



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.01.2007 Bulletin 2007/02

(51) Int Cl.:
E04B 9/14 (2006.01) **E04B 9/10 (2006.01)**
E04B 9/18 (2006.01)

(21) Application number: **05106258.6**

(22) Date of filing: **08.07.2005**

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

(72) Inventors:
• **Hedrn, Mattias**
218 32, Bunkeflostrand (SE)
• **Albertsson, Lars**
260 40, Viken (SE)

(71) Applicant: **Tego System AB**
261 22 Landskrona (SE)

(74) Representative: **Milanov, Nina Vendela Maria et al**
Awapatent AB
P.O. Box 5117
200 71 Malmö (SE)

(54) **Functional ceiling system and method of earthing such system**

(57) A functional ceiling system comprises channels (202) and a hanger (203) for connecting channels (202). The hanger (203) is optionally provided with brackets (204) for hanging the ceiling system (202) from an existing overhead structure. For ensuring electrical contact

between said channels (202) and said hanger (203), at least one of said channels (202) is provided with a sharp edge (216 for engagement of the hanger (203) or said hanger (203) is provided with a sharp edge (216) for engagement of at least one of said channels (202) A method of earthing a functional ceiling system is also disclosed.

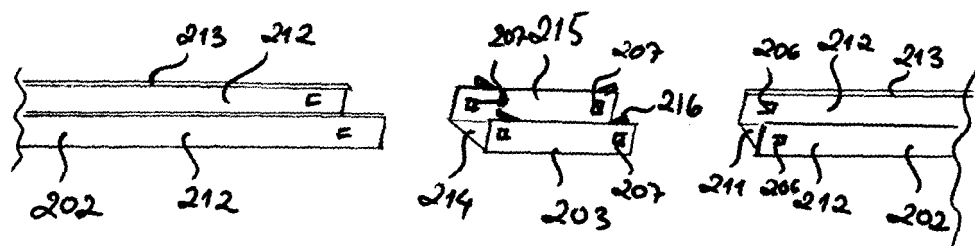


Fig. 6

Description

Technical Field of the Invention

[0001] The present invention relates to a functional ceiling system comprising channels and a hanger for connecting channels and optionally provided with brackets for hanging the ceiling system from an existing overhead structure. The invention also relates to a method of earthing a functional ceiling system.

Background Art

[0002] Functional ceiling systems are commonly used in stores of various types, often stores of warehouse type where the floor to ceiling height is significant and/or when unsightly constructional details are present in the original ceiling. A functional ceiling system is then arranged below the original ceiling and provides anchoring points for lighting fixtures, signs, decorations, sound absorbing material, surveillance systems, loudspeakers and so forth. The ceiling systems often comprise U-shaped beams, called primary channels and secondary channels, and some sort of hanger, the latter acting as a connection structure between the channels and also as an anchoring point to the suspension to the original ceiling. The primary and secondary channels, respectively, are mounted perpendicular to each other, meeting in the connection structure of the hanger. Prior art ceiling systems are described in e.g. GB-A-2 240 124, and in the product catalogue "Systems and Components" (provided by TEGO System AB).

[0003] Recently, there has been an increased interest in providing a potential equalisation or earthing of such ceiling systems in order to avoid accidents involving electricity. This may be done using earthing wires that are connected to the different parts of the ceiling system. However, it is time consuming to add these extra wires and there is always a risk that the earthing is not properly done, should a wire not be accurately connected.

Summary of the Invention

[0004] It is therefore an object of the present invention to provide a functional ceiling system that is easy to earth.

[0005] A specific object of the invention is to provide a functional ceiling system that may be earthed without the need for extra parts.

[0006] It is also an object of the invention to provide a method of earthing a functional ceiling system, which in a practical way ensures a correct earthing of the functional ceiling system.

[0007] According to the invention, these objects are achieved by means of a functional ceiling system as claimed in claim 1, preferred embodiments thereof being defined in dependent claims 2-7.

[0008] These objects are also achieved through a method according to claim 8. Preferred variants are put

forth in dependent claims 9-10.

[0009] For ensuring electrical contact between the channels and the hanger of the functional ceiling system of the invention at least one of the channels is provided with a sharp edge for engagement of the hanger or the hanger is provided with a sharp edge for engagement of at least one of the channels. In this manner, electrical contact between the hanger and the channels can easily be established, even if the channels have a coat of paint, and without the need for extra wires.

[0010] The channels of the functional ceiling system of the invention are preferably primary channels and optionally secondary channels arranged essentially perpendicularly to the primary channels.

[0011] The primary channels may fit overlappingly on the hanger and the hanger be provided with a sharp protrusion for engagement of the primary channel. In this manner, the electrical contact between the primary channel and the hanger may be established automatically when the primary channel is slipped onto the hanger.

[0012] In one embodiment, the primary channels and the hanger have an essentially U-shaped cross section with a web and two flanges and the primary channels have an inbent portion, wherein the hanger at a top edge of at least one of its flanges has a sharp protrusion for engagement of an underside of the inbent portion of the primary channels when the primary channels are slipped onto the hanger. This arrangement makes it particularly easy to ensure electrical contact, while at the same time the protrusion on the hanger is visually concealed by the inbent portion of the primary channel.

[0013] The sharp protrusion is preferably formed as a resilient tongue cut from the top edge of one of the flanges of the hanger. The resilience of the tongue makes it possible to accommodate differences in cross sectional dimensions of the primary channels and the hanger caused by manufacturing tolerances.

[0014] Alternatively, the sharp protrusion may be formed on an outside of the web of the hanger for engagement of an inside of the web of the primary channels. This is another way of enabling a visually concealed protrusion which may easily and automatically establish electrical contact between the primary channels and the hanger.

[0015] In another type of functional ceiling system wings are arranged at the ends of the secondary channels for insertion into overlapping slots in the primary channels and the hanger for locking the primary channels and the secondary channels against the hanger, wherein the wings are provided with a sharp edge for engagement with the primary channels and the hanger. In this way, electrical contact may easily be established between all parts of the ceiling system.

[0016] In the inventive method of earthing a functional ceiling system, for ensuring electrical contact between the channels and the hanger, a sharp edge on at least one of the channels is engaged with the hanger or a sharp edge on the hanger is engaged with at least one of the

channels. This method makes it possible to easily establish electrical contact between the hanger and the channels, even if the channels have a coat of paint, and without the need for extra wires.

[0017] The channels of the functional ceiling system are preferably primary channels and optionally secondary channels arranged essentially perpendicular to the primary channels, and the primary channels may be slipped overlappingly onto the hanger such that a sharp protrusion on the hanger engages the primary channels. In this manner, the electrical contact between the primary channel and the hanger may be established automatically when the primary channel is slipped onto the hanger.

[0018] In a functional ceiling system with primary channels and secondary channels arranged perpendicular to the primary channels, wherein the secondary channels have wings at their ends, the wings may be inserted into overlapping slots in the primary channels and in the hanger, said wings having a sharp edge that engages the primary channels and the hanger. With this method, electrical contact between the primary channels, the secondary channels and the hangers can easily and automatically be established when the ceiling system is assembled.

Brief Description of the Drawings

[0019] The invention will be described in more detail with reference to the appended schematic drawings, which show examples of currently preferred embodiments of the invention.

Fig. 1 is a perspective view of a part of a functional ceiling system according to a first embodiment of the invention.

Fig. 2 is a view detail A of the ceiling system of Fig. 1.

Fig. 3 is a perspective view of a part of a functional ceiling system according to a second embodiment of the invention.

Fig. 4 is an exploded view of the ceiling system of Fig. 3.

Fig. 5 is a perspective view of a part of a functional ceiling system according to a third embodiment of the invention.

Fig. 6 is an exploded view of the ceiling system of Fig. 5.

Fig. 7 is a perspective view of a part of a functional ceiling system according to a fourth embodiment of the invention.

Fig. 8 is an exploded view of the ceiling system of Fig. 7.

Fig. 9 is a perspective view of a hanger similar to the one in the ceiling system of Fig. 6.

Fig. 10 is a perspective view from below of a hanger that is lightly modified as compared to the one in Fig. 9.

Detailed Description of Preferred Embodiments of the Invention

[0020] The functional ceiling system 1 shown in Figs 1 and 2 consists of a number of primary channels 2 connected by means of hangers 3. The primary channels 2 and the hangers 3 are made of metal. Each hanger 3 is provided with a bracket 4 for hanging the ceiling system 1 from an existing overhead structure (not shown). Two primary channels 2 are connected to each hanger 3 using a snap lock 5 comprised of a plate spring 6 arranged on the hanger 3 and an aperture 7 in the primary channel 2. At least one edge 8 of the plate spring 6 is sharp enough to cut through a possible paint coating on the primary channel 2.

[0021] When assembling the ceiling system 1, the fitter hangs two hangers 3 from the overhead structure and then slips each end of a primary channel 2 onto a respective hanger 3. By depressing a curved portion 9 of the plate spring 6, the fitter forces the plate spring 6 to lock into the aperture 7 in the primary channel 2, thus locking the primary channel 2 and the hanger 3 together. The sharp edge 8 of the plate spring 6 cuts through the paint coating on the primary channel 2, thus ensuring a good electrical contact between the primary channel 2 and the hanger. The ceiling system 1 will then only have to be connected to earth in one or a few points.

[0022] The functional ceiling system 1 of Fig. 1 also has secondary channels 10 extending perpendicularly between parallel primary channels 2. The secondary channels 10 are connected to the primary channels 2 by means of tongues 21 on the secondary channels 10, which are passed through openings 22 in the primary channels 2. A snap lock 5 locks the secondary channel 10 on the primary channel 2 in much the same way as the primary channels 2 are connected to the hangers 3. The tongues 21 have a sharp edge 23, which cuts through the paint coating on the primary channel 2. In this way, electrical contact is established also between the primary channels 2 and the secondary channels 10.

[0023] Figs 3 and 4 show a second embodiment of the invention. This functional ceiling system 101 consists of primary channels 102 connected by means of hangers 103. Secondary channels may also be added perpendicularly to the primary channels 102, but for the sake of clarity of the drawings such secondary channels are not shown. The primary channels 102 have a web 111 and two parallel flanges 112 perpendicular to the web 111. At the upper edge, the flanges 112 have an inward portion 113. The hanger 103 has a similar configuration with a web 114 and two flanges 115. The cross-section of the hanger 103 is slightly smaller than the cross-section of the primary channels 102, such that the primary channels 102 may be slipped onto the hanger 103. The primary channels 102 and the hanger 103 are locked together using a snap lock 105 of slightly simpler construction than the one used in the first embodiment described. A tab 106 is cut out from the web 111 of the primary channel 102

and bent slightly inwards into the primary channel 102. An aperture 107 is formed in the hanger 103. When the primary channel is slipped onto the hanger 103, the tab 106 first deflects and then exits through the aperture 107, thus locking the primary channel 102 and the hanger 103 together.

[0024] At the upper edge of one of the flanges 115, the hanger 103 near each end has a sharp protrusion in the form of a small tooth 116. When the fitter during assembly slips the primary channel 102 onto the hanger 103, the tooth 116 cuts through the paint coating on the underside of the inbent portion 113 of the primary channel 102. In this manner, electrical contact between the primary channel 102 and the hanger 103 is established.

[0025] Figs 5 and 6 show a third embodiment of the invention. This ceiling system 201 is very similar to the one of the second embodiment. Only the differences will therefore be described. The small protrusion on the hanger 203 is here in the form of a tongue 216 cut from the upper edge of the web 214 of the hanger 203. The tongue 216 has a sharp upper edge and is resilient. When the primary channel 202 is slipped onto the hanger 203, the sharp tongue will cut through the paint coating on the underside of the inbent portion 213 of the primary channel 202. The resilience of the tongue 216 makes it possible to accommodate differences in the dimensions of the cross-sections of the primary channel 202 and the hanger 203 that are caused by manufacturing tolerances. Further, the resilience of the tongue 216 makes it possible to repeatedly connect and disconnect the primary channel 202 and the hanger 203 without wearing out the earthing function of the tongue 216. The tongue 216 can be seen more clearly in Fig. 9, which shows a hanger similar to the one shown in Fig. 6. Fig. 10 shows a hanger 203 where the tongues 216 are instead formed in the web 214 of the hanger 203. In this manner, the tongues 216 will engage the inside of the web 211 of the primary channels 202 when the primary channels 202 are slipped onto the hanger 203.

[0026] Figs 7 and 8 show a functional ceiling system 301 according to a fourth embodiment of the invention consisting of primary channels 302, hangers 303 and secondary channels 310. The secondary channels 310 are at their ends provided with wings 317. When assembling the ceiling system 301 of this embodiment, the wings 317 are introduced into slots 318 in the primary channels 302 and slots 319 in the hanger 203. The slots 318 and 319 of the primary channels 302 and the hangers 303 overlap. In this manner, the wings 317 lock both the primary channels 302 and the secondary channels 310 onto the hangers 303. The wings 317 have a sharp edge 308 able to cut through the paint coating on the primary channels 302 and the hanger 303 in order to establish good electrical contact.

[0027] The skilled person realises that a number of modifications of the embodiments described herein are possible without departing from the scope of the invention, which is defined in the appended claims.

[0028] For instance, the functional ceiling system 1 of Fig. 1 is shown having both primary 2 and secondary channels 10. However, this ceiling system 1 may also be assembled without the secondary channels 10. In some cases, the company constructing and/or owning a building may provide the building with a ceiling system having only primary channels 2 and no secondary channels, and a shop keeper renting the building may later on add secondary channels 10 in parts or all of the building.

[0029] In the ceiling system 1 of the first embodiment shown, the snap locks 5 may also be reversed, such that the plate spring 6 is arranged on the primary channel 2 and the aperture formed in the hanger.

[0030] Similarly, the snap locks 5 connecting the secondary channels 10 to the primary channels 2 may also be reversed.

[0031] The snap lock 105 described in connection with Figs 3 and 4 may be modified, such that the tab 106 is initially not bent inwards, but left in the plane of the flange 112. When the primary channel 102 is slipped onto the hanger 103, the tab 106 in this case does not automatically snap into the aperture 107 in the hanger 103, but will have to be manually bent inwards to lock the primary channel 102 and the hanger 103 together.

[0032] The tooth 116 in the embodiment shown in Fig. 3 may instead of at the top edge of the flange 115 be arranged on the outside of the web 114 of the hanger 103 to engage the inside of the web 111 of the primary channel 102, similar to what is shown in Fig. 10.

[0033] The different ways of ensuring electrical contact between the parts of the ceiling system may of course also be combined, such that for example the connection between the primary channels and the hangers uses one type and the connection of the secondary channels to the primary channels or hangers uses another.

[0034] The skilled person will also realise that the three first embodiments shown are not limited to connection of the secondary channels to the primary channels. The secondary channels may of course also be connected to the hangers, similarly to the fourth embodiment. However, connection to the primary channels provides a higher degree of flexibility in the placement of the secondary channels.

Claims

1. A functional ceiling system comprising channels (2; 102; 202; 302) and a hanger (3; 103; 203; 303) for connecting channels (2; 102; 202; 302) and optionally provided with brackets (4; 104; 204; 304) for hanging the ceiling system (1; 101; 202; 301) from an existing overhead structure, **characterised in that**, for ensuring electrical contact between said channels (2; 102; 202; 302) and said hanger (3; 103; 203; 303), at least one of said channels (2; 102; 202; 302) is provided with a sharp edge (8; 116; 216; 308) for engagement of the hanger (3; 103; 203; 303) or

said hanger (3; 103; 203; 303) is provided with a sharp edge (8; 116; 216; 308) for engagement of at least one of said channels (2; 102; 202; 302).

2. A functional ceiling system as claimed in claim 1, wherein said channels are primary channels (2; 102; 202; 302) and optionally secondary channels (10; 310) arranged essentially perpendicular to the primary channels (2; 102; 202; 302). 5
3. A functional ceiling system as claimed in claim 2, wherein said primary channels (102; 202) fit overlappingly on the hanger (103; 203) and wherein said hanger (103; 203) is provided with a sharp protrusion (116; 216) for engagement of the primary channels (102; 202;). 10
4. A functional ceiling system as claimed in claim 3, wherein the primary channels (102; 202) and the hanger (103; 203) have an essentially U-shaped cross-section with a web (111, 114; 211, 214) and two flanges (112, 115; 212, 215) and the primary channels (102; 202) on each flange (112; 212) has an inbent portion (113; 213), and wherein the hanger (103; 203) at a top edge of at least one of its flanges (115; 215) has a sharp protrusion (116; 216) for engagement with an underside of the inbent portion (113; 213) of the primary channels (102; 202) when the primary channels (102; 202) are slipped onto the hanger (103; 203). 15
5. A functional ceiling system as claimed in claim 4, wherein the sharp protrusion is formed as a resilient tongue (216) cut from a top edge of one of the flanges (215) of the hanger (203). 20
6. A functional ceiling system as claimed in claim 4, wherein the sharp protrusion is formed on an outside of the web of the hanger for engagement with an inside of the web of the primary channels. 25
7. A functional ceiling system as claimed in claim 2, wherein wings (317) are arranged at the ends of the secondary channels (310) for insertion into overlapping slots (318, 319) in the primary channels (302) and the hanger (303) for locking the primary channels (302) and the secondary channels (310) against the hanger (303), and wherein the wings (317) are provided with a sharp edge (308) for engagement with the primary channels (302) and the hanger (303). 30
8. A method of earthing a functional ceiling system (1; 101; 201; 301) comprising channels (2; 102; 202; 302), a hanger (3; 103; 203; 303) for connecting the channels (1; 101; 201; 301) and optionally provided with brackets (4; 104; 204; 304) for hanging the ceiling system (1; 101; 201; 301) from an existing over- 35

head structure, **characterised in that**, for ensuring electrical contact between said channels (2; 102; 202; 302) and said hanger (3; 103; 203; 303), a sharp edge (8; 116; 216; 308) on at least one of said channels (2; 102; 202; 302) is engaged with the hanger (3; 103; 203; 303) or a sharp edge (8; 116; 216; 308) on said hanger (3; 103; 203; 303) is engaged with at least one of said channels (2; 102; 202; 302).

9. A method as claimed in claim 8, wherein the channels of the functional ceiling system (1; 101; 201) are primary channels (102; 202) and optionally secondary channels (10; 310) arranged essentially perpendicular to the primary channels (2; 102; 202), the primary channels (2; 102; 202) are slipped overlappingly onto the hanger (103; 203) and wherein sharp protrusions (116; 216) on the hanger (103; 203) engage the primary channels (102; 202). 40
10. A method as claimed in claim 8, wherein the channels of the functional ceiling system (301) are primary channels (302) and secondary channels (310) arranged essentially perpendicular to the primary channels (302), and wherein wings (317) at the ends of the secondary channels (310) are inserted into overlapping slots (318, 319) in the primary channels (302) and in the hanger (303), said wings (317) having a sharp edge (308) that engages the primary channels (302) and the hanger (303). 45

30

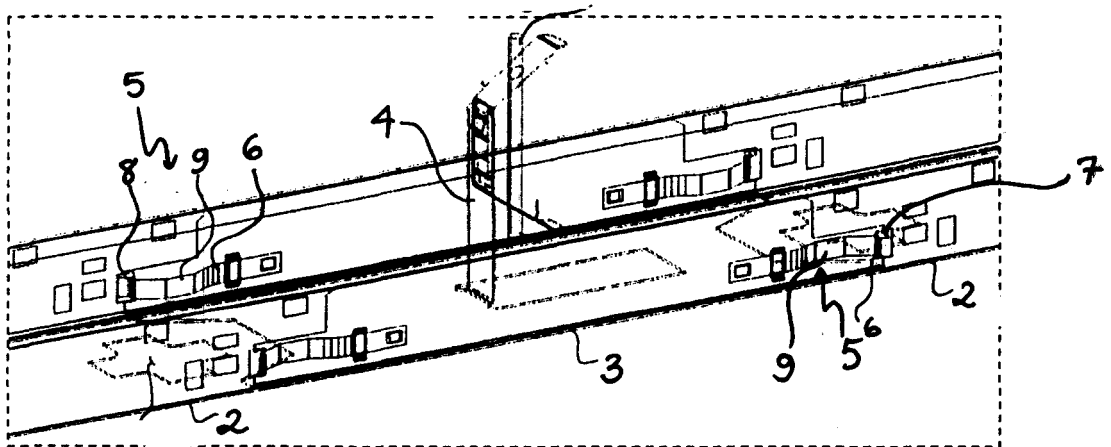
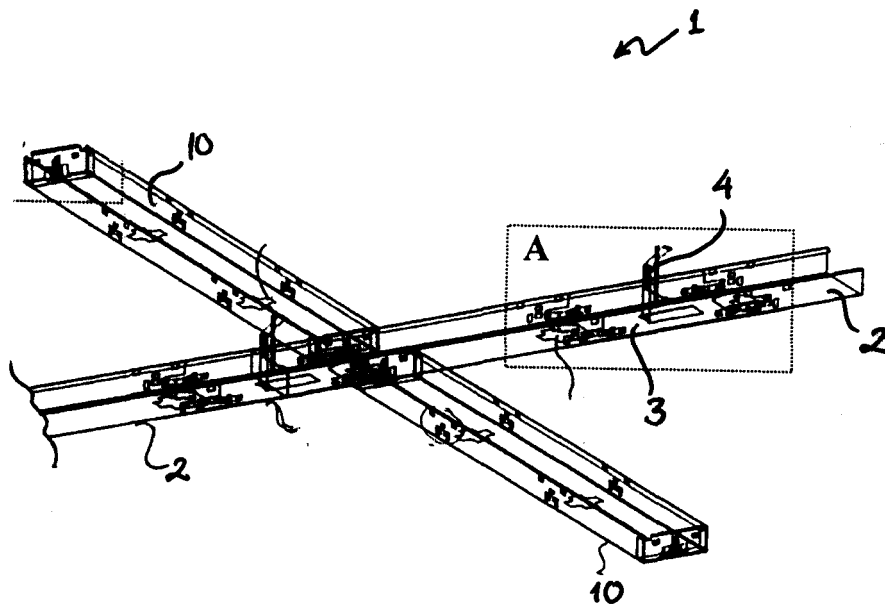
35

40

45

50

55



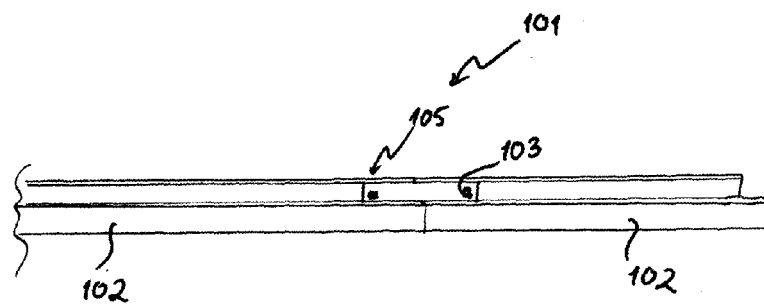


Fig. 3

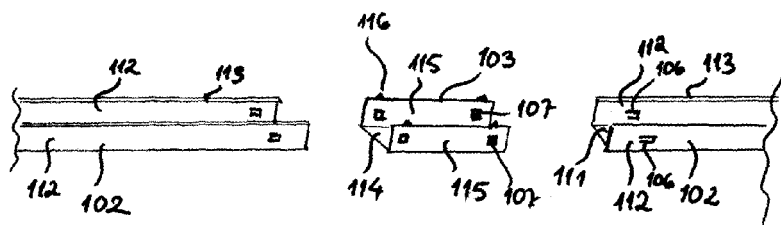


Fig. 4

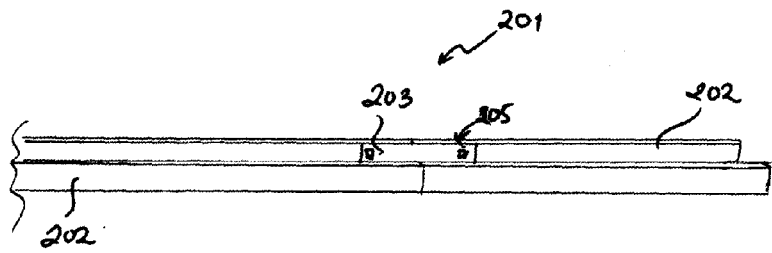


Fig. 5

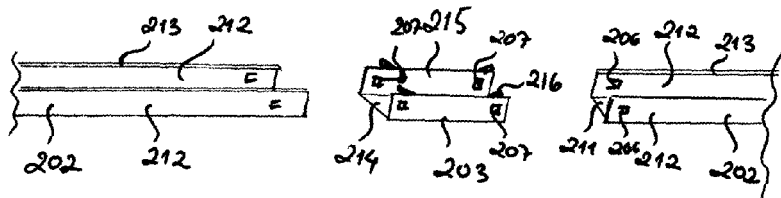
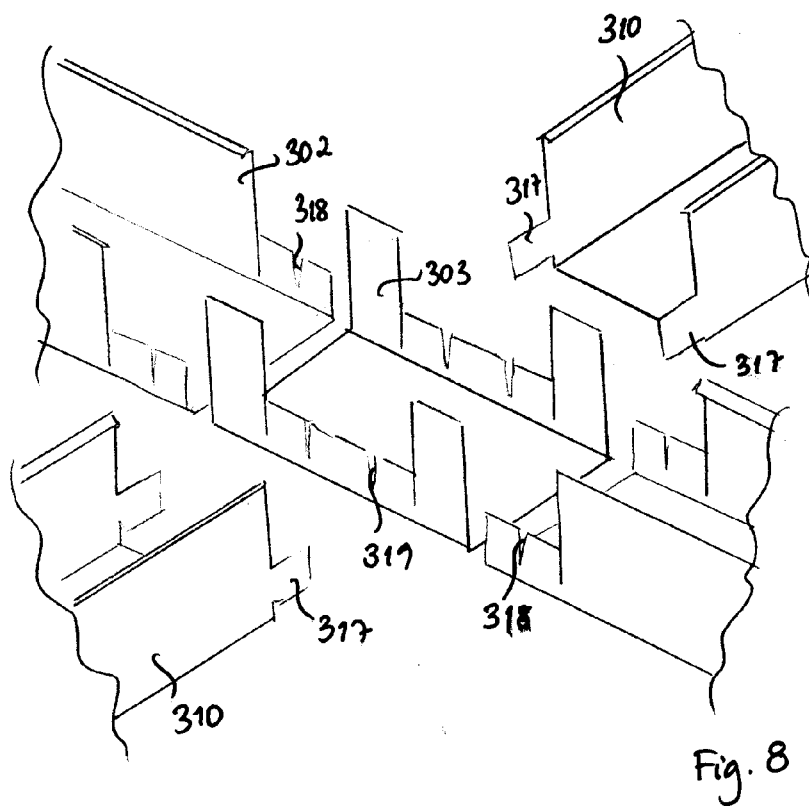
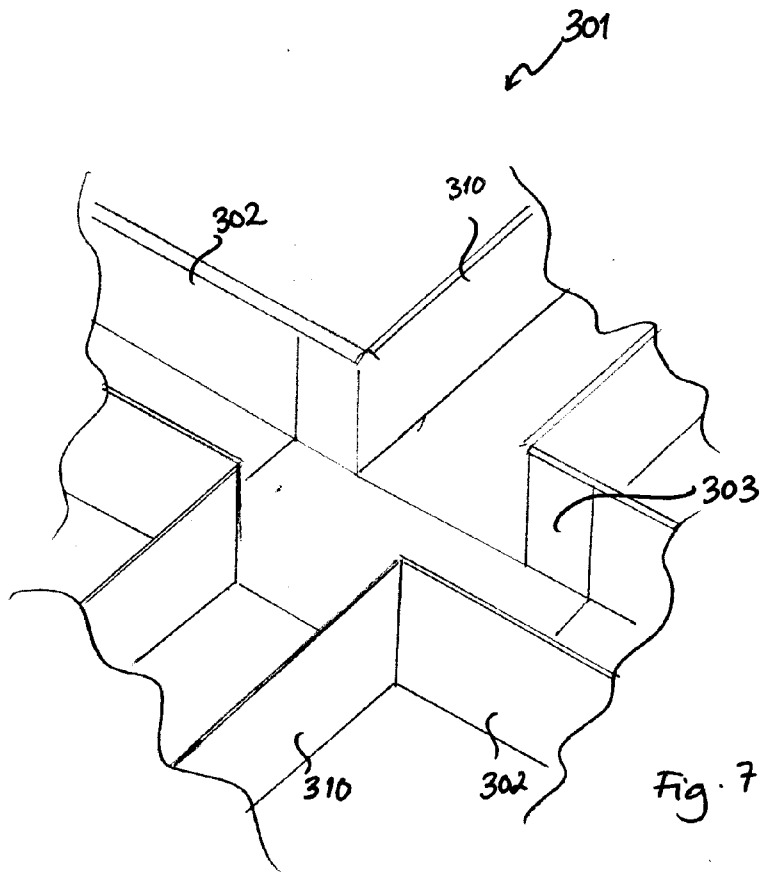
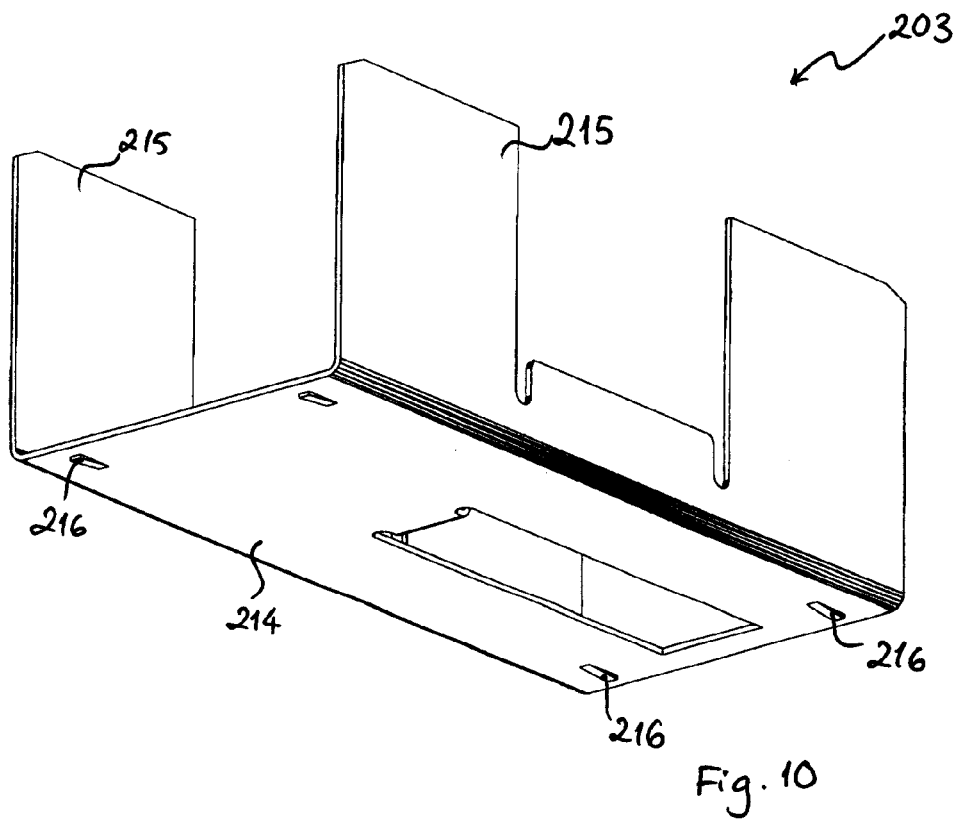
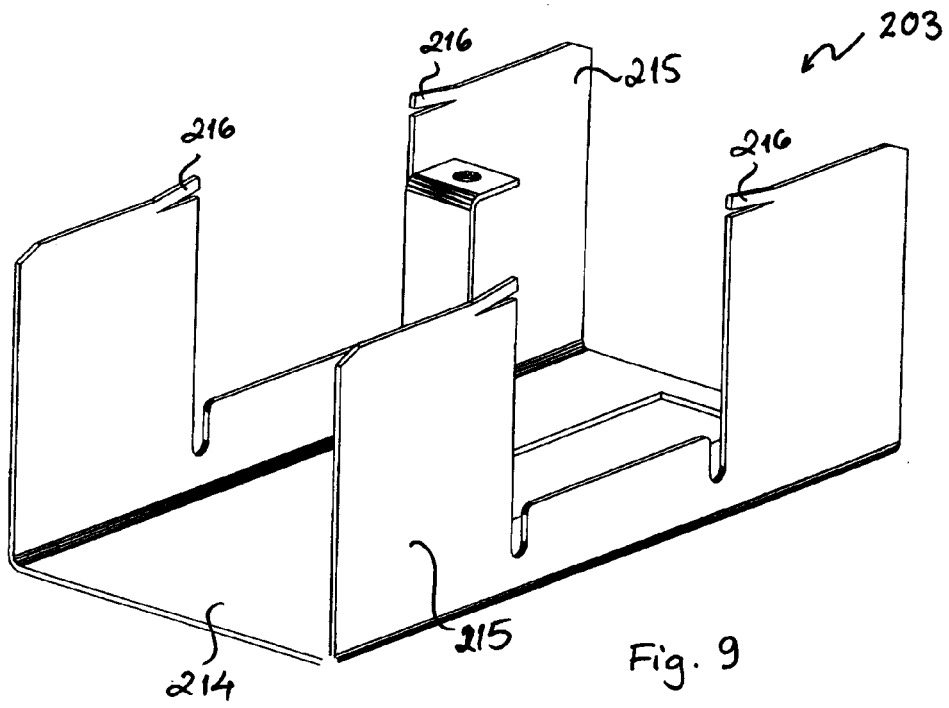


Fig. 6







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 10 6258

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 30 48 946 A1 (WICHERT, HANS-RAINER; WICHERT, HANS-RAINER, 5800 HAGEN, DE) 1 July 1982 (1982-07-01) * page 8, paragraph 2; figures 1,3 *	1-5,8,9	E04B9/14 E04B9/10 E04B9/18
X	WO 2004/046482 A (CALEIDOSCOPE SYSTEMS AB; SVENSSON, JAN; SVENSSON, MARCUS) 3 June 2004 (2004-06-03) * page 5, last paragraph; figures 1-4 *	1-4,7-10	
X	DE 43 22 631 A1 (RICHTER-SYSTEM GMBH & CO KG, 64347 GRIESHEIM, DE) 19 January 1995 (1995-01-19) * column 2, line 55 - line 57; figures *	1-5,8,9	
X	EP 0 475 721 A (HUNTER DOUGLAS INDUSTRIES B.V) 18 March 1992 (1992-03-18) * figures 1a-g *	1-5,7-10	
X	US 3 785 110 A (PLIML F, US ET AL) 15 January 1974 (1974-01-15) * column 2, line 37 - line 64; figures 1-4 *	1-5,8,9	TECHNICAL FIELDS SEARCHED (IPC) E04B
X	DE 103 32 681 A1 (HUWER KG) 3 March 2005 (2005-03-03) * paragraph [0028]; figures 1,7 *	1-4,6,8,9	
A			
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 December 2005	Examiner Demeester, J
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			

2
EPO FORM 1503 03.82 (P04C01)

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

EP 05 10 6258

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.

20-12-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 3048946	A1	01-07-1982	NONE	
WO 2004046482	A	03-06-2004	AU 2003263722 A1	15-06-2004
			EP 1565627 A1	24-08-2005
			SE 524518 C2	24-08-2004
			SE 0203397 A	19-05-2004
DE 4322631	A1	19-01-1995	NONE	
EP 0475721	A	18-03-1992	AT 115666 T	15-12-1994
			DE 69105886 D1	26-01-1995
			DE 69105886 T2	04-05-1995
			DK 475721 T3	29-05-1995
			GB 2247701 A	11-03-1992
US 3785110	A	15-01-1974	AT 309039 B	15-06-1973
			AU 452485 B2	05-09-1974
			AU 3266271 A	01-03-1973
			BE 772360 A1	08-03-1972
			CA 943319 A1	12-03-1974
			CH 543651 A	31-10-1973
			DE 2160346 A1	27-07-1972
			FR 2123249 A5	08-09-1972
			GB 1359370 A	10-07-1974
			JP 51004578 B	13-02-1976
			NL 7112243 A	18-07-1972
			ZA 7200249 A	26-09-1973
DE 10332681	A1	03-03-2005	WO 2005017274 A1	24-02-2005

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 2240124 A [0002]