023] In another preferred embodiment of the invention, the bottom wall of the splice comprises at least one resilient tongue which protrudes from a face of the bottom wall of the splice pointing away from the inner space, towards the bottom wall of the bandraster. The

presence of such resilient tongue allows to compensate for any tolerance occurring in height direction of the bandraster and splice in view of obtaining an optimum alignment of the base walls of successive bandrasters, to fix the position of the splice within the bandraster and to improve the stretching of the bandraster in height direction. The thus produced additional stretching in height direction has the effect that an optimum alignment of consecutive bandrasters may be achieved, as the position of consecutive bandrasters is now controlled in longitudinal direction, width direction and height direction of the bandraster and splice.

[0024] A ceiling extending at different levels may be built with a bandraster system which comprises at least one bandraster and splice the longitudinal bottom wall of which comprises a first and second longitudinally extending part, which slant with respect to each other along a longitudinally extending fold between them. Thereby, the first and second part may slant towards or from each other, depending on the direction in which the ceiling is to slant.

[0025] The bandraster system of this invention is also characterised in that it comprises at least one bandraster having a longitudinally extending flange which protrudes with respect to and extends along the upright side wall of the bandraster. The flange comprises a bottom face which extends in line with or in other words at the position of the bottom face or base wall of the bandraster. This flange in fact forms a support surface for the ceiling panels received between consecutive bandrasters, the edges of the ceiling panels supported by the flange being hidden above the flange. The fact that the bottom face of the bandraster is continued into the flange improves the aesthetic appearance.

[0026] In view of connecting a transversally extending bandraster to one or more longitudinally extending bandrasters, the bandraster system of this invention preferably comprises at least one transverse splice. The transverse splice in fact functions as a connecting piece connecting bandrasters which extend in perpendicular directions. The transverse splice of this invention comprises at an end part thereof suspension means for suspending it to the side wall of a bandraster which extends transversally with respect to the splice. The transverse splice further comprises first connecting means as described above, for connecting it to a bandraster extending longitudinally with respect to the transverse splice.

[0027] To facilitate the connection and to improve the aesthetic appearance, the suspension means comprise a bottom wall which extends from the bottom wall of the transverse splice and is dimensioned so as to be received on top of and to be supported by the longitudinal flange of the bandraster, which bottom wall is connected to connecting means for connecting the transverse splice to an upright side wall of the transversally extending bandraster.

[0028] The connecting means preferably comprise a top hook portion with clamping means to be clamped

over the top edge of the upright side wall of the transversally extending bandraster.

[0029] An improved alignment of the visible bottom face of bandrasters which extend perpendicularly with respect to each other is obtained by a transverse splice characterised by the presence of at least one resilient tongue which protrudes from a bottom face of the transverse splice in the direction of the longitudinally extending bandraster.

[0030] The invention is further elucidated in the appending figures and description of the figures.

[0031] Figure 1 a is a view to a bandraster connected to a splice and one additional bandraster to be connected to the splice.

[0032] Figure 1 b is a cross section of a bandraster connected to a splice.

[0033] Figure 2a is a view to a transverse splice.

[0034] Figure 2b shows an alternative embodiment of the transverse splice of this invention.

[0035] Figure 2c shows a bandraster connected to a transverse splice.

[0036] Figure 3 is a view to a wall connector part.

[0037] Figure 4 shows suspension means for suspending the bandraster system to the building construction.

[0038] Figure 5 shows an embodiment of the bandraster system of this invention, having ceiling parts positioned at different levels.

[0039] The bandraster system 1 shown in figure 5 is provided to be mounted to an existing building construction in view of providing a new, lowered ceiling. The bandraster system 1 is however also useful for use as an original ceiling. The bandraster system functions as a support means for ceiling tiles to be positioned on the system.

[0040] The bandraster system 1 comprises a plurality of bandrasters or individual bandraster units 10. Consecutive bandrasters 10 are connected in longitudinal direction by means of at least one splice 20. In transverse direction of the bandrasters 10, between adjacent bandrasters, a plurality of transversally extending connector bandrasters 5 may be provided so as to connect parallel extending bandrasters spaced apart from each other, in view of providing a square or rectangular grid for supporting ceiling tiles. The bandraster system 1 may be suspended to a wall by means of a connector splice 50 (figure 3), to a suspending construction by means of an assembly of a suspension splice and shoe (40, 45) (figure 4) or to another bandraster by means of a cross connector 30, 31 (figure 2b). The bandraster may be further suspended to the building construction at well defined positions, by means of suspension splices 40, 45.

[0041] The ceiling tiles may be any tiles known to the person skilled in the art, for example square or rectangular tiles, planks or grids or any other shape ought suitable by the person skilled in the art.

[0042] A view to a preferred embodiment of the band-

draster of this invention is shown in figure 1 a. As can be seen from figure 1 a, each bandraster 10 comprises a substantially U-shaped portion with a longitudinally extending bottom wall 15, delimited by two longitudinally extending side walls 11, 12 provided on opposite sides of the bottom wall 15. The longitudinally extending bottom wall has an inner face 3 pointing towards the inner part of the U shaped portion and the plenum between the bandraster system and the building construction, and a bottom face 4 pointing towards the space to be covered by the bandraster system. The longitudinally extending side walls 11, 12 have a top edge 38. The top edge 38 may be a straight top edge, but may also comprise a part which is folded inwardly in view of limiting the upward displacement of a splice 20 connecting two consecutive bandrasters 10. The inwardly folded part of top edge 38 may further be folded downwardly towards the bottom wall 15 of the bandraster in view of further fixing the positioning of the splice 20 within the bandraster 10. The inwardly folded part 38 may be provided with a reinforcing hemmed edge 46, which counteracts deformation when the system is loaded and assists in maintaining the levelling of consecutive bandrasters. The hemmed edge allows controlling the height of the downwardly folded part and of obtaining a downwardly folded part with a reproducible height. This is especially the case when the bandraster 10 is made of steel, bending of the steel involving a re-crystallisation strengthening the material. Controlling the height of the downwardly folded part allows obtaining a bandraster system in which (i) the bandraster may always be positioned at the same height with respect to the rigid hanger, connecting the bandraster to the building construction; that (ii) consecutive bandrasters are well aligned. Because of the restricted space available on the rigid hanger, it is preferred to control the height of the downwardly bent part, in view of minimising the risk that the rigid hanger is moved to an angled position with respect to the bandraster, either in longitudinal or transverse direction of the bandraster.

[0043] The bandraster system 1 of this invention comprises means 13, 14, 23, 24 for connecting consecutive bandrasters 10 to each other through interfering splices 20. The connecting means may be any connecting means known to the man skilled in the art

- which are capable of limiting the displacement of bandraster 10 and splice 20 with respect to each other in longitudinal direction,
- which are capable of stretching the bandraster in height direction,
- the positioning of which on at least the bandraster 10 may be improved in view of providing an improved alignment of consecutive bandrasters. Or in other words with which it is possible to achieve that the visible side of the bottom wall 15 of consecutive bandrasters 10 extends at the same height in view of improving the aesthetic view of the grid 1.

[0044] The connecting means comprise mutually cooperating first 13, 14 and second 23, 24 connecting means, which are positioned at an end part of the bandraster (52, 53) and splice 20. The connecting means may be present at both opposite ends of each of the bandraster and splice or at only one single end if this allows a specific application or positioning of the bandraster and/or splice. In the preferred embodiment shown in the figures 1, the first connecting means comprise an elongated slot 14 and a slit 13, which are spaced apart from each other in longitudinal direction of the splice 20 or bandraster 10. The slit 13 extends in height direction of the upright side wall 11, 12, the elongated slot 14 is positioned at a distance d with respect to the bottom wall 15, 25 at a position shifted towards the bottom wall 15, 25 of the splice 20 or bandraster 10. First connecting means 13, 14 provided on opposite end parts of an upright wall 11, 12 point in opposite directions, which means that on each end part the slit 13 is positioned remote from the end part 52, 53 while the slot 14 is positioned proximate to the end part 52, 53.

[0045] The second connecting means 23, 24 comprise a resilient longitudinal tongue 24 provided to be received in the slot 14, a first end part of which comprises a protruding lip 23 which is provided to engage the slit 13 upon engagement of a splice 10 and a bandraster 20. The lip 23 has a height which is chosen somewhat smaller than the height of the slit 13, as a consequence of which the lip will automatically engage the slit when positioned in front of it. If so desired, the tongue 24 can be manually forced into the corresponding slot 14 of the splice. The resiliency of the tongue 24 provides for the removable connection.

[0046] An optimum stretching of the bandraster 10 is obtained when the slot 14 and slit 13 are provided on the bandraster 10 and the tongue 24 and lip 23 are provided on the splice 20. The lip 23 protrudes from the tongue in the direction of the bandraster 10.

[0047] The position of the first connecting means 13, 14 is determined with respect to the bottom wall 15, the connecting means being provided after the bandraster 10 has been formed by means of a roll forming process.

[0048] The splice 20 comprises a longitudinally extending bottom wall 25 (figure 1 a and 1b). The bottom wall 25 may have a width which is substantially the same as, but somewhat smaller than the width of the bottom wall 15 of the bandraster 10, or may have a substantially smaller width equal to or less than half of the width of the bottom wall 15 of the bandraster 10. In the latter case, the bottom wall 25 will in general be delimited by a single upright side wall extending along only one of the longitudinal sides of the bottom wall 25.

[0049] A view to a preferred embodiment of the splice 20 of this invention is also shown in figure 1a. As can be seen from figure 1a, the splice 20 comprises a longitudinally extending bottom wall 25 delimited by upright longitudinal side walls 21, 22 on opposite sides of the bottom wall 25. The bottom wall 25 and upright side

walls 21, 22 enclose an inner space 39 pointing towards the plenum between the bandraster system and the building construction. Preferably the width of the bottom wall 25 of the splice is chosen such that it is somewhat smaller than the width of the bottom wall 15 of the bandraster, to provide for an easy insertion of the splice into the bandraster. Simultaneously, the upright side walls 21, 22 of the splice 20 are mounted such that they exert an outwardly extending force to the side walls 11, 12 of the bandraster in view of stretching the bandraster in width direction. The outer width of the splice, measured between outer faces of the side walls, when adapted to the inner width of the bandraster, i.e. the width between inner faces of the side walls of the bandraster, can further assist in this stretching.

[0050] If it is the intention to provide a ceiling extending at different levels as is shown in figure 5, use is made of a folded bandraster 9. The folded bandraster 9 comprises a longitudinally extending fold 17, connecting a first and second longitudinally extending base part 18, 19, which slant with respect to each other along the longitudinally extending fold 17 between them. To connect consecutive folded bandrasters 9 use can for example be made of a folded splice having a first 28 and second 29 part which are folded along a folding line 49 for connecting consecutive folded bandrasters to each other. However, it is also possible to use a splice 20 having a the bottom wall which extends over a width which is smaller than or equal to the width of the first or second base part 18, 19 of the bandraster and a single upright side wall 11 or 12. This type of splices, which may for example extend over maximum half of the width of the bottom wall 15 of the bandraster, has the advantage of being suitable for use with any of the type of bandrasters 10 described herein, independently of the shape of the bottom wall 15. However, the width of the bottom wall 15 may be larger if this is ought suitable by the person skilled in the art. The first and second part 18, 19 of the bandraster 9 may either slant towards or from each other.

[0051] If it is the intention of covering a space comprising partitions dividing the space to be covered by the bandraster system of this invention, the bottom wall 15 of bandraster 10 may comprises an inwardly protruding longitudinal groove 16, or in other words a groove protruding in the inner space 3' of the bandraster enclosed by the bottom wall 15 and the upright side walls 11, 12.

[0052] The side walls 11, 12 of the bandraster 10 may be immediately connected to the bottom wall 15 along for example a substantially straight edge, or may be connected to the bottom wall 15 by means of a longitudinally extending flange 5 which extends parallel to the side walls 11, 12 and protrudes therefrom. The bottom face 6 of the flange 5 preferably extends along the bottom face 4 of the bandraster 10. The flange 5 functions as a support surface for the rim of any ceiling tiles positioned on top thereof. If so desired however, in certain embodiments the bottom face 6 of the flange may as well ex-

tend at a level different from the visible bottom face 4 of the bandraster.

[0053] In view of compensating any tolerances in height direction, in the bottom 25 of the splice a further resilient tongue 27 is provided which protrudes from the bottom of the splice 20 towards the bottom 15 of the bandraster 15, to achieve a stretching effect in height direction of the bandraster. It is however also possible to provide a similar resilient tongue on top of the bottom wall of the bandraster which protrudes from this bottom wall towards the splice.

[0054] The bandraster system 1 of the present invention will usually comprise a second type of bandraster, in particular a transverse bandraster 10' connecting two parallel extending bandrasters 10 in transverse direction as is shown in figure 5. This is done to provide a sufficiently solid system, and to provide a support for the tiles to be supported by the bandraster system. In principle, transverse bandraster 10' comprises the same structural elements as the bandraster 10 described above.

[0055] The transverse bandraster 10' is connected to a bandraster 10 by means of a connector splice or cross connector 30 as is shown in figure 2a, which functions to connect two bandrasters to each other in for example a perpendicular direction. The connector splice 30 comprises suspension means 31, 34, 35, 36 for suspending it to the side wall 11 of a bandraster 10 extending transversally with respect to the transverse splice 30. The connector splice further comprises first connecting means 13, 14 for connecting it to a bandraster 10 extending longitudinally with respect to the transverse splice. The suspension means 31 comprise a bottom wall 34 which extends from the bottom wall of the transverse splice and is dimensioned so as to be received on top of and to be supported by the longitudinal flange 5 of the bandraster 10, which bottom wall is connected to clamping means 35 clamping the transverse splice 30 over the top edge 38 of a bandraster 10. The clamping means may for example comprise a top hook 35 to be received over the top edge 38 of the upright side wall 11, 12 of the transversally extending bandraster and clamping means 36 to be clamped over the top edge 38. The base of the transverse splice comprises at least one resilient tongue 37, which protrudes from a bottom wall 25 of the transverse splice 30 in the direction of the longitudinally extending bandraster 10 positioned underneath. The above described cross connector may also be used for coupling a folded bandraster 10' to a further bandraster 10 or folded bandraster 9.

[0056] The bandraster system 1 of this invention may also comprise at least one suspension shoe 40 which functions to co-operate with a rigid hanger 45 of wall connector 50 in view of suspending the bandraster system 1 to a wall. In the embodiment of figure 4, this suspension shoe comprises a longitudinally extending bridge 41 which protrudes from the bottom wall leaving a free space between the bottom wall 25 and the side

of the bridge 41 facing the bottom wall. The suspension shoe may further comprise a first 42 and second notch 43 which are spaced from each other and from the bridge 41 and shifted towards the end part of the splice with respect to the bridge 41. This type of suspension shoe is provided to co-operate with a rigid hanger 45, comprising an upright part 47 to be suspended to the building construction, and a connecting part 48 connecting the rigid hanger 45 to a suspension shoe 40. The connecting part 48 is provided to pass below the bridge 41 of the suspension shoe 40, the displacement of the rigid hanger 45 into the suspension shoe 40 being limited by notch 43 and locked by notch 42 which is provided to be received within hole 44 of rigid hanger 45 in view of fixing the position of suspension shoe 40 with respect to the rigid hanger 45. The wall connector 50 shown in figure 3 has a somewhat different construction and is made of a single part. As can be seen from the comparison of figure 3 and 4 the angle between the upright part 47 and base 48 may vary between virtually perpendicular and slanting under a smaller angle.

[0057] According to a further preferred embodiment, the bandraster 10 may be adapted to receive lightning devices or electric contacts. Thereto, the bandraster may for example comprise a bottom wall 15 into which at least one hole is left out for receiving lightning. The bandraster may for example comprise an inwardly protruding groove 16 into which electric contacts are provided for mounting lightning.

[0058] When connecting consecutive bandrasters 10, a splice 20 is inserted in the bandraster 10 in such a way that the bottom walls 15, 25 of bandraster and splice face one another, the side walls 21, 22 of the splice are received in the inner space of the bandraster, the top edge 39 of the side walls of the splice being received in the space between the top edge 38 of side wall 11, 12 and the downwardly bent part. Lip 23 extends in height direction of the side wall 21, 22 of splice 20 and is provided to be received in slit 13 on the bandraster and limits the displacement of bandraster 10 and splice 20 with respect to each other in longitudinal direction. The tongue 24 is provided to be received in hole 14 and to exert an outwardly directed force to the bandraster 10.

Claims

1. A bandraster system (1) comprising a plurality of bandrasters (10) and splices (20) for connecting successive bandrasters to each other, each bandraster (10) comprising a substantially U shaped portion with two upright side walls (11, 12) on opposite longitudinal sides of a bottom wall (15) and an open top, each splice (20) comprising a bottom wall (25) and at least one upright side wall (21, 22), the splice (20) being provided to be received at least partly in an end part of the bandraster (10), the bandraster (10) and splice (20) comprising mutually co-operat-

ing connecting means, **characterised in that** the connecting means (13, 14, 23, 24) comprise mutually co-operating first (13, 14) and second (23, 24) connecting means positioned at an end part of each of the bandraster and splice (10, 20), connecting means on opposite end parts pointing in opposite directions; **in that** the first connecting means comprise an elongated slot (14) and a slit (13) spaced apart from each other in longitudinal direction, the slit (13) extending in height direction of the upright side wall (11, 12), the elongated slot (14) being positioned at a distance d with respect to the bottom wall (15, 25) at a position shifted towards the bottom wall; **in that** the second connecting means (23, 24) comprise a resilient longitudinal tongue (24) provided to be received in the slot (14), at such a position that an upper edge of the tongue (24) abuts against an upper edge (51) of the slot (14), an end part of the tongue comprising a protruding lip (23) which is provided to engage the slit (13) upon engagement of a splice (10) and a bandraster (20).

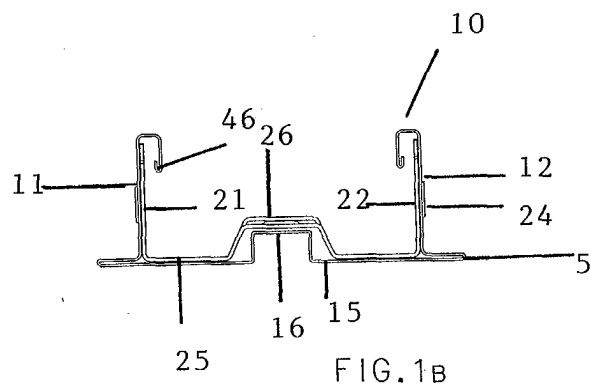
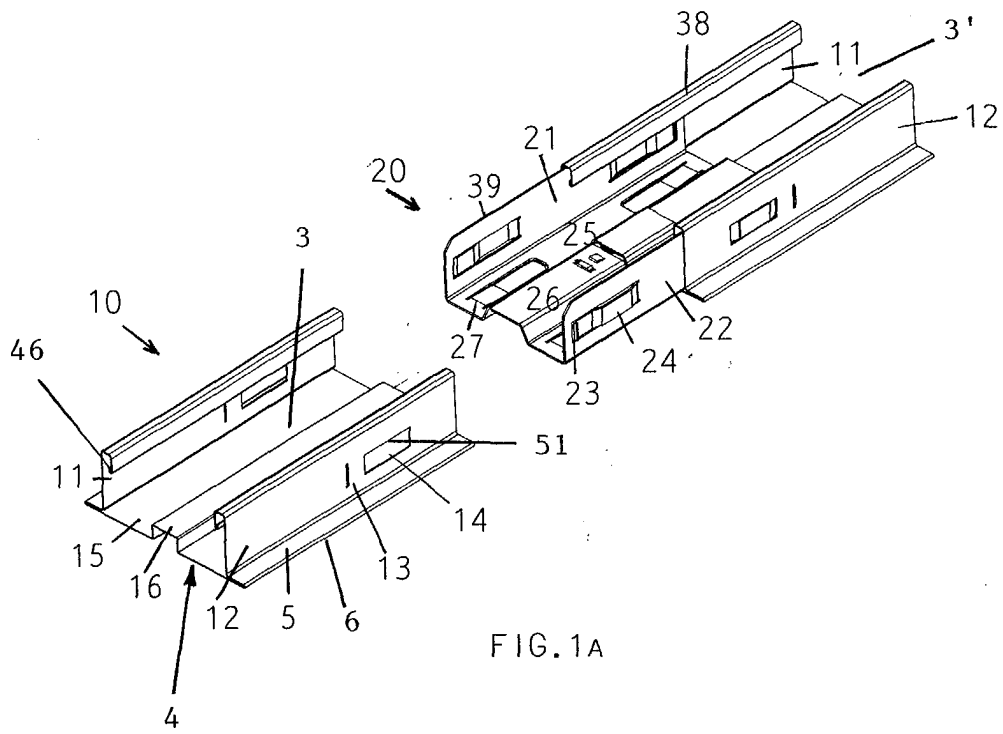
2. A bandraster system as claimed in claim 1, **characterised in that** opposite end parts (52, 53) of the bandraster (10) in longitudinal direction are provided with first connecting means (13, 14) and **in that** opposite end parts of the splice (20) in longitudinal direction are provided with second connecting means (23, 24).
3. A bandraster system as claimed in claim 1 or 2, **characterised in that** the slit (13) is positioned remote from the end part, and **in that** the slot (14) is positioned proximate to the end part.
4. A bandraster system as claimed in any one of claims 1-3, **characterised in that** the splice (20) comprises two longitudinal opposite upright side walls (21, 22) on opposite sides of the bottom wall (25), each of the side walls (21, 22) being provided to exert an outwardly extending force to the facing side wall (11, 12) of the bandraster (10).
5. A bandraster system as claimed in claim 1, **characterised in that** the bandraster system comprises a connector splice, the connector splice having a bottom wall (25) and at least one upright side wall (21, 22), a first end part (32) of the upright side wall of the splice (30) comprising second connecting means (23, 24) and a second end part (33) of the upright side wall of the splice comprising suspension means (31) for suspending the splice to a side wall (11, 12) of the bandraster (10).
6. A bandraster system as claimed in any one of claims 1 - 5, **characterised in that** the bandraster system comprises at least one bandraster and splice (10, 20) with a bottom wall (15, 25) having a

groove (16, 26) protruding towards the inner space of the bandraster and splice, the groove of the splice (26) being provided to receive the groove (16) of the bandraster, the dimensions of both grooves being adapted so as to provide a close fit.

7. A bandraster system as claimed in any one of claims 1-6, **characterised in that** in the bottom wall (25) of the splice (20), at least one resilient tongue (27) is provided, which protrudes from a bottom face of the splice (20) in the direction of the bandraster (10).
8. A bandraster system as claimed in any one of claims 1-17, **characterised in that** the supporting grid comprises at least one suspension splice (40, 45) having connecting means (42, 43) for removably connecting the splice (40) to one or more of a suspension shoe and rigid hanger (44, 45, 48) for suspending the splice.
9. A bandraster system as claimed in any one of claims 1-8, **characterised in that** the bandraster (10) and splice (20) each comprise a longitudinally extending bottom wall (15, 25), the bottom wall comprising a first and second longitudinally extending base part (18, 19, 28, 29), which slant with respect to each other along a longitudinally extending fold (17, 49) between them.
10. A bandraster system as claimed in claim 9, **characterised in that** the first and second longitudinally extending base part (18, 19, 28, 29) slant towards or from each other.
11. A bandraster system as claimed in any one of claims 1-10, **characterised in that** the bandraster system comprises at least one bandraster (10) having at least one longitudinally extending flange (5) which protrudes from and extends along at least one upright side wall (11, 12), the flange comprising a bottom face (6) which extends at the position of a bottom face (4) of the bandraster (10).
12. A bandraster system as claimed in any one of claims 1-11, **characterised in that** the bandraster system comprises at least one transverse splice (30) for connecting a first and second bandraster extending perpendicular with respect to each other, the transverse splice (30) having third connecting means (31, 35, 36) for connecting it to the side wall (11) of a bandraster (10) extending transversally with respect to the transverse splice (30), and first connecting means (13, 14) for connecting it to a bandraster (10) extending longitudinally with respect to the transverse splice.
13. A bandraster system as claimed in claim 12, **char-**

acterised in that the third connecting means (31, 35, 36) comprise suspension means for suspending the transverse splice to the upright side wall (11) of the bandraster (10).

14. A bandraster system as claimed in claim 10, 12 or 13, **characterised in that** the suspension means (31) comprise a bottom wall (34) which extends from the bottom wall of the transverse splice (30) and is dimensioned so as to be received on top of and to be supported by the longitudinal flange (5) of the bandraster (10), which bottom wall is connected to a top hook (35) to be received over the top edge (18) of the upright side wall of the transversally extending bandraster and clamping means (36) to be clamped over the top edge (18) of the bandraster.
15. A bandraster system as claimed in claim 12-14, **characterised in that** in the bottom wall (25) of the transverse splice (30), at least one resilient tongue (37) is provided, which protrudes from the bottom wall (25) of the transverse splice (30) in the direction of the longitudinally extending bandraster (10).
16. A bandraster system as claimed in any one of claims 1-15, **characterised in that** the bandraster (10) comprises a bottom wall (15) into which at least one hole is left out for receiving lightning.
17. A bandraster system as claimed in any one of claims 1-16, **characterised in that** the bandraster comprises a bottom wall (15) with an inwardly protruding groove (16) into which electric contacts are provided for mounting lightning.
18. A splice for use with the bandraster system as claimed in any one of claims 1-17.
19. A suspension splice for use with the bandraster system as claimed in any one of claims 1-17.
20. A transverse splice for use with the bandraster system as claimed in any one of claims 1-17.



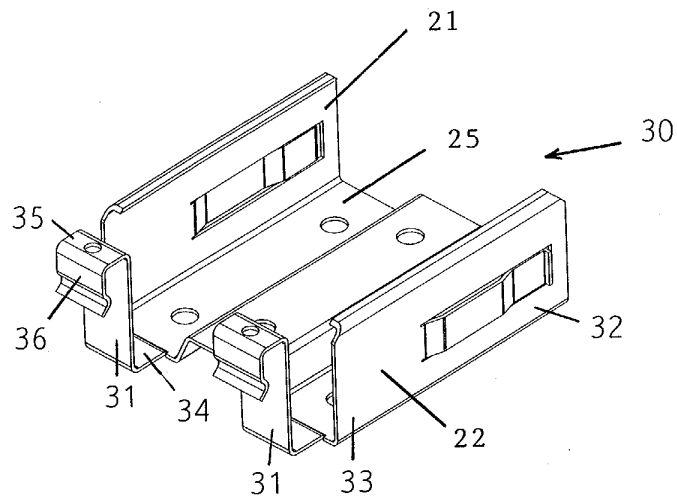
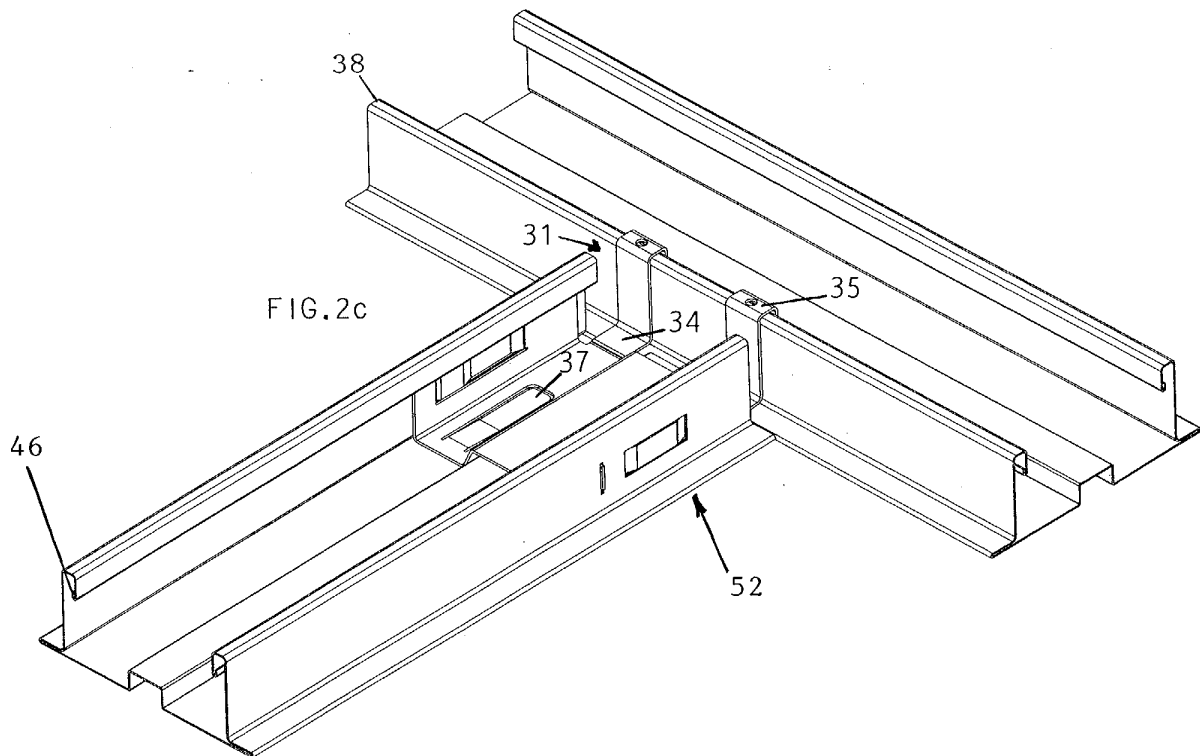
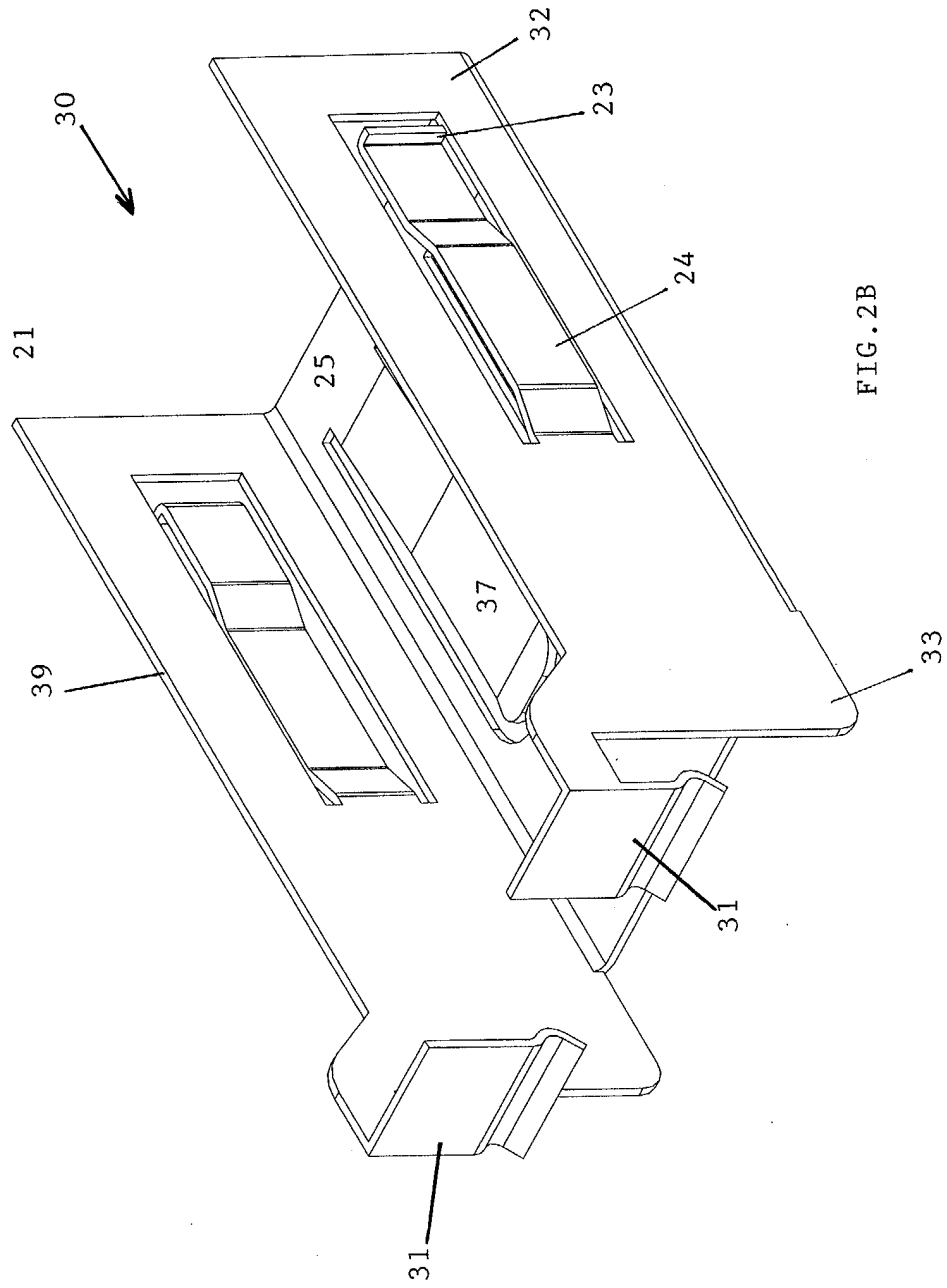
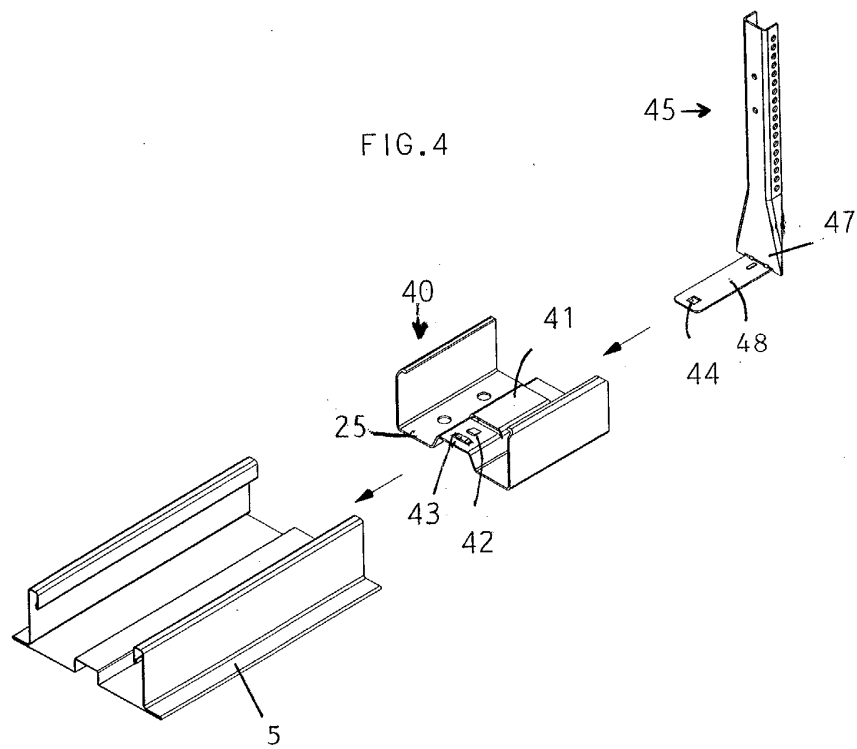
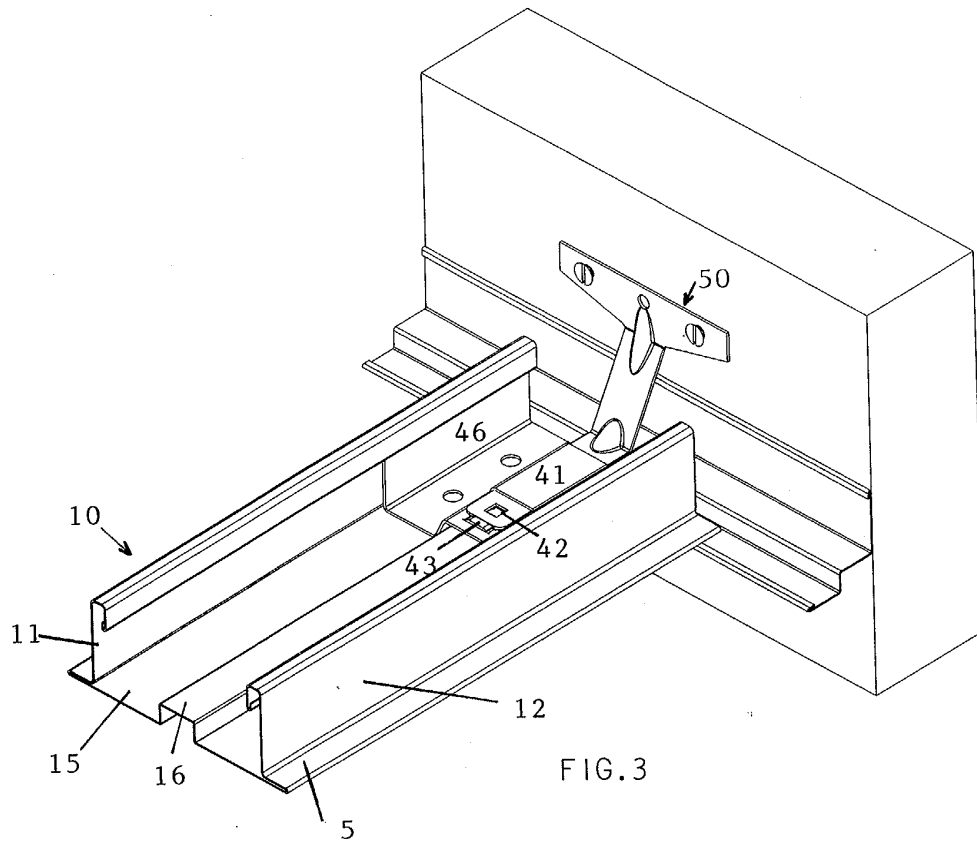


FIG. 2A







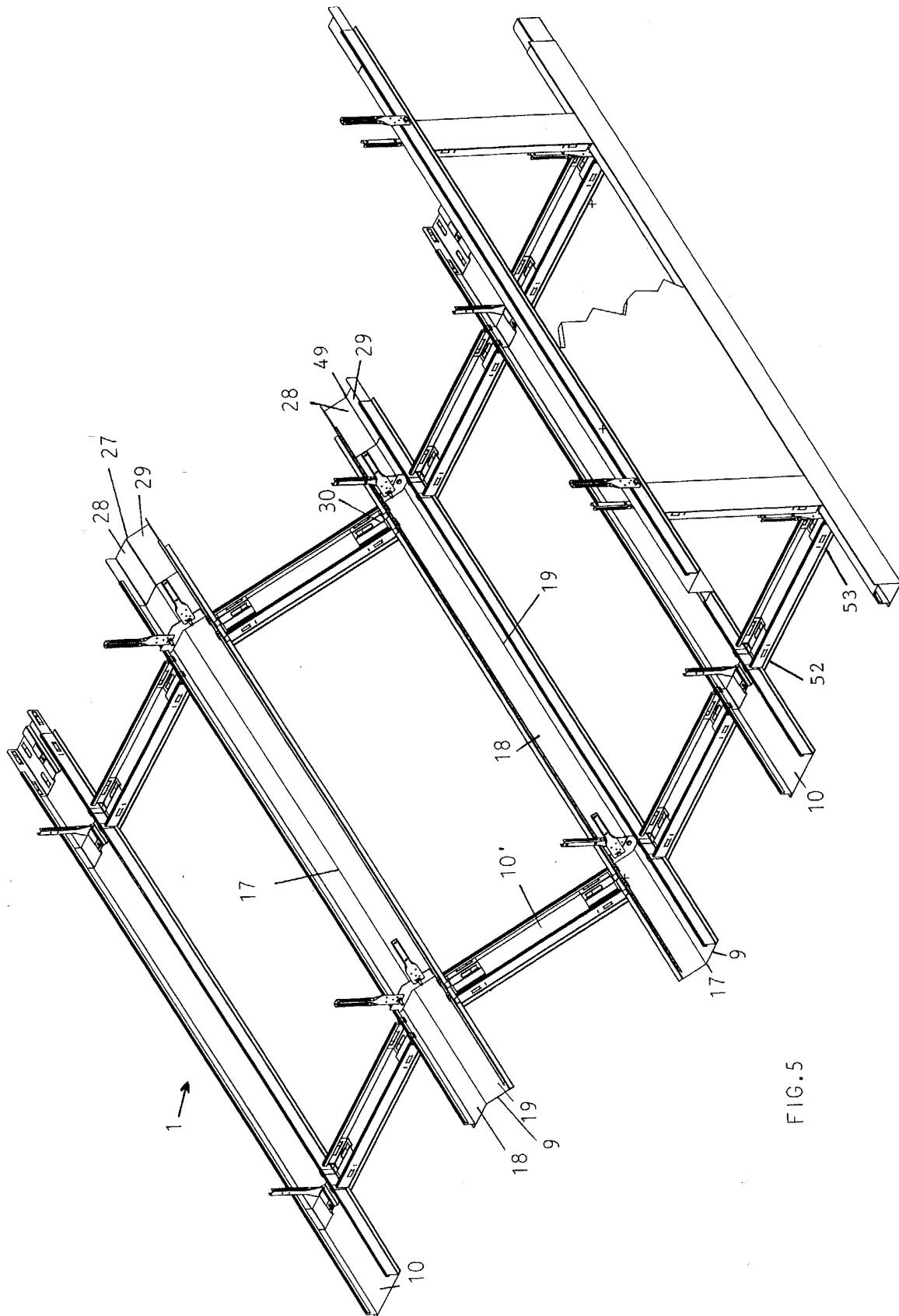


FIG. 5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 44 7029

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 4 492 066 A (LALONDE PAUL D) 8 January 1985 (1985-01-08) * column 2, line 57 - column 3, line 2; figures 1,2,9 * * column 5, line 16 - column 6, line 2 * ---	1-8, 11-15, 18-20	E04B9/12 E04B9/30 E04B9/16
D,A	GB 2 266 736 A (RUETGERS PAGID AG) 10 November 1993 (1993-11-10) * figure 1 * ---	1-5, 12-14, 18-20	
A	US 4 598 521 A (EVERITT BRIAN T ET AL) 8 July 1986 (1986-07-08) * figures 1-3 * ---	1-5, 12-14, 18-20	
A	US 5 699 641 A (HOOPER DOUGLAS ET AL) 23 December 1997 (1997-12-23) * figures 3-7 * ---	1-5, 12-14, 18-20	
A	CA 1 322 647 C (DONN CANADA LTD) 5 October 1993 (1993-10-05) * figures 1-5 * -----	1-5, 12-14, 18-20	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 8 June 2004	Examiner Vratsanou, V
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

1

EPC FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 44 7029

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-06-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4492066 A	08-01-1985	NONE	

GB 2266736 A	10-11-1993	DE 9206049 U1	02-07-1992
		BE 1006123 A6	17-05-1994
		FR 2690941 A3	12-11-1993
		IT RM930083 U1	05-11-1993
		LU 88245 A1	01-03-1994
		NL 9300525 A	01-12-1993

US 4598521 A	08-07-1986	NONE	

US 5699641 A	23-12-1997	NONE	

CA 1322647 C	05-10-1993	CA 1317432 C	11-05-1993
		CA 1322647 C2	05-10-1993

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82