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(54) **AN INSULATED PANEL**

WÄRMEGEDÄMMTES PANEEL

PANNEAU ISOLE

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Description

[0001] The invention relates to an insulated panel of the type comprising a profiled external sheet, an internal liner sheet, and an insulating core between the external sheet and the liner sheet.

[0002] Various panels of this type are known. For example in CA2075553A, a panel including a foam core with inner and outer metal facings, and a series of male projection and female groove interconnections is disclosed. In US4122641, a pair of panel forming members secured together mechanically by a plurality of spaced apart sub-girt members is disclosed.

[0003] There is, however, a need for an improved construction of panel which will facilitate a highly sealed joint between adjacent panels for improved insulation and fire resistance.

Statements of Invention

[0004] According to the invention, there is provided an insulated panel comprising:-

an external sheet;

an internal lining sheet;

an insulating core between the external sheet and the internal lining sheet;

the external sheet and internal lining sheet having profiled joint forming portions for connecting adjacent panels;

the external sheet having an external male projecting part and an internal recess part on one side, and a corresponding external recess part and projecting inner male part respectively on the opposite side of the panel;

the internal lining sheet having an inner recess part and an outer male projecting part on one side, and a corresponding inner projecting male part and an outer recess part respectively on the opposite side of the panel;

the external male projecting part of the external sheet having a wall portion and the external recess of an adjacent sheet being defined by a wall portion, the wall portions defining a substantially uniform outer gap between the two external sheets of adjacent panels, on assembly.

characterised in that: -

the wall portions defining the gap are inclined to diverge outwardly,

the inner male projecting part of the external sheet is profiled for substantially uniform sealing engagement with an inner seal interposed between the inner male projecting part of the external sheet and the corresponding inner recess of the external sheet of an adjacent panel, on assembly, wherein the inner seal is substantially flattened on assembly of adjacent panels to substantially fill the gap there between,

and in that the outer male projecting part of the internal lining sheet and the corresponding outer recess of the internal lining sheet of an adjacent panel are arranged to receive an internal seal, wherein the outer male projecting part of the internal lining sheet and/or the corresponding outer recess of the internal lining sheet of an adjacent panel include a dimple for receiving said internal seal.

[0005] In a particularly preferred arrangement, the inner male projecting part of the external sheet has a substantially flat nose portion for sealing engagement with the seal in the inner recess of the external sheet of an adjacent panel, on assembly.

[0006] Most preferably, the profile of the inner recess of the external sheet is of channel shape for sealing engagement with the seal and the inner male projecting part, on assembly.

[0007] In one embodiment of the invention the internal seal is of a fire resistant material. Alternatively or additionally the seal is of a food-safe material, such as butyl rubber.

[0008] In a preferred embodiment of the invention at least the inner male projecting part of the internal lining sheet and the inner recess part of the internal lining sheet of an adjacent panel are profiled so that, on assembly, a fixing pin may be extended between the profiles for fire resistance. Ideally the inner projecting male part of the external sheet is also profiled for engagement by the fixing pin.

[0009] In another embodiment of the invention on assembly, the external male projecting part of the external sheet extends over the external recess part of an adjacent external sheet to define a hidden recess for housing the head of a fastener.

[0010] The invention also provides an insulated panel assembly including a plurality of the panels of the invention.

Brief Description of the Drawings

[0011] The invention will be more clearly understood from the following description thereof, given by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a side cross sectional view of portion of two adjacent panels according to the invention separat-

ed;

Fig. 2 is a cross sectional view of the panels joined together with seals omitted for clarity;

Fig. 3 is a cross sectional view of the panels joined together with seals and a fastener in position;

Fig. 4 is a view similar to Fig. 3 with a panel jointing pin in position;

Fig. 5 is an exploded perspective view of adjacent panels;

Fig. 6 is a view of part of an external sheet on one side of a panel;

Fig. 7 is a view of part of an external sheet on the opposite side of the panel;

Fig. 8 is a view of part of an internal sheet on one side of a panel; and

Fig. 9 is a view of part of an internal sheet on the opposite side of the panel.

Detailed Description of the Drawings

[0012] Referring to the drawings, there is illustrated an insulated panel according to the invention and comprising a profiled external sheet 2, an internal liner sheet 3 and an insulating core 4 between the external sheet 2 and internal sheet 3. The sheets 2 and 3 are typically of steel material and the core 4 is of polyurethane or polyisocyanurate foam material which fills the space between the sheets 2, 3. The panel 1 is typically used for roofing and/or cladding systems.

[0013] The profiled external sheet 2 and internal lining sheet 3 have profiled joint-forming portions for connecting adjacent panels, on assembly as illustrated.

[0014] The profiled external sheet 2 has an external male projecting part 10 and an internal recess part 11 on one side for engagement, on assembly, with a corresponding external recess part 12 and projecting inner male part 13 respectively on the opposite side of the panel. An internal weather seal 20 is placed in the internal recess 11 for sealing engagement, on assembly, with the internal male projecting part 13 of the external skin 2 of an adjacent panel. The seal 20 is of an elastomeric memory material which, in this case, is of hollow cylindrical shape, as illustrated.

[0015] It will be noted that the internal recess 11 is of generally channel-shape having a base web 11a which is substantially flat with rounded corners. Similarly, a front nose portion 13a of the inner male part 13 is substantially flat, also with rounded corners for effective sealing engagement with the seal 20, on assembly. The seal 20, on assembly is deformed evenly into a flattened

oval shape as illustrated, providing a highly effective seal.

[0016] To control the sealing engagement and to provide a substantially uniform outer gap g between the external sheets 2 of adjacent panels, on assembly, the external male projecting part 10 has an inner engagement portion 10a for engaging with an inwardly inclined wall 25 defining the outer recess 12 of the external sheet 2 of an adjacent panel 1.

[0017] An outwardly diverging wall 10b extends at an angle α of from 70 to 80°, ideally approximately 75° to define, together with the inclined wall 25, the fixed gap g . The inclined wall 25 extends at an angle β which is also from 70 to 80°, ideally approximately 75°. The engagement of the portion 10a of the male part 10 against the inclined wall 25, on assembly, acts as a stop limiting the engagement between the nose 13a and wall 11a thus controlling the sealing engagement. This engagement between the portion 10a and the inclined wall 25 also ensures that the gap g is uniform which provides an excellent aesthetic finish when a plurality of panels are joined side to side either vertically or horizontally to provide, for example a wall cladding.

[0018] It will be noted that on assembly, the external male projecting part 10 of the external sheet 2 extends over the external recess 12 of an adjacent external sheet 2 to define a hidden recess 26 housing the head 27 of a fastener 28. As will be particularly apparent from Fig. 3, the fastener 28 extends through the external sheet 2, the foam core 4 and the internal sheet 3 for fixing a panel to a support.

[0019] The internal lining sheet 3 has an inner recess part 30 and an outer male projecting part 31 on one side, and a corresponding inner projecting male part 32 and an outer recess part 33 respectively on the opposite side of the panel, for interengagement on assembly of adjacent panels, as illustrated.

[0020] The internal lining sheet 3 includes a dimple to accommodate an internal seal 35 which is typically gun-applied, on-site. The seal 35 is of a fire resistant and/or food-safe material such as butyl rubber.

[0021] The profiles of the male parts 31, 32 and recess parts 30, 33 are arranged to overlap on assembly to receive a fixing pin 40 to ensure the integrity of the joint for fire rating, as required. The fixing pin 40 also extends, in this case through the profile of at least one of the external sheets 2 to further strengthen the joint.

[0022] In use, the panels may be overlapped either vertically or horizontally. Typically an end bearer is used to start a panel assembly, the end bearer having a head part for engagement in a female recess 11 of the external sheet 2 of a first panel. The other side of the first panel is then fixed in place by a fastener 28. This side of the first panel is then engaged with the mating side of a second panel, as illustrated so that the head 27 of the fastener 28 is hidden, the seal 20 is engaged into the flat oval shape and the gap g between the panels is substantially uniform. Construction is continued in this

way. After on-site construction, fixing pins 40 may be inserted, as illustrated and an internal seal 35 is applied to ensure the integrity of the joint for fire resistance application on/or environments in which the inner wall requires washing, for example in the food applications.

[0023] The invention provides an insulated panel with side edges which are arranged for highly efficient heat insulation, sound insulation, weather ingress and fire sealing.

[0024] It will be appreciated that the panels may be provided with opposite side edges or two different panels with a similar profile on both side edges may be provided.

Claims

1. An insulated panel comprising: -

an external sheet (2);

an internal lining sheet (3);

an insulating core (4) between the external sheet (2) and the internal lining sheet (3);

the external sheet (2) and internal lining sheet (3) having profiled joint forming portions for connecting adjacent panels;

the external sheet (2) having an external male projecting part (10) and an internal recess part (11) on one side, and a corresponding external recess part (12) and projecting inner male part (13) respectively on the opposite side of the panel;

the internal lining sheet (3) having an inner recess part (30) and an outer male projecting part (31) on one side, and a corresponding inner projecting male part (32) and an outer recess part (33) respectively on the opposite side of the panel;

the external male projecting part (10) of the external sheet (2) having a wall portion (10b) and the external recess (12) of an adjacent sheet (2) being defined by a wall portion (25), the wall portions (10b and 25) defining a substantially uniform outer gap (g) between the two external sheets (2) of adjacent panels, on assembly;

characterised in that: -

the wall portions (10b, 25) defining the gap (g) are inclined to diverge outwardly,

the inner male projecting part (13) of the exter-

nal sheet (2) is profiled for substantially uniform sealing engagement with an inner seal (20) interposed between the inner male projecting part (13) of the external sheet (2) and the corresponding inner recess (11) of the external sheet (2) of an adjacent panel, on assembly, wherein the inner seal (20) is substantially flattened on assembly of adjacent panels to substantially fill the gap there between,

and **in that** the outer male projecting part (31) of the internal lining sheet (3) and the corresponding outer recess (33) of the internal lining sheet (3) of an adjacent panel are arranged to receive an internal seal (35), wherein the outer male projecting part (31) of the internal lining sheet (3) and/or the corresponding outer recess (33) of the internal lining sheet (3) of an adjacent panel include a dimple for receiving said internal seal (35).

2. An insulated panel as claimed in claim 1, wherein the inner male projecting part (13) of the external sheet (2) has a substantially flat nose portion (13a) for sealing engagement with the seal (20) in the inner recess (11) of the external sheet (2) of an adjacent panel, on assembly.

3. An insulated panel as claimed in any preceding claim, wherein the profile of the inner recess (11) of the external sheet (2) is of channel shape for sealing engagement with the seal (20) and the inner male projecting part (13), on assembly.

4. An insulated panel as claimed in any preceding claim, wherein the internal seal (35) is of a fire resistant material.

5. An insulated panel as claimed in any preceding claim, wherein the internal seal (35) is of a food-safe material.

6. An insulated panel as claimed in any preceding claim, wherein the internal seal (35) is of butyl rubber material.

7. An insulated panel as claimed in any preceding claim, wherein at least the inner male projecting part (32) of the internal lining sheet (3) and the inner recess part (30) of the internal lining sheet (3) of an adjacent panel are profiled so that, on assembly, a fixing pin (40) may be extended between the profiles for fire resistance.

8. An insulated panel as claimed in claim 7, wherein the inner projecting male part (13) of the external sheet (2) is also profiled for engagement by the fixing pin (40).

9. An insulated panel as claimed in any preceding claim wherein, on assembly the external male projecting part (13) of the external sheet (2) extends over the external recess part (12) of an adjacent external sheet (2) to define a hidden recess (26) housing the head (27) of a fastener (28). 5
10. An insulated panel assembly comprising a plurality of the panels as claimed in any of claims 1 to 9. 10

Patentansprüche

1. Isolierplatte, die Folgendes umfasst: 15

ein äußeres Blech (2);

ein inneres Futterblech (3);

einen Isolierkern (4) zwischen dem äußeren Blech (2) und dem inneren Futterblech (3); 20

wobei das äußere Blech (2) und das innere Futterblech (3) mit einem Profil versehene verbindungs- bildende Abschnitte zur Verbindung benachbarter Platten aufweisen; 25

das äußere Blech (2) einen äußeren hervorstehen- den Vorsprungsabschnitt (10) und einen inneren Vertiefungsabschnitt (11) auf einer Seite und einen entsprechenden äußeren Vertiefungsabschnitt (12) und einen inneren hervorstehenden Vorsprungsab- schnitt (13) jeweils auf der gegenüberliegenden Seite der Platte aufweist; 30

das innere Futterblech (3) einen inneren Vertie- fungsabschnitt (30) und einen äußeren hervorstehenden Vorsprungsabschnitt (31) auf einer Seite und einen entsprechenden inneren hervorstehen- den Vorsprungsabschnitt (32) und einen äußeren Vertiefungsabschnitt (33) jeweils auf der gegen- überliegenden Seite der Platte aufweist; 35

der äußere hervorstehende Vorsprungsabschnitt (10) des äußeren Blechs (2) einen Wandabschnitt (10b) aufweist und die äußere Vertiefung (12) eines benachbarten Blechs (2) durch einen Wandab- schnitt (25) abgegrenzt wird, wobei die Wandab- schnitte (10b und 25) beim Zusammenbau einen im Wesentlichen gleichförmigen äußeren Spalt (g) zwischen den beiden äußeren Blechen (2) von be- nachbarten Platten abgrenzen; 40 45

dadurch gekennzeichnet, dass: 50

die Wandabschnitte (10b, 25), die den Spalt (g) abgrenzen, geneigt sind, so dass sie nach außen auseinanderlaufen, 55

der innere hervorstehende Vorsprungsab- schnitt (13) des äußeren Blechs (2) ein Profil für einen im Wesentlichen gleichmäßigen ab-

dichtenden Eingriff in eine innere Dichtung (20) aufweist, die beim Zusammenbau zwischen dem inneren hervorstehenden Vorsprungsab- schnitt (13) des äußeren Blechs (2) und der ent- sprechenden inneren Vertiefung (11) des äuße- ren Blechs (2) einer benachbarten Platte ange- ordnet ist, wobei die innere Dichtung (20) beim Zusammenbau benachbarter Platten im We- sentlichen abgeflacht ist, um den Spalt dazwi- schen im Wesentlichen zu füllen,

sowie dadurch, dass der äußere hervorstehen- de Vorsprungsabschnitt (31) des inneren Fut- terblechs (3) und die entsprechende äußere Vertiefung (33) des inneren Futterblechs (3) ei- ner benachbarten Platte dafür ausgelegt sind, eine innere Dichtung (35) aufzunehmen, wobei der äußere hervorstehende Vorsprungsab- schnitt (31) des inneren Futterblechs (3) und/ oder die entsprechende äußere Vertiefung (33) des inneren Futterblechs (3) einer benachbar- ten Platte eine Einsenkung zur Aufnahme der inneren Dichtung (35) umfassen.

2. Isolierplatte nach Anspruch 1, wobei der innere her- vorstehende Vorsprungsabschnitt (13) des äuße- ren Blechs (2) beim Zusammenbau einen im We- sentlichen flachen Nasenabschnitt (13a) für einen abdichtenden Eingriff in die Dichtung (20) in der in- neren Vertiefung (11) des äußeren Blechs (2) einer benachbarten Platte aufweist.

3. Isolierplatte nach einem der vorhergehenden An- sprüche, wobei das Profil der inneren Vertiefung (11) des äußeren Blechs (2) eine Kanalförmigkeit für ei- nen abdichtenden Eingriff beim Zusammenbau in die Dichtung (20) und den inneren hervorstehenden Vorsprungsabschnitt (13) aufweist.

4. Isolierplatte nach einem der vorhergehenden An- sprüche, wobei die innere Dichtung (35) aus einem feuerfesten Material besteht.

5. Isolierplatte nach einem der vorhergehenden An- sprüche, wobei die innere Dichtung (35) aus einem für Lebensmittel geeigneten Material besteht.

6. Isolierplatte nach einem der vorhergehenden An- sprüche, wobei die innere Dichtung (36) aus einem Butyl-Gummimaterial besteht.

7. Isolierplatte nach einem der vorhergehenden An- sprüche, wobei mindestens der innere hervorstehende Vorsprungsabschnitt (32) des inneren Fut- terblechs (3) und der innere Vertiefungsabschnitt (30) des inneren Futterblechs (3) einer benachbar- ten Platte ein Profil aufweisen, so dass sich beim Zusammenbau zum Zweck von Feuerfestigkeit ein

Befestigungsstift (40) zwischen den Profilen erstrecken kann.

8. Isolierplatte nach Anspruch 7, wobei der innere hervorstehende Vorsprungsabschnitt (13) des äußeren Blechs (2) für einen Eingriff durch den Befestigungsstift (40) ebenfalls mit einem Profil versehen ist. 5
9. Isolierplatte nach einem der vorhergehenden Ansprüche, wobei sich beim Zusammenbau der äußere hervorstehende Vorsprungsabschnitt (13) des äußeren Blechs (2) über den äußeren Vertiefungsabschnitt (12) eines benachbarten äußeren Blechs (2) erstreckt, um eine verborgene Vertiefung (26) abzugrenzen, die den Kopf (27) eines Befestigungselements (28) enthält. 10 15
10. Isolierplattenbaugruppe, die eine Vielzahl der Platten nach einem der Ansprüche 1 bis 9 umfasst. 20

Revendications

1. Panneau isolé comprenant : 25
 - une tôle externe (2) ;
 - une plaque de garnissage interne (3) ; 30
 - un noyau isolant (4) entre la tôle externe (2) et la plaque de garnissage interne (3) ;
 - la tôle externe (2) et la plaque de garnissage interne (3) possédant des sections profilées pour la formation d'un raccord afin de raccorder des panneaux adjacents ; 35
 - la tôle externe (2) possédant une partie saillante mâle externe (10) et une partie creuse interne (11) d'un côté et une partie creuse externe correspondante (12) et une partie saillante mâle interne (13) respectivement sur le côté opposé du panneau ; 40
 - la plaque de garnissage interne (3) ayant une partie creuse interne (30) et une partie saillante mâle externe (31) d'un côté, et une partie saillante mâle interne (32) ainsi qu'une partie creuse externe (33) respectivement sur le côté opposé du panneau ; 45
 - la partie saillante mâle externe (10) de la tôle externe (2) ayant une section de paroi (10b) et l'évidement externe (12) d'une tôle adjacente (2) étant défini par une section de paroi (25), les sections de paroi (10b et 25) définissant un intervalle externe essentiellement uniforme (g) 55

entre les deux tôles externes (2) de panneaux adjacents, au moment de l'assemblage.

caractérisé en ce que :

les sections de paroi (10b, 25) qui définissent l'intervalle (g) sont inclinées de façon à diverger vers l'extérieur.

la partie saillante mâle interne (13) de la tôle externe (2) est profilée en vue d'un engagement de scellement essentiellement uniforme avec un joint interne (20) intercalé entre la partie saillante mâle interne (13) de la tôle externe (2) et l'évidement interne correspondant (11) de la tôle externe (2) d'un panneau adjacent, au moment de l'assemblage, cas dans lequel le joint interne (20) est essentiellement aplati au moment de l'assemblage de panneaux adjacents afin de combler essentiellement l'intervalle entre eux.

et en ce que la partie saillante mâle externe (31) de la plaque de garnissage interne (3), et l'évidement externe correspondant (33) de la plaque de garnissage interne (3) d'un panneau adjacent, sont agencés de manière à recevoir un joint interne (35), cas dans lequel la partie saillante mâle externe (31) de la plaque de garnissage interne (3), et/ou l'évidement externe correspondant (33) de la plaque de garnissage interne (3) d'un panneau adjacent, comprennent un renforcement destiné à recevoir ledit joint interne (35).

2. Panneau isolé, selon la revendication 1, dans lequel la partie saillante mâle interne (13) de la tôle externe (2) possède une partie de nez (13a) essentiellement plate en vue d'un engagement de scellement avec le joint (20) dans l'évidement interne (11) de la tôle externe (2) d'un panneau adjacent au moment de l'assemblage.
3. Panneau isolé, selon l'une quelconque des revendications précédentes, dans lequel le profil de l'évidement interne (11) de la tôle externe (2) a une forme en U en vue d'un engagement de scellement avec le joint (20) et la partie saillante mâle interne (13), au moment de l'assemblage.
4. Panneau isolé, selon l'une quelconque des revendications précédentes, dans lequel le joint interne (35) est fabriqué dans un matériau résistant aux flammes.
5. Panneau isolé, selon l'une quelconque des revendications précédentes, dans lequel le joint interne (35) est fabriqué dans un matériau non nocif pour

les produits alimentaires.

6. Panneau isolé, selon l'une quelconque des revendications précédentes, dans lequel le joint interne (35) est fabriqué dans un matériau en caoutchouc butyle. 5
7. Panneau isolé, selon l'une quelconque des revendications précédentes, dans lequel au moins la partie saillante mâle interne (32) de la plaque de garnissage interne (3) et la partie creuse interne (30) de la plaque de garnissage interne (3) d'un panneau adjacent sont profilées de sorte qu'au moment de l'assemblage, une broche de fixation (40) peut s'étendre entre les profils pour la résistance aux flammes. 10 15
8. Panneau isolé, selon la revendication 7, dans lequel la partie saillante mâle interne (13) de la tôle externe (2) est également profilée en vue d'un engagement par la broche de fixation (40). 20
9. Panneau isolé, selon l'une quelconque des revendications précédentes, dans lequel au moment de l'assemblage, la partie saillante mâle externe (13) de la tôle externe (2) s'étend au-dessus de la partie creuse externe (12) d'une tôle externe adjacente (2) afin de définir un évidement dissimulé (26) qui abrite la tête (27) d'un dispositif de fixation (28). 25 30
10. Ensemble de panneaux isolés comprenant une pluralité des panneaux, tels qu'ils sont stipulés dans l'une quelconque des revendications 1 à 9. 35

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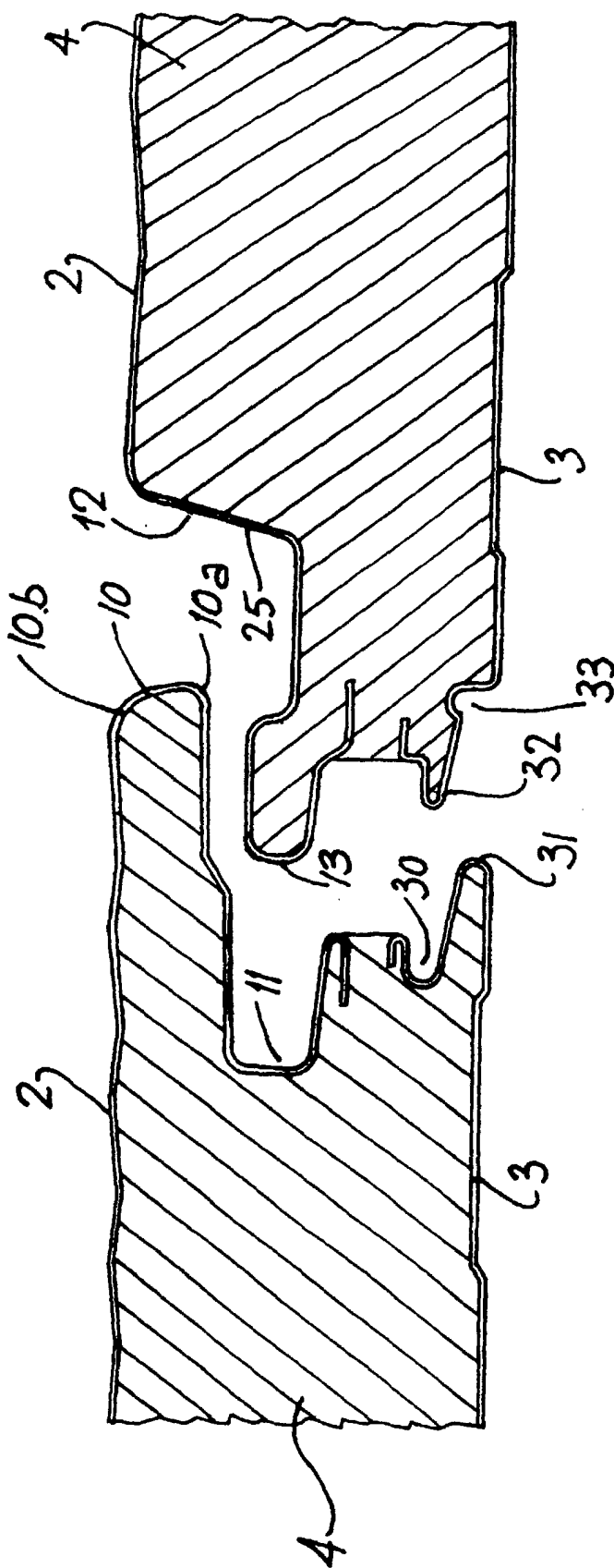


Fig.1

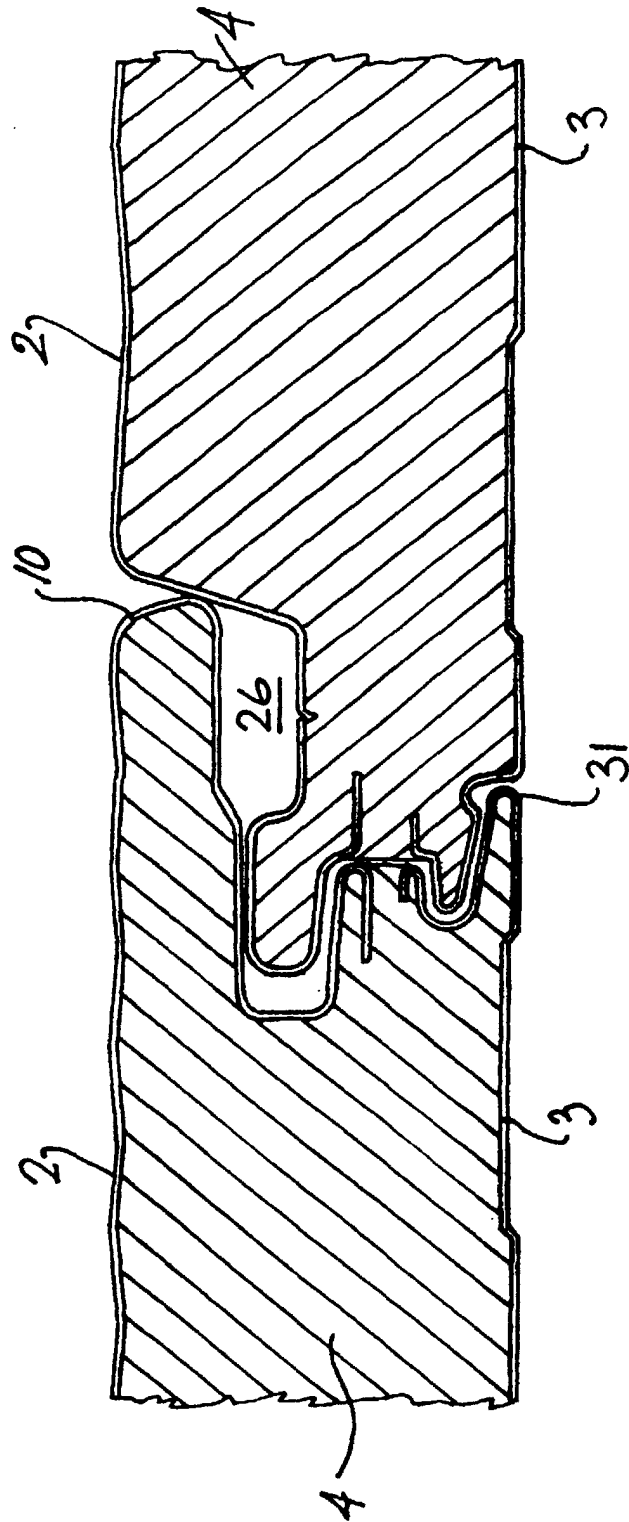


Fig. 2

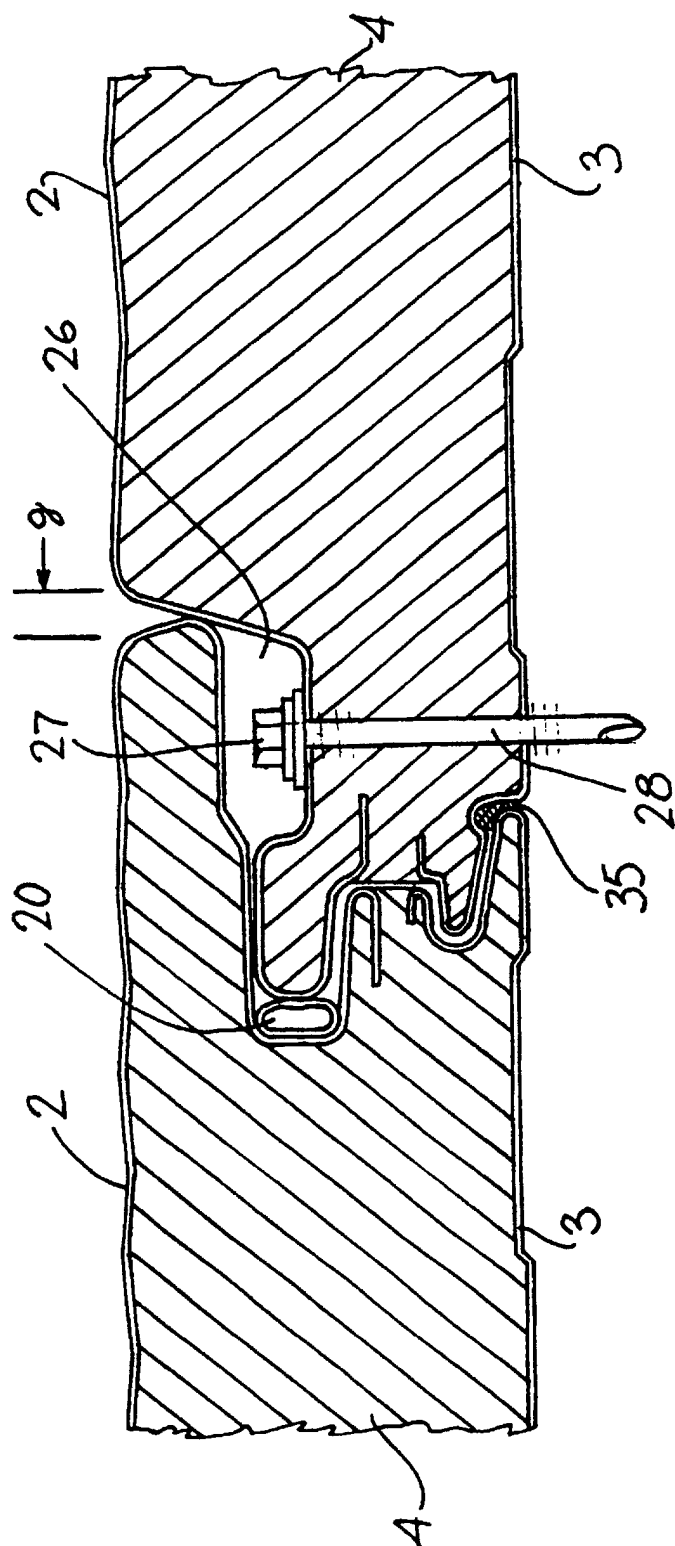


Fig. 3

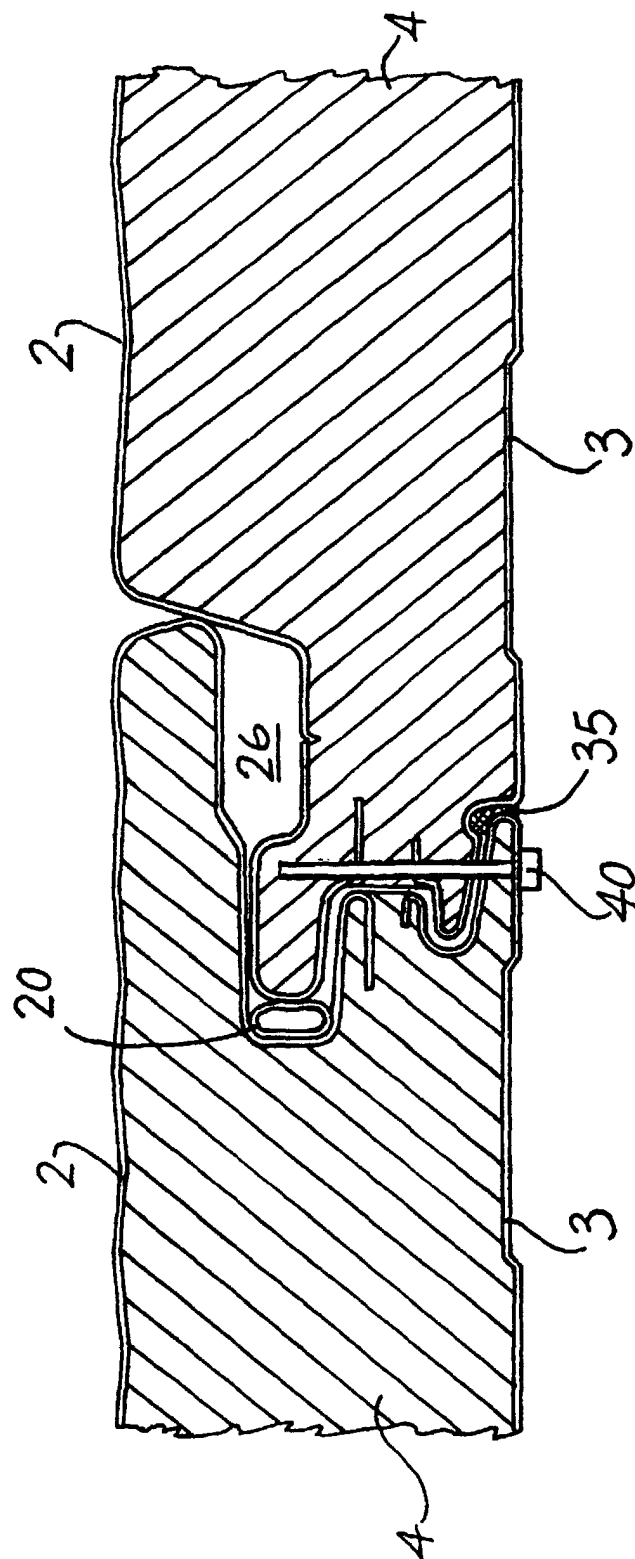


Fig.4

