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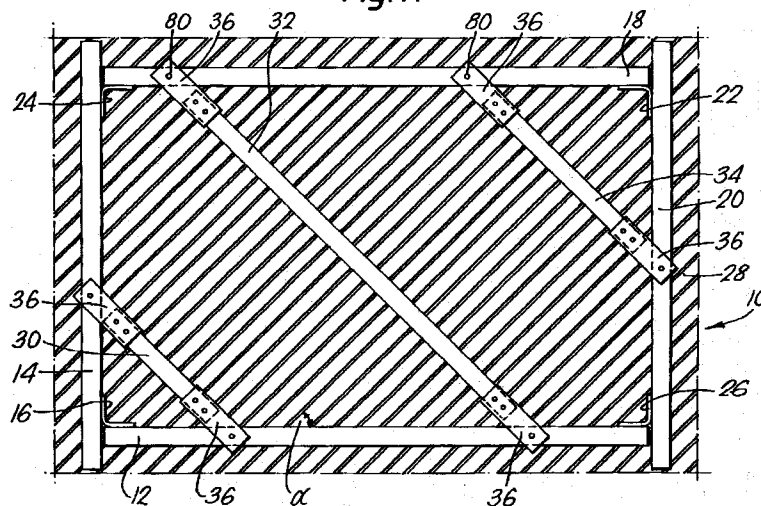
0 486 166 A1

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J.A. KEMP & CO. 14 South Square Gray's Inn
London WC1R 5LX(GB)**(54) **Panelling assembly.**

(57) A panelling assembly, e.g. for a ceiling, in which a plurality of inverted channel section panels 28, each having a lower web, upstanding side flanges and deflected rims to the side flanges, are supported on lugs formed on at least one pair of first elongate

carrier members 12, 14, 16, 18. The structure is rigidified by second carriers 30, 32, 34 which extend perpendicular to the panels 28, and also provided with holding tags engaging the rims of the panels 28.

Fig.1.**EP 0 486 166 A1**

The present invention relates to a panelling assembly, for example for providing a suspended ceiling.

There are many known designs of such panelling assembly and one of these involves the use of a large number of elongate, generally channelled sectioned panels, arranged in parallel laterally relationship, the panels each including a web and opposite upturned side flanges having rim members deflected from the longitudinal upper edges of the side flanges in a direction generally parallel to the panel web. These rim members are used to engage lugs in panel carriers which are mounted on the ceiling itself. Conventionally, the panels run parallel to the side of the room or space, the ceiling of which is to be covered.

Proposals have been made to arrange the panels at an angle other than perpendicular or parallel to the sides of a wall or ceiling. One solution has been to use special panel installation clips which are provided to allow rotational positioning of the panels with respect to the carriers. However, carrier arrangements with separate mountings are expensive and time consuming to instal. Furthermore, these carrier systems can give rise to noise and stability problems, particularly where there is the possibility of a wind.

Another option has been to arrange conventional carriers with integral lugs with their longitudinal axes at an angle with respect to the sides of the wall or ceiling to be covered, so that the panels which are perpendicular to the conventional panel carrier are also at an angle with respect to the sides of the wall or ceiling. It is complicated and laborious to arrange carriers in this way, because at the corners where two adjacent sides of the wall or ceiling sections meet, numerous short pieces of carrier are required to bridge the distance between the more or less full length carriers.

EP-A-226556 discloses a carrier having equally spaced pairs of hooks which are each arranged at an angle with respect to the longitudinal axis of the carrier. In order that the single type of carrier may be used in directions perpendicular to each other, a second set of equally spaced pairs of hooks is provided, these second pairs each being functional in a direction perpendicular to the first pairs. Such an arrangement, therefore, requires a wide carrier base, whereas it would generally be more economical to have a majority of the material used for the carriers extending in a direction normal to the covering surface, where it can contribute to the strength of the carrier. Furthermore, the carrier disclosed in EP-A-226556 is very difficult to manufacture and cannot be made on the same equipment as is used for conventional carriers.

According to the present invention, there is provided a panel assembly comprising at least one elongate channel shaped panel, arranged in parallel laterally spaced relationship with other elongate panels of the same or a different width, said panels each including a web and opposite upturned side flanges having rim members deflected from the longitudinal upper edges of the side flanges in a direction generally parallel to the panel web, the rim members of each panel being directed in the same or opposite directions, the two opposite rim members of said at least one panel being spaced from one another by a distance D, at least one pair of first elongate carrier members, each first elongate carrier member including a row of integrally formed lugs, said lugs being longitudinally spaced along the length of said carrier member and projecting away from a body portion of the carrier member in the same general direction, said lugs each comprising at least one support surface spaced from and facing the body portion and positioned and shaped to hold a respective one of the opposite rim members of said elongate panels, said at least one panel being able to have one rim member held by a support surface of one lug and the opposite rim member held by a complementary support surface of another lug or the same lug, the panels extending at an angle α other than 90° to one of said first carrier members of said at least one pair, complementary ones of the support surfaces being longitudinally spaced from one another by a distance corresponding to $D \sec \alpha$ on one of said first carrier members at least one second carrier extending transversely to the elongate direction of the panels, said at least one second carrier being provided with pairs of complementary holding elements, the holding elements of each pair engaging the two opposite rim members of a panel and means securing said at least one second carrier to at least one of said first elongate carrier members.

With such an arrangement, it is possible to use a simplified structure which enables one to mount the panels at any desired angle although, in a preferred structure, the angle α is 45° .

Advantageously at least two pairs of first carrier members surround the panelling assembly closely adjacent and within the boundaries thereof with said at least one second carrier being secured between two of said first elongate carrier members. This provides a robust structure which firmly holds all the panels.

The first elongate carrier members may each comprise between adjacent lugs, flanges which extend generally perpendicular to the lugs. Furthermore, it is contemplated that each first elongate carrier member should comprise a U-shaped channel section member, having a web and two arms,

one of said arms being accurately aligned with said lugs and the other of said arms, having at its free end, a further flange aligned with said flanges extending generally perpendicular to the lugs.

Alternatively, the first elongate carrier members could comprise a vertically depending arm.

The panel assembly may comprise panels of a modular series of widths in a decorative arrangement, the panels having a width of D or $D + nd$, where n is a positive integer and d is a modular increment of the modular series of widths. It will be appreciated that some of these panels, that is to say the wider ones, can span at least two of the lugs.

It is also contemplated that there be two or more sets of generally parallel elongate sheet material panels, the longitudinal axis of one set being at said angle α and the longitudinal axis of the other set being at a different angle. A particularly pleasing effect can be achieved if the first and second sets are actually perpendicular to one another.

The second carriers may each comprise a U-shaped channel section member also, this having a web and two arms and holding elements may then comprise cut out portions of the free edges of the arms providing holding tags which engage the rims of the panel.

The second carriers are preferably secured to the first elongate carrier members by brackets which are formed separately therefrom and each securable both to one end of a second carrier and also to a first elongate carrier.

If the first elongate carrier members comprise regularly spaced apertures along their lengths, these may register with a bracket for correct alignment and connection at the corners where the first carriers of said at least one pair meet one another and/or for securing the brackets which secure the second carriers to the first elongate carrier members.

In order that the present invention may more readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawings in which:-

Figure 1 is a plan view of one embodiment of panelling assembly according to the invention;

Figure 2 is an enlarged view of a section of one of the first elongate carrier members of the assembly of Figure 1, shown with three different widths of panel;

Figure 3 is an end elevation of the first carrier member of Figure 2;

Figure 4 is an enlarged underneath perspective view of one embodiment of second carrier of the assembly of Figure 1;

Figure 5 is a side elevation of one embodiment of bracket for mounting the second carriers on the first carrier members; and

Figure 6 and 7 are each an underneath plan view, shown schematically, of a second and a third embodiment of panelling assembly according to the invention.

Referring first to Figure 1, there is illustrated a ceiling panelling assembly 10 which comprises a first pair of carrier members 12, 14 arranged perpendicular to one another and secured by an angle bracket 16 to each other and a second pair of first elongate carrier members 18, 20 arranged perpendicular to one another and secured by an angle bracket 22. The first pair and second pair are also secured to one another by further angle brackets 24, 26 to provide a rectangular carrier frame for a plurality of parallel panels 28 which are arranged in spaced apart relation to one another at an angle α to one of said first carrier members 12, which is other than 90° . In the construction shown the angle α is 45° .

Three second carriers 30, 32, 34, are secured at each end by brackets 36 to the first carrier members. The second carriers 30, 34 are secured to both of the elongate first carriers 12, 14 and 18, 20 of the first and second pairs, whereas the second carrier 32 is connected to one first elongate carrier 12, 18 of each pair.

Referring now to Figures 2 and 3, the form of the first carrier members 12, 14, 16, 18, is illustrated. It can be seen that each member comprises an inverted channel section having a web 38, and two arms 40, 42. One of the arms, arm 42, is provided with longitudinally spaced lugs 44 along the length of the carrier member, these projecting away from a body portion of the carrier member in the same general direction, the lugs each comprising at least one support surface 46 spaced from and facing the body formed by the arm 42. The arms 40, 42 also have, at their free ends, flanges 48, 50 extending in the same plane and parallel to the web 38. As can be seen in Figure 2 there is a series of equally spaced apertures 51.

Figure 2 also shows two panels 28 secured to two of the lugs 44. Each panel 28 is of channel section including a web 52, side flanges 54 and rim members 56 deflected from the longitudinal upper edges of the side flanges in a direction generally parallel to the panel web 52. While they are shown in Figure 2 as being directed towards one another, that is in opposite directions, they could be both directed in the same direction. The panels 28 have a width D so that they engage, as shown, above the two adjacent lugs 44 shown to the left in Figure 2.

Figure 2 also illustrates two further panels 28A, 28B which are of the same general concept but are wider. The panels collectively have a modular series of widths. It will be seen, thus, that the panel 28A has a width $D + d$, and the panel 28B has a width $D + 2d$. Typically, the increment d is 50 mm and the distance D is 80 mm. It will be seen that the rims of the panel 28A engage in the first and third lugs 44 and those of the panel 28B in the first and fourth lugs 44. Any suitable arrangement in the ceiling can be provided with one or more panels of the same width and one or more panels of a different width to provide a particular decorative effect.

It will be appreciated that because the panels 28 are at an angle α to the first elongate carrier members 12, 14, 16, 18, that the spacing between the support surfaces 46 of the lugs will be, for the carrier members 12, 16, $D \sec \alpha$ and for the carrier members 14, 18, $D \csc \alpha$.

The assembly additionally comprises, as indicated, the second carriers 30, 32, 34, and the formation of these is shown in Figure 4. Here again the carriers are of inverted U-shaped section having a web 60, having arms 62, 64 with outwardly projecting flanges 66, 68 each provided with complementary holding elements 70 comprising cut out portions of the flanges 66, 68, providing holding tags which engage the rims of the panels. The spacing between the holding tags is, however, different, being equal to the dimension D .

In order to mount the second carriers 32, 34, 36, the brackets 36 shown in Figure 5 comprise a first portion 72 which is connected to a second portion 74 by a crank 76. Secured to the second portion 74 is an inverted channel section member 78 which is designed to be secured to the second carrier 32, 34 or 36 while the first arm 72 is designed to be connected via an aperture, the centre line of which is indicated by the reference numeral 80, to the first carrier members as illustrated in Figure 1. Thus the second carriers can be seen to be secured to the first elongate carrier members by brackets which are formed separately therefrom and are each securable both to one end of the second carrier and also to a first elongate carrier member. The assembly thus provided gives considerable rigidity to the panels and enables the panels of very different lengths to be accurately and firmly supported. Regularly spaced apertures 79 are formed to cooperate with similarly spaced apertures 73 (Figure 4) in the associated second carrier, e.g. carrier 32.

Figure 6 illustrates a modified structure from below and the panels 28 are in two sets indicated by the general reference numerals 27, 29. The panels 27 are slanted in one direction at 45° and those of the second set 29 in the opposite direc-

tion, so as to be perpendicular to the panels of set 27. Thus the panels of the set 27 are arranged at an angle α to the first elongate carrier members 12, while those of the second set 29 at an angle β . The various first carrier members are shown in chain dotted lines purely schematically, these lines representing the centre lines of the carrier members. Similarly, the second carrier members are illustrated, one for each set 27, 29 by the diagonal lines indicated by the reference numerals 35, 37, while only one such diagonal line has been illustrated, one could provide, as in Figure 1, several second carriers parallel to the second carriers 35, 37.

Figure 7 shows a further embodiment in which there is a pair of first elongate carrier members 12, 14 which are parallel to one another and a plurality of second carriers 30, 32, 34, 35, these supporting a plurality of parallel panels 28 which are disposed perpendicular to the second carriers 30, 32, 34, 35. This structure is particularly useful in a corridor and the total width of the panelling assembly can be adjusted by relative longitudinal movement of the first carrier members 12, 14, thereby changing the angle of the second carriers 30 - 35.

Claims

1. A panelling assembly comprising at least one elongate channel shaped panel (28), arranged in parallel laterally spaced relationship with other elongate panels of the same or a different width, said panels each including a web (38) and opposite upturned side flanges (54) having rim members (56) deflected from the longitudinal upper edges of the side flanges in a direction generally parallel to the panel web, the rim members of each panel being directed in the same or opposite directions, the two opposite rim members of said at least one panel being spaced from one another by a distance D , at least one pair of first elongate carrier members (12, 14, 16, 18), each first elongate carrier member including a row of integrally formed lugs (44), said lugs being longitudinally spaced along the length of said carrier member and projecting away from a body portion (42) of the carrier member in the same general direction, said lugs each comprising at least one support surface (46) spaced from and facing the body portion (42) and positioned and shaped to hold a respective one of the opposite rim members (56) of said elongate panel, said at least one panel being able to have one rim member held by a support surface of one lug and the opposite rim member held by a complementary support surface of another lug or the same lug, the

- panels extending at an angle α other than 90° to one of said first carrier members of said at least one pair, complementary ones of the support surfaces (46) being longitudinally spaced from one another by a distance corresponding to $D \sec \alpha$ on one of said first carrier members at least one second carrier (30, 32, 34, 35) extending transversely to the elongate direction of the panels (28), said at least one second carrier being provided with pairs of complementary holding elements, the holding elements (70) of each pair engaging the two opposite rim members of a panel and means (36) securing said at least one second carrier to at least one of said first elongate carrier members.
2. A panelling system according to claim 1, characterised in that the first carrier members of each pair extend substantially perpendicular to each other and in that complementary ones of the support surfaces (46) of the first carrier member are spaced by a distance corresponding to $D \operatorname{cosec} \alpha$ on the other first carrier of the pair.
 3. A panelling assembly according to claim 2, characterised in that at least two pairs of first carrier members (12, 14, 16, 18) surround the panelling assembly closely adjacent and within the boundaries thereof with said at least one second carrier being secured between two of said first elongate carrier members.
 4. A panelling assembly according to claim 1, 2 or 3 characterised in that said angle α is 45° .
 5. A panelling assembly according to any preceding claim, characterised in that said first elongate carrier members each comprise, between adjacent lugs (44), flanges (48, 50) extending generally perpendicular to the lugs.
 6. A panelling assembly according to any preceding claim, characterised in that each first elongate carrier member comprises a U-shaped channel section member, having a web (38) and two arms (40, 42), one of said arms (42) having a flange (50) thereon on which are formed said lugs (44), said one arm being accurately aligned with said lugs (44) and the other of said arms (40), having at its free end, a further flange (48) aligned with said flange (50) extending generally perpendicular to the lugs.
 7. A panelling assembly according to any one of claims 1 to 5, wherein said first elongate carrier members each comprise a vertically depending arm.
 8. A panelling assembly according to any preceding claim, wherein at least a number of said panels span at least two of said lugs.
 9. A panelling assembly according to any preceding claim comprising panels of modular series of widths in a decorative arrangement, the panels having a width of D or $D + nd$, where n is a positive integer and d is a modular increment of the modular series of widths.
 10. A panelling assembly according to any preceding claim, wherein there are two sets of generally parallel elongate sheet material panels, the longitudinal axes of one set being at said angle α and the longitudinal axes of the other set being at a different angle.
 11. A panelling assembly according to claim 10, wherein the longitudinal axes of the first and second sets are substantially perpendicular to one another.
 12. A panelling assembly according to any preceding claim, wherein the second carriers each comprise a U-shaped channel section member, having a web and two arms and wherein the holding elements comprise cut out portions of the free edges of the arms providing holding tags which engage the rims of the panel.
 13. A panel assembly according to any preceding claim, wherein the second carriers are secured to the first elongate carrier members by brackets formed separately therefrom and each securable both to one end of a second carrier and also to a first elongate carrier member.
 14. A panelling assembly according to any preceding claim, wherein said first elongate carrier members comprise regularly spaced apertures along their lengths, which register with a bracket for correct alignment and connection at corners where the first carriers of said at least one pair meet one another.
 15. A panel assembly according to any preceding claim, wherein the second carriers are arranged perpendicular to the longitudinal direction of the panels.

Fig.1.

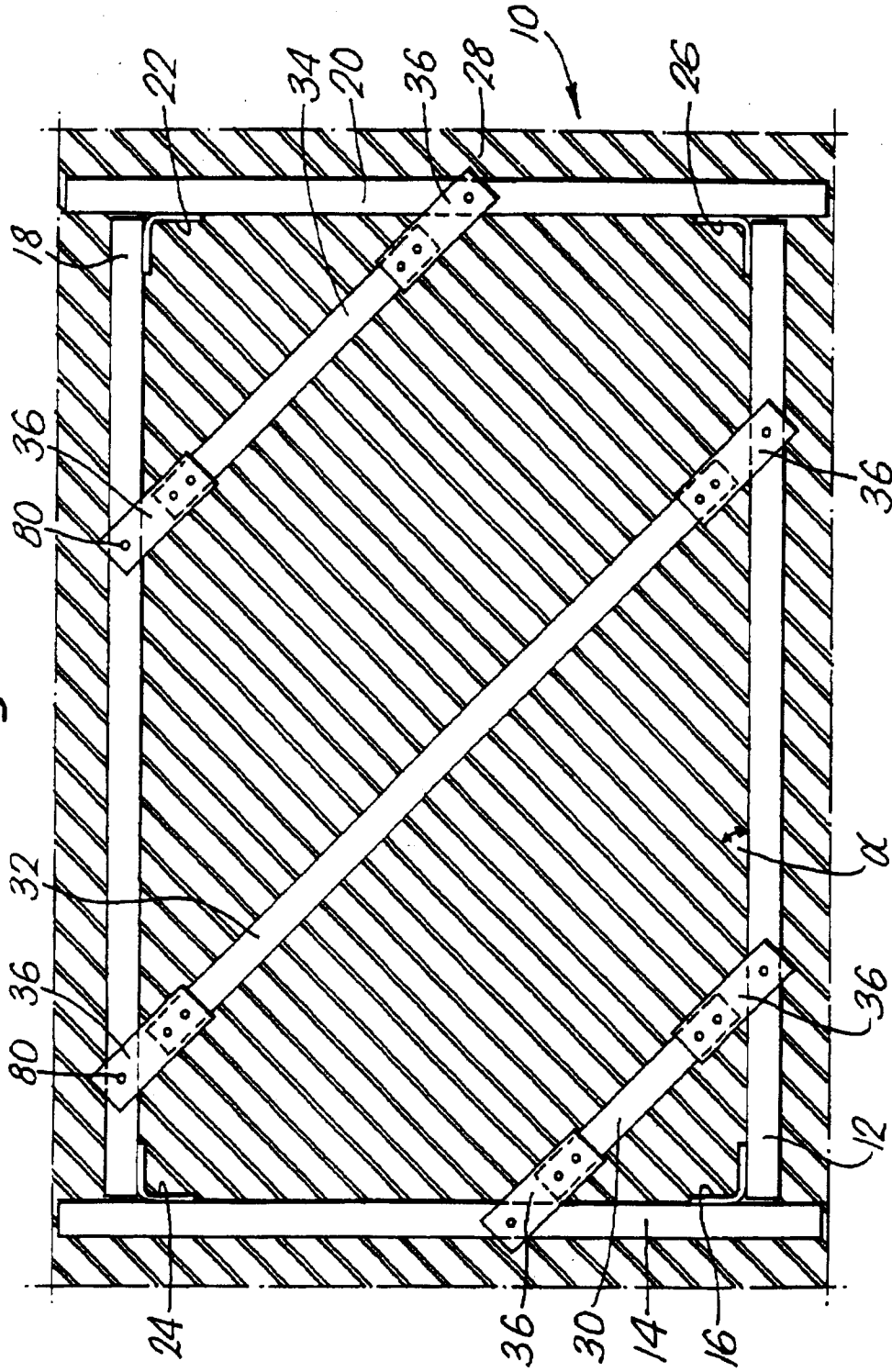


Fig. 2.

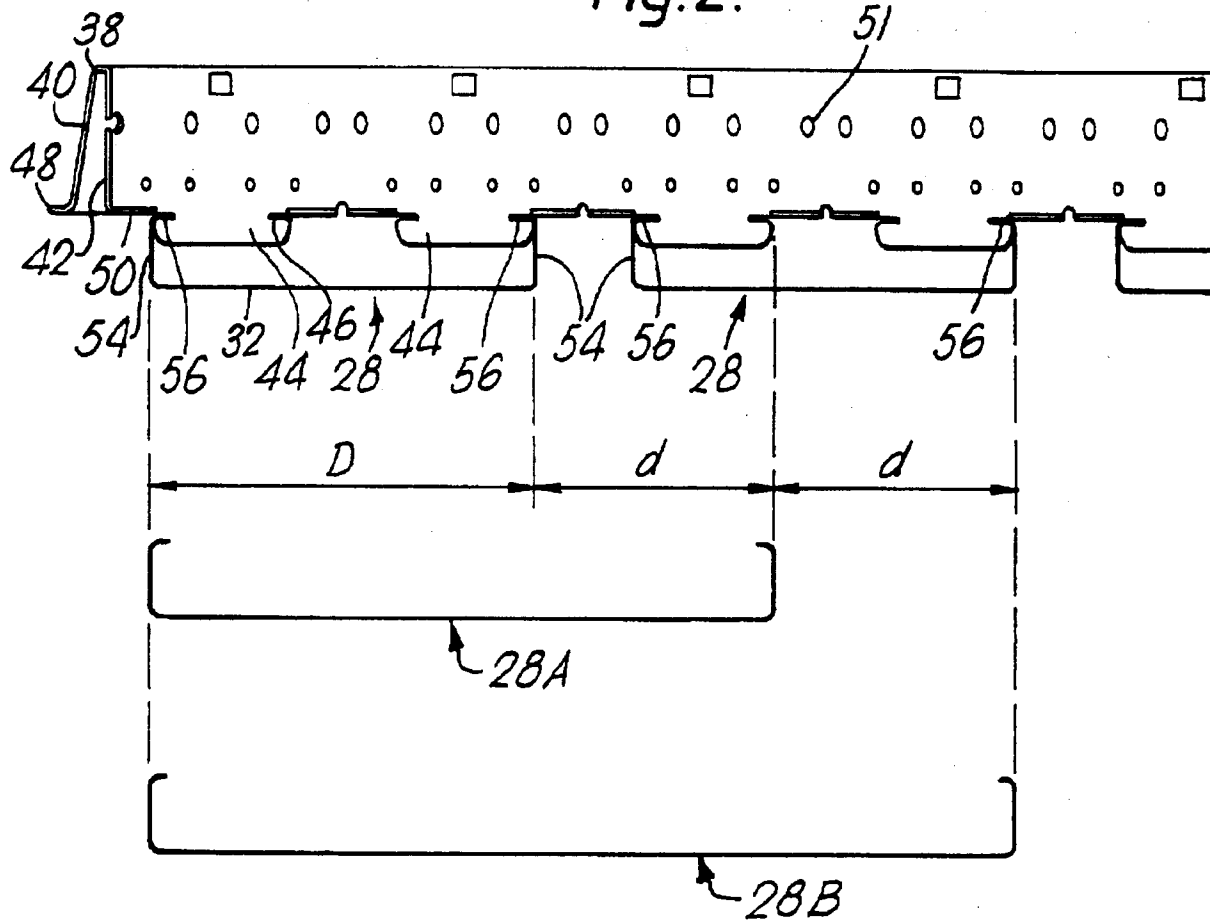


Fig. 3.

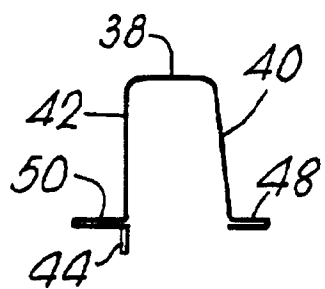
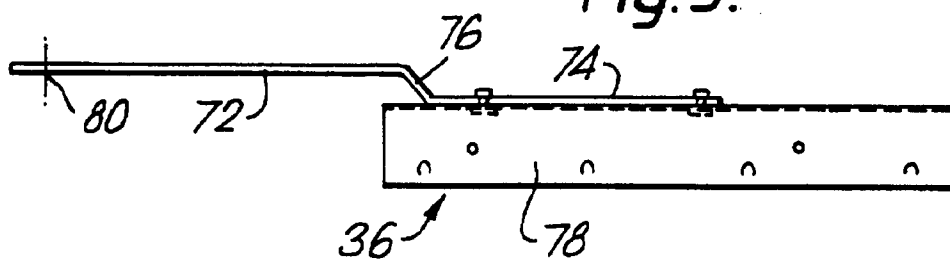


Fig. 5.



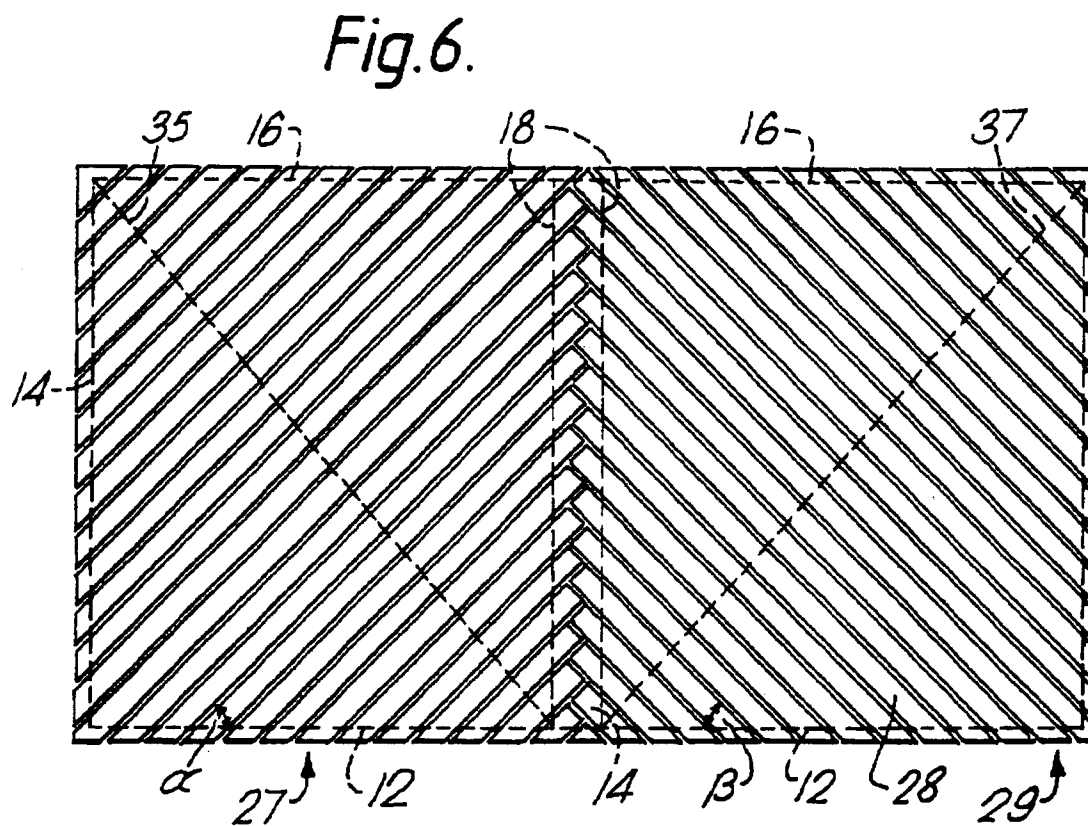
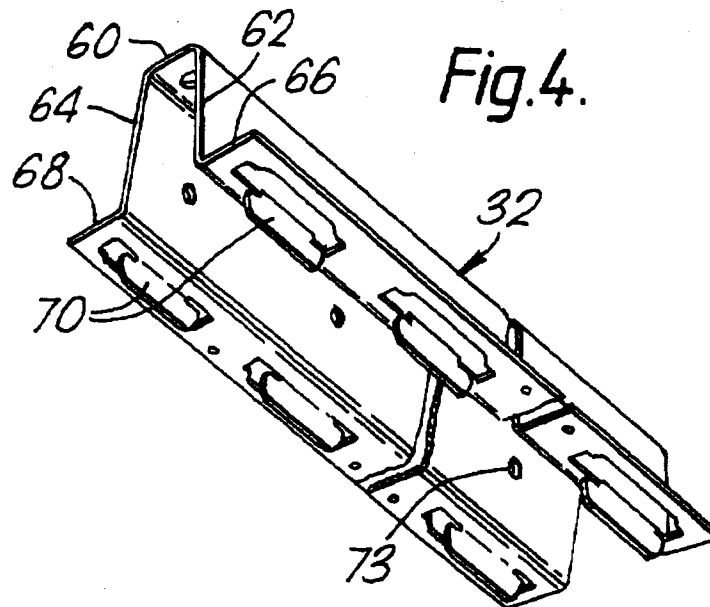
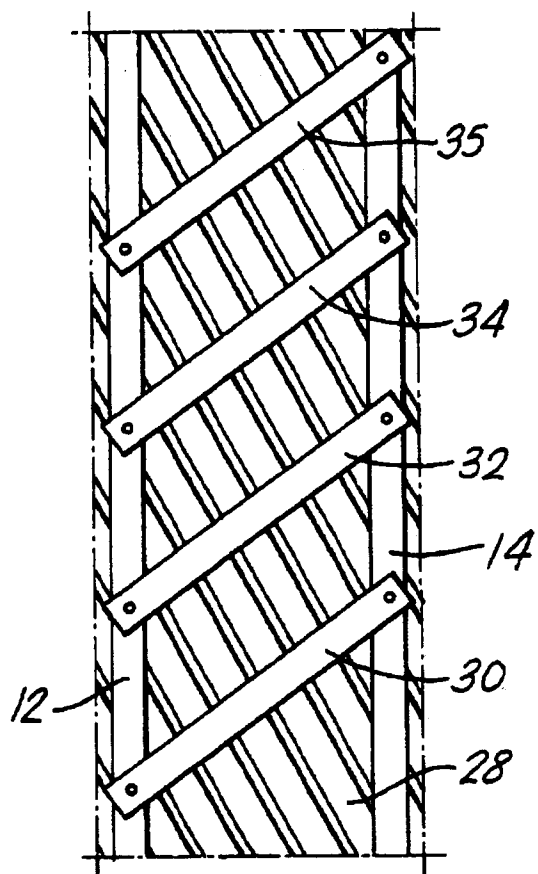


Fig. 7.





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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 9765

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.5)
A	US-A-4 494 346 (GAILEY) * column 3, line 17 - line 61; figures * ---	1-15	E04B9/26
A	FR-A-2 232 650 (FORNELLS S.A.) * page 1, line 22 - line 28 * * page 5, line 5 - page 6, line 34; figures 9-11 * ---	1-15	
A	US-A-4 580 382 (JUDKINS ET AL) * column 3, line 6 - line 44; figures * ---	1-15	
A	BE-A-862 856 (SMEESTERS) * claim 1; figures * ---	1	
A	LU-A-66 429 (P. DUPONT) * page 2, line 9 - page 3, line 13; figures 3-5 * ---	1	
A	EP-A-0 165 809 (HUNTER DOUGLAS B.V.) * abstract; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E04B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 FEBRUARY 1992	Examiner RIGHETTI R.
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			