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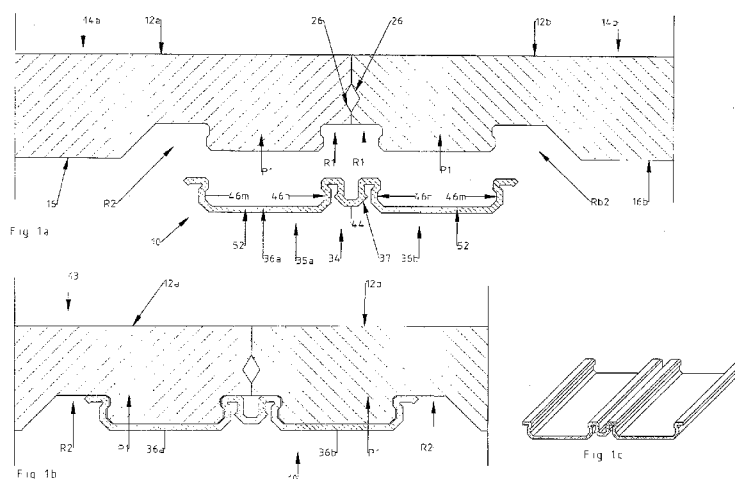
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(54) **Title:** CLIP FOR COUPLING TWO SUBSTRATES TOGETHER

(57) **Abstract:** A clip (10) for joining together first and second substrates (12) in a vertical flooring system where each substrate has: opposite first and second major surfaces (14), (16) and one or more recesses R and projections P formed in a peripheral band in and circumscribing the second major surface (14), (16). The clip (10) comprises: a first protrusion (34) configured to engage and extend between each of the two substrates (12); and first and second panel engaging portions (35a), (35b), one on each side of the first protrusion (34). The clip (10) is configured to engage at least one of the substrates (12) by relative motion in a direction perpendicular to the major surfaces. The first protrusion (34) has stop surfaces (38) lying parallel to the first major surface and a space (37) formed beneath the stops surfaces. Each panel engaging portion (35) has opposite side walls (46m), (46n) which extend upward from and are contiguous with a bottom wall (52). The first panel engaging portion (35a) is configured to receive a projection P of a first substrate (12) and engage the first substrate (12) in a manner to form at least two locking planes LP. The locking planes lie perpendicular to the major surfaces (14). The second panel engaging portion (35b) is configured to receive a projection P of a second substrate (12) and engage the second substrate in a manner to form at least two further locking planes LP. Thus the clip (10) mechanically grips the engaged substrates along at least four of the locking planes LP.

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CLIP FOR COUPLING TWO SUBSTRATES TOGETHERField of the Invention

- 5 The present invention relates to a clip for coupling two substrates together. Non-limiting examples of such substrates include boards or planks which may be used as floor, wall or ceiling coverings.

Background Art

- 10 “Click” type flooring uses complimentary joints formed integrally with each flooring substrate to connect or couple adjacent substrates together to cover a surface. As an alternative to the click type flooring, separately formed clips may be used to mechanically couple together adjacent boards or planks. Such clips are typically made
15 of metal or plastics material and can provide greater resistance to shearing or fracturing as compared with click type floor systems where the joints are integrally formed with the substrate.

- The above references to the background art do not constitute an admission that the art
20 forms a part of the common general knowledge of a person of ordinary skill in the art. The above references are also not intended to limit the application of the clip as disclosed herein.

Summary of the Invention

- 25 In one aspect the invention provides a clip for joining together first and second substrates in a vertical flooring system where each substrate has: opposite first and second major surfaces and one or more recesses and projections formed in a peripheral band in and circumscribing the second major surface, the clip comprising:
30 a first protrusion configured to engage and extend between each of the two substrates; and
first and second panel engaging portions, one on each side of the first protrusion, the clip configured to engage at least one of the substrates by relative motion in a direction perpendicular to the major surfaces;
35 the first protrusion having one or more planar surface portions lying parallel to the first major surface wherein a space is formed beneath the one or more planar surface portions;
each panel engaging portion having opposite side walls and a bottom wall wherein the side walls extend upward from and are contiguous with the bottom wall,
40 the first panel engaging portion configured to receive a projection of a first substrate and engage the first substrate in a manner to form at least two locking planes, the

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locking planes lying perpendicular to the major surfaces, and the second panel engaging portion configured to receive a projection of a second substrate and engage the second substrate in a manner to form at least two further locking planes, wherein the clip mechanically grips the engaged substrates along at least four of the locking planes.

In a second aspect the invention provides a clip for joining together first and second substrates in a vertical flooring system where each substrate has: opposite first and second major surfaces and one or more recesses and projections formed in a peripheral band in and circumscribing the second major surface, the clip comprising:

- a first protrusion; and
- first and second panel engaging portions, one on each side of the first protrusion, the clip configured to engage at least one of the substrates by relative motion in a direction perpendicular to the major surfaces;
- the first protrusion configured to extend between each of the two substrates;
- each panel engaging portion having opposite side walls and a bottom wall wherein the side walls extend upward from and are contiguous with the bottom wall, the first panel engaging portion configured to engage an outermost projection of a first substrate to form two locking planes, one on each side of the projection, the locking planes lying perpendicular to the major surfaces, and the second panel engaging portion configured to engage an outermost projection of a second substrate to form at least one further locking plane, wherein the clip mechanically grips the engaged substrates along at least three of the locking planes.

In one embodiment the first protrusion is dimensioned to lie wholly below the first major surfaces when the clip is engaged with the substrates.

In one embodiment the side walls and bottom wall of at least one of the first and second panel engaging portions forms a socket.

In one embodiment the clip is arranged to enable relative rotation or pivoting of the substrates joined by the clip by at least 3° while maintain engagement of both substrates.

In one embodiment the clip is provided with torsional resilience enabling resilient twisting or flexing of the clip about a longitudinal axis of the clip.

In one embodiment at least one of the first and second panel engaging portions is configured to engage a panel by overhanging one or more locations, in a direction perpendicular to the major surfaces of the panel, an adjacent surface of a projection of that panel.

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In one embodiment at least one of the first and second panel engaging portions is arranged to spring open to receive or release a projection.

5 In one embodiment at least one of the panel engaging portions comprises a bulge on each side wall, the bulges extending transversely inward toward each other to form a neck, the bulges disposed to overhang portions of a received projection to form respective ones of the locking planes.

10 In one embodiment the first and second panel engaging portions are of the same configuration and the second panel engaging portion engages the outermost projection of a second substrate about two locking planes, one on each side of thereof.

In one embodiment each bulge comprises either: a plurality of contiguous planar
15 surfaces; or a smoothly curved convex surface.

In one embodiment the side walls and bottom wall of each panel engaging portion form a socket and each panel engaging portion is configured so that two of its
20 corresponding locking planes line within the respective socket.

In one embodiment the side walls and bottom wall of each panel engaging portion form a socket and each panel engaging portion is configured so that a first of its locking
25 planes lies inside, and second of its locking planes lies outside, of the corresponding socket.

In one embodiment the side walls and bottom wall of each panel engaging portion form a socket and each panel engaging portion is configured to form three locking planes,
30 where two of the three locking planes line within the corresponding socket, and a remaining locking lies outside the corresponding socket.

In one embodiment the side walls and bottom wall of each panel engaging portion form a socket and each side wall is provided with an inflexion, the inflexions facing each
35 other to form a neck, the neck arranged to spring open to receive or release a protrusion.

In one embodiment the clip is symmetrical in shape and configuration about a plane of symmetry passing through the first protrusion and perpendicular to a plane containing
40 the bottom wall of the first sockets.

In one embodiment the first protrusion is arranged to flex laterally.

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In one embodiment the first protrusion comprises two planar surface portions a spring formed integrally with and extending between the two planar surface portions.

In one embodiment the first protrusion comprises one planar surface portion.

5

In one embodiment the space is open below the one or more two planar surface portions.

10 In one embodiment the first protrusion comprises one planar surface portion and a bottom wall lies below the one planar surface portion and extends between and joins the bottom walls of the first and second panel engaging portions.

15 In one embodiment the clip comprises one or both of third and fourth panel engaging portions integrally formed with the first and second panel engaging portions respectively; the third panel engaging portion configured to engage a projection adjacent to the outermost projection of the first substrate to form two further locking planes, one on each side of the adjacent projection, the further locking planes lying perpendicular to the major surfaces; the fourth panel engaging portion configured to engage projection adjacent to the outermost projection of the second substrate to form
20 two further locking planes, one on each side of the adjacent projection; wherein the clip mechanically grips the two engaged substrates along eight locking planes.

In one embodiment the third and fourth panel engaging portions are of the same configuration as the first and second panel engaging portions.

25

In one embodiment the clip comprises two second protrusions, one formed integrally between the first and third panel engaging portions; and another formed integrally between the second and fourth panel engaging portions.

30 In one embodiment each of the second protrusions is arranged to flex laterally.

In one embodiment the side walls and bottom wall of each of the third and fourth panel engaging portion form third and fourth sockets respectively.

35 In one embodiment each of the third and fourth sockets comprises a bulge on each side wall, the bulges extending transversely inward toward each other to form a respective neck, the bulges disposed to overhang portions of a received projection to form respective ones of the further locking planes.

40 In one embodiment the clip is arranged so that the necks of the third and fourth sockets spring open to receive or release a respective projection.

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In one embodiment each bulge of the third and fourth sockets comprises a plurality of contiguous planar surfaces.

- 5 In one embodiment each bulge of the third and fourth sockets comprises a smoothly curved convex surface.

In one embodiment the projection engaging portions are self-engaging.

- 10 In one embodiment the clip is formed from a web of material.

- In a third aspect the invention provides a clip for joining together first and second substrates in a vertical flooring system where each substrate has: opposite first and second major surfaces and one or more recesses and projections formed in a
- 15 peripheral band in and circumscribing the second major surface, the clip comprising:
a first protrusion configured to extend between each of the two substrates; and
first and second panel engaging portions, one on each side of the first protrusion, the clip configured to engage at least one of the substrates by relative motion in a direction perpendicular to the major surfaces;
- 20 each panel engaging portion having opposite side walls and a bottom wall wherein the side walls extend upward from and are contiguous with the bottom wall, the first panel engaging portion configured to engage an outermost projection of a first substrate to form two locking planes, one on each side of the projection, the locking planes lying perpendicular to the major surfaces, and the second panel engaging
- 25 portion configured to engage an outermost projection of a second substrate to form at least one further locking plane, wherein the clip mechanically grips the engaged substrates along at least three of the locking planes;
the second panel engaging portion having one or more mechanical fasteners arranged to extend through the bottom wall and into an overlying substrate to fasten
- 30 the clip to the overlying substrate.

In one embodiment the or each mechanical fastener is one of: a screw, nail or barb.

- 35 In one embodiment the or each mechanical fastener extends from the side wall of the second panel engaging portion distant the first protrusion.

In one embodiment the or each mechanical fastener extends through the side wall of the second panel engaging portion distant the first protrusion.

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In one embodiment when the or each mechanical fastener is a nail or barb, the or each mechanical fastener is formed integrally with the side wall of the second panel engaging portion distant the first protrusion.

- 5 In one embodiment wherein the first protrusion comprises a transverse arm extending into and forming part of the second panel engaging portion.

- 10 In one embodiment the first panel engaging portion comprises a plurality of ratchet teeth extending along at least one of its side walls and orientated to face the other of its side walls.

In one embodiment the first panel engaging portion comprises a plurality of ratchet teeth extending along each of its side walls and orientated to face each other.

- 15 In one embodiment the clip comprises a third panel engaging portion adjacent the first projection engaging portion and distant the first protrusion, the third projection engaging portion configured to engage an adjacent projection to the outermost projection of the first substrate to form two further locking planes.

- 20 In one embodiment the third panel engaging portion comprises opposite side walls, and a bottom wall wherein the side walls extend upward from and are contiguous with the bottom wall.

- 25 In one embodiment the third panel engaging portion comprises a plurality of ratchet teeth extending along at least one of its side walls and orientated to face the other of its side walls.

- 30 In one embodiment the third panel engaging portion comprises a plurality of ratchet teeth extending along each of its side walls and orientated to face each other.

In one embodiment a side wall of the third panel engaging portion nearest the first protrusion is spaced from a side wall of the first panel engaging portion distant the first protrusion.

- 35 In one embodiment the first panel engaging portion comprises a bulge on each of its side walls, the bulges extending transversely inward toward each other and disposed to overhang portions of a received projection to form respective ones of the locking planes.

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In one embodiment the side wall of the first engaging portion distant the first protrusion is provided, on a surface facing away from the first protrusion, with a transversely outward extending bulge.

- 5 In one embodiment the surface facing away from the first protrusion is formed in the configuration of an inflexion with said bulge forming a portion of the inflexion.

- 10 In one embodiment the first panel engaging portion comprises a socket and the side walls of the first panel engaging portions together form side walls and a root of the socket.

In one embodiment the first protrusion is dimensioned to lie wholly below the first major surfaces when the clip is engaged with the substrates.

- 15 In one embodiment the side walls and bottom wall of at least one of the first and second panel engaging portions forms a socket.

- 20 In one embodiment the clip is arranged to enable relative rotation or pivoting of the substrates joined by the clip by at least 3° while maintain engagement of both substrates.

In one embodiment the clip is provided with torsional resilience enabling resilient twisting or flexing of the clip about a longitudinal axis of the clip.

- 25 In one embodiment at least one of the first and second panel engaging portions is configured to engage a panel by overhanging one or more locations, in a direction perpendicular to the major surfaces of the panel, an adjacent surface of a projection of that panel.

- 30 In one embodiment at least one of the first and second panel engaging portions is arranged to spring open to receive or release a projection

- In a fourth aspect there is provided a surface covering system comprising:
a plurality of substrates each having: opposite first and second major surfaces;
35 one or more recesses and projections formed in a peripheral band in and circumscribing the second major surface; and,
a plurality of clips in accordance with the first, second or third aspects for engaging adjacent substrates.

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In one embodiment the substrates comprise side walls lying in planes extending between the opposite major surfaces wherein the side wall lie within a footprint of the first major surface.

- 5 In one embodiment the system comprises one or more beads of re-stickable adhesive provided between the substrates and the clips to facilitate re-stickable adhesive bonding of the substrates to the clips.

- 10 In one embodiment the projections on the substrates are provided with grooves or channels in which the beads of re-stickable adhesive reside when the substrates are engaged by the clips.

- 15 In one embodiment the system comprises a quantity of re-stickable adhesive bonded to the first major surface; and, one or more release strips covering the re-stickable adhesive on the first major surface.

- 20 In one embodiment the system comprises an extraction system configured to lift a first substrate engaged along opposite sides with other substrates in a direction perpendicular to the major surface thereby holding the first substrate it in a plane parallel to that in which it lay prior to lifting.

In a fifth aspect there is provided a surface covering system comprising:

- 25 a plurality of substrates, each substrate having: opposite first and second major surfaces wherein the first major surface is arranged to face an underlying support to be covered by the system, and one or more recesses and projections formed in a peripheral band in and circumscribing the second major surface; and,

a plurality of clips each provided with two or more panel engaging portions configured to adjacent substrates;

- 30 the substrates and clips relatively configured to enable adjacent substrates to be coupled together by respective clips by motion of the substrates relative to the clips in an engagement direction which is perpendicular to the major surfaces and to enable engaged substrates to be disengaged by: (a) lifting a first substrate in a direction opposite to the engagement direction to facilitate rotation of adjacent engaged substrates along opposite sides of the first substrate to lie in planes declined from the first substrate; and (b) subsequently applying a force in the engagement direction to
35 the second joints of the engaged substrates.

- 40 In one embodiment of the surface covering system the substrates comprise side walls lying in planes extending between the opposite major surfaces wherein the side wall lie within a footprint of the first major surface.

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Brief Description of the Drawings

Notwithstanding any of the forms which may fall within the scope of the clips as set forth in the Summary, the specific embodiments will now be described by way of example only with reference to the accompanying drawings in which:

- 5
- Figure 1a is a schematic representation of a clip and an associated surface covering system in accordance with a first embodiment of the present invention prior to engaging with two substrates;
- 10
- Figure 1b is a schematic representation of the clip shown in Figure 1a but when engaged with the two substrates;
- Figure 1c is an isometric view of the clip shown in Figure 1a;
- Figure 2 is an enlarged view of the clip shown in Figure 1a;
- Figure 3 is an enlarged view of a side wall of the clip shown in Figures 1a-2;
- 15
- Figure 4a is a plan view of a substrate which may be coupled in using embodiments of the clip and, which together with the clip form a surface covering system;
- Figure 4b is a bottom elevation of the substrate shown in Figure 4a;
- Figure 4c is an end elevation of the substrate shown in Figures 4a and 4b;
- Figure 5 is a representation of the plurality of substrates with attached clips;
- 20
- Figure 6a is a representation of two substrates joined by a clip and rotated in a first direction;
- Figure 6b is a representation of the substrates depicted in Figure 6a but rotated in an opposite direction;
- Figures 7a-7d illustrate the effect of use of an embodiment of the clip 10 on an
- 25
- undulating surface;
- Figure 8a is a representation of an extraction system used for disengaging a clip from a substrate;
- Figure 8b is a plan view of the extraction system shown in Figure 8a;
- Figures 9a-9o depict sequential steps in the replacement of a damaged substrate
- 30
- when joined to adjacent substrates utilizing the embodiments of the present clip;
- Figure 10a depicts a second embodiment of the clip prior to engagement with two adjacent substrates;
- Figure 10b depicts the second embodiment of the clip when engaged with two substrates;
- 35
- Figure 11a is a schematic representation of a third embodiment of the clip;
- Figure 11b is a schematic representation of a fourth embodiment of the clip;
- Figure 11c is a schematic representation of a fifth embodiment of the clip;
- Figure 12 is a schematic representation of a sixth embodiment of the clip;
- Figure 13 is a schematic representation of a seventh embodiment of the clip;
- 40
- Figure 14a is a schematic representation of a second embodiment of a surface covering system incorporating the first embodiment of the clip;

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Figure 14b is a schematic representation of an eighth embodiment of the clip, and associated third embodiment of the surface covering system;

Figure 14c is a schematic representation of a fourth embodiment of a surface covering system incorporating the eighth embodiment of the clip shown in Figure 14b;

5 Figures 15a-15c is a schematic representation of a ninth eighth embodiment of the clip;

Figures 15d-15f is a schematic representation of a tenth embodiment of the clip;

Figures 16a and 16b provide a schematic representation of an eleventh embodiment of the clip; and

Figures 17a-17c is a schematic representation of a twelfth embodiment of the clip.

10

Description of Preferred Embodiments

Figures 1a-3 depict an embodiment of a clip 10 for coupling together two substrates in the form of first and second panels 12a and 12b (referred to hereinafter in general as
15 "panels 12"). The clip 10 in this embodiment is "self-engaging" in that it does not require the use of a mechanical fastener such as a screw to fix to a panel 12.

The panels 12 are depicted in more detail in Figures 4a, 4b and 4c. Each panel 12 has opposed major first and second surfaces 14 and 16 respectively. The surface 14 may
20 be considered as an upper or exposed surface while surface 16 may be considered to be an under surface which bears against a support surface or structure. The surfaces 14 and 16 are planar and parallel to each other. Opposite planar longitudinal side walls 18 and 20 extend perpendicular to and between upper and lower surfaces 14 and 16. Transverse side walls 22 and 24 extend from opposite ends of each panel 12
25 between the surfaces 14 and 16. A notch 26 circumscribes the side walls 18-24 and lies in a plane parallel to the major surfaces 14 and 16.

Each of the walls 18, 20, 22 and 24 lay on respective planes perpendicular to planes containing the major surfaces 14 and 16. More particularly it will be noted that no part
30 of the any side wall 18-24 extends laterally beyond the peripheral edge of either of the major surface 14, 16. Stated another way, the side walls 18-24 lay wholly within the footprint of the major surface 14. As a result of this there is substantially no wastage in the manufacture of the panels 12 in terms of the total surface coverage. For example assume four panels 12 of equal width are cut from the same "mother board" having a
35 width of 80 cm using a saw with a kerf width of 4mm. This requires three cuts to be made. So 12mm is lost as a result of the kerf width of the saw. Therefore each of the four panels will have a width of 19.97cm. When the four panels are laid side by side they will cover a total width of 79.88cm. Consider now the same mother board used to produce four panels of equal width but where the panels have a tongue that extends
40 laterally by 10mm on one side and a groove dimensioned to receive such a tongue on the opposite side. Thus now not all of the side walls lie within the footprint of the major

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surface due to the tongue. Assuming the same saw is used each of the four panels will again have a width of 19.97mm each. But when these panels are now joined side by side with the tongue of one panel received in the groove of an adjacent panel the total width covered is now only 76.88cm. In effect 3cm width of coverage, i.e. wood or other material used to make the panels is lost. This is of great cost significance when a manufacturer may be manufacturing millions of panels per year.

A series of recesses R and projections P are formed in a peripheral band 32 circumscribing the under surface 16. The peripheral band 32 is rebated from the major surface 16 by a distance D shown in Figure 4c such that when a clip 10 is engaged with the projections P the under surface of the clip 10 and the non-rebated portion of the major surface 16 are flush with each other as shown in Figure 1b.

Each panel 12 has a first recess R1 formed adjacent each of the sides 18 – 24. That is the recess R1 extends substantially completely about the under surface 16 adjacent the side walls 18-24. Immediately inside of the recess R1 is a first projection P1. Inside of the projection P1 is a second and inner most recess R2. The projection P1 and recess R2 likewise extend substantially completely about the under surface 16. Each projection P1 has opposite side surfaces 15 and 17 depending generally perpendicular to the major surfaces 14, 16 in the general profile or configuration of an inflexion. Each inflexion comprises a cavity or recess 19 nearest major surface 14 and a contiguous bulge 21 nearest major surface 16. The bulge 21 is convex or at least generally convex in that it protrudes laterally outward and can be: continuously smoothly curved; composed of a number of contiguous planar surfaces; or composed of a combination of smoothly curved and planar surfaces. Similarly the recess 19 is concave or at least generally concave in that the recess can have a surface that may be: continuously smoothly curved; composed of a number of contiguous planar surfaces; or composed of a combination of smoothly curved and planar surfaces.

The panels 12 can be considered to be “all male” panels as it is the projections P that extend into and engages the clips 10. The panels 12 do not have complimentary joints (e.g. male and female portions, or tongues and grooves) to enable engagement with each other. Engagement is only by way of the clips 10.

Figures 1a and 1b show two panels 12a and 12b disposed adjacent each other ready for coupling with the clip 10. Each of the panels 12a and 12b is of the same shape and configuration the panel 12 depicted in Figures 4a – 4c. For ease of description, the features of the panel 12a will be designated with the same reference numbers as shown in Figures 4a – 4c but with the addition of suffix “a”. Similarly, features of panel 12b will be denoted with the reference numbers shown in Figures 4a – 4c but with the suffix “b”.

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5 In order to couple the two panels 12 together, the clip 10 is provided with a first protrusion 34a and first and second panel engaging portions 35a and 35b (referred to in general as "panel engaging portion 35" or "panel engaging portions 35") , one on either side of the protrusion 34a. Each panel engaging portion 35 mechanically grips, engages or otherwise couples to the projection P of respective panels 12.

10 Broadly speaking the clip 10 is arranged to engage and thus join two panels 12 about at least three locking planes. Each locking plane lies perpendicular to the major surfaces 14 or 16. A locking plane is created by a part of the clip overhanging or extended transversely into a part of an engaged panel. The overhang or traverse extension occurs in a plane or direction perpendicular to the major surfaces 14, 16. To achieve the at least three locking planes, at one or more locations the first panel engaging portion 35a engages one panel 12a about at least two locking planes and the
15 second panel engaging portion 35b engages a second panel 12b about at least one locking plane. However in some embodiments the clip 10, each of the panel engaging portions 35 engages respective panels 12 along two locking planes, to provide four locking planes in total for a clip with two panel engaging portions 35. Other
20 embodiments are also described where the panel engaging portions 35 form three locking planes with a panel 12.

25 In the clip 10 the first panel engaging portion 35a self-engages the first panel 12a along at least two locking planes upon relative motion between the clip and a panel facilitated by application of force or pressure in a direction perpendicular to the major surface 14 or 16. As a consequence clips 10 provide for, and can form part of, what is known in the art as a "vertical" surface covering system 13. This term designates that the panels 12 can be coupled together and indeed removed from between each other by a vertical motion maintaining the panel being coupled or removed in a substantially horizontal plane, when the surface covering system is a flooring system.

30 As shown in Figure 1b, the panel engaging portions 35a and 35b of a first embodiment include respective sockets 36a and 36b (referred to in general as "socket 36" or "sockets 36"). Further, each socket 36 is of the same configuration. The first protrusion 34 engages both of the substrates 12a and 12b by way of engaging their respective recess R1, while the sockets 36 engage respective projections P of the overlying
35 panels 12. A space or void 37 is created between the protrusion 34 and the underlying substrate or support surface on which the panels 12 are laid. The engagement of a panel 12 with the clip 10 is facilitated by the resilient opening and closing of a corresponding socket 36. That is, each of the sockets 36 (and panel engaging portion
40 35) is arranged or otherwise configured to spring open to receive or release a projection of an overlying substrate 12. This arises due to one or both of: the

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configuration of the sockets 36; and, the material from which the clips 10 are made. The provision of the space or void 37 also assists in providing resilience to the clip 10. In this embodiment the space 37 is open in that it has no bottom until the clip 10 is laid on an underlying substrate. But in other embodiments the space may be closed by
5 extending a bottom of the panel engaging portions 35a and 35b across the protrusion 34. (An example of this is shown in the embodiments of clip 10v and 10s, described later in this specification.).

With particular reference to Figure 2 the first projection 34a is provided with a stop 38
10 that panel 12 overlies and indeed sits on. The stop 38 has a planar upper surface portion 40 which is parallel to the major surfaces 14 of the panels 12. The stop 38 is formed as two spaced apart lands 42 joined by an integrally formed spring 44. The upper surface portion 40 is constituted by upper surfaces of the lands 42. The spring 44 provides lateral resilience to the protrusion 34 enabling the lands 42 to flex relatively
15 toward or away from each other. The space 37 is beneath the surface portion 40 of protrusion 34 which allows for some downward flexing of the protrusion 34 and the surface 40/lands 42.

In this embodiment the panel engaging portions 35 are of identical configuration are
20 disposed about a line of symmetry S passing through a mid-plane of the protrusion 34a. For this reason a full description will be made of the first panel engaging portion 35a only. The features of the second socket 36b are identical and will be labelled with the same reference numbers.

25 The panel engaging portion 35 and corresponding socket 36a have two side walls 46n and 46m (referred to in general and collectively as "side wall 46" or "side walls 46"). The side wall 46n is nearest the line of symmetry S and is common to the protrusion 34a. The side wall 46m is distant the line of symmetry S. Also in this and other, but not all, embodiments of the side walls 46m is a mirror image of side wall 46n. The side
30 wall 46n extends in a general direction perpendicular to the major surfaces 14 and 16. Adjacent the land 42 the side wall 46n is formed with a bulge 48 that extends transversely inward of the socket 36a. Extending continuously from the bulge 48 is a generally concave recess 50. The bulge 48 may be described as being generally convex as it is formed with a plurality of contiguous planar surfaces rather than an
35 arcuate surface. Similarly the recess 50 is described as being generally concave as it is formed with contiguous planar surfaces rather than an arcuate surface.

Figure 3 is an enlarged view of a side wall 46 extending between the land 42 and
40 bottom wall 52 of the socket 36a. The planar nature of the surfaces forming the bulge 48 and the recess 50 can be plainly seen. Starting from the land 42, the bulge 48 has a first planar surface 49 that slopes 45° in an anti-clockwise direction downwardly from

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the land 42 toward the corresponding socket 36a. Formed contiguously with the surface 49 is a planar surface 51 which is angled at 45° in an anticlockwise direction from the surface 49. Contiguous with the surface 51 is a further surface 53 which is angled at 45° in clockwise direction for planar surface. Contiguous with the surface 53
 5 is a further planar surface 55 which is angled at 45° in anticlockwise direction from the surface 53 parallel with the surface 51. Contiguous with the surface 55 bottom wall 50 is a planar surface 57 angled at 45° degrees in a clockwise direction to the surface 55.

The contiguous planar surface 49, 51 and 53 form the generally convex bulge 48 while
 10 the planar surfaces 53, 55 and 57 form the generally concave recess 50. By virtue of the contiguous nature of the bulge and recess 48 and 50 the side walls 46 can be described as being formed with a corresponding inflexion.

The side wall 46n extends contiguously from the land 42 to a planar bottom wall 52 of
 15 the socket 36a. The bottom wall 52 extends in a plane parallel to the major surfaces 14 and 16. A distal end of the bottom wall 52 is formed contiguously with the side wall 46m of the socket 36a. The side wall 46m is formed with a recess portion 50 of a generally concave configuration and a contiguous bulge 48 having a generally convex configuration. A land 42 extends from the bulge 48 at the free end of the side wall 46m
 20 away from the first protrusion 34 and coplanar with the lands 42 of the first protrusion 34a.

The side wall 46m and contiguous land 42 extend into the recess R2 of an engage
 25 panel 12.

The bulges 48 of the socket 36a extend laterally toward each other. This results in the creation of a neck 54 at the mouth of the socket 36a. The opposed recesses 50 together with the bottom wall 52 may be considered as forming a body 56 of the corresponding socket 36a. The clip 10 is made from a material enabling the socket
 30 36a to spring open to receive or release a projection P1 of an overlying substrate 12. This is enabled by a lateral flexing of one or both of the side walls 46 to increase the width of the neck 54. For example the clip 10 may be made from, but not limited to, aluminium, spring steel, plastics materials, and composite materials such as fibre glass.

35
 Returning to Figure 1b it will be seen that each panel engaging portion 35 receives a respective projection P and engages each of the panels 12 about two locking planes LP. Thus the clip 10 engages the panels 12a and 12b about or along a total of four locking planes LP. Each locking plane is created by the bulge 48 on each side wall 46
 40 overhanging a corresponding bulge 21 on each adjacent side of each projection P in a direction perpendicular to the major surfaces 14, 16. Stated another way the locking

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planes are parallel to a direction of insertion and retraction of the projections P into and out of the panel engaging portions 35. It will also be noted in this embodiment that the locking planes LP all lie within the sockets 36 of the panel engaging portions 35.

- 5 With reference to Figure 5a the clips 10 may be made in a variety of lengths substantially shorter than the length of a panel 12 to which they are applied. For example, while a panel 12 may be in the order of 0.9 – 1.8m, a clip 10 may be provided in a length range of for example 2cm – 10cm. Thus multiple clips 10 will be used to connect together two adjacent panels 12. In one example for a 1.8m length panel, four
10 or five spaced apart clips 10 having a length in the range mentioned above may be used.

- The panels 12 and clips 10 may be supplied separately. In that event, when laying a floor, an installer will initially engage a plurality of clips 10 along two adjacent sides, for
15 example 18 and 22, of each panel 12 in a manner so that the first (central or common) protrusion 34a and one socket 36 are engaged with the first recess R1 and first protrusion P1 of that panel. This in effect transforms the all-male panels 12 into panels having notional male sides or joints and female sides or joints. In particular, the sides 18 and 22 which are now fitted with the clips 10 and have the laterally extending
20 sockets are considered as female joint sides while the remaining sides 20 and 24 are considered as male joint sides.

- The clips 10 are engaged with the panels by application of a force or pressure in a direction which is perpendicular to the major surfaces 14 and 16. For example, an
25 installer can place a plurality of clips 10 partially beneath say side 18 of one panel 12 so that the first protrusion 34a underlies a recess R1 and the socket 36 underlies the protrusion P1. By applying force or pressure in a plane perpendicular to the major surface 14 protrusion P1 springs open the underlying socket 36 allowing it to pass through the neck 54 to be captured in the body 56. More particularly, the bulges 21 of
30 protrusion P1 bear and slide down corresponding bulges 48 of the socket 36 in response to the force or pressure. This causes tension in the socket 36 and a corresponding compression in the projection P1. This tension causes the flexing of the side walls 46 of the socket 36 in an outward direction and may also result in a compression of the projection P1 as the projection P1 passes through the neck 54.
35 Whether or not the projection P1 actually compresses is dependent on the type of material from which it is made and the relative resilience and stiffness of the clip 10 and projection P1. In any event it is not critical that there is compression of the projection P1. The outward flexing of the side wall 46n adjacent the first protrusion 34a is accommodated to an extent by compression of the spring 44. After the respective
40 vertical faces of the bulges 21 pass the vertical faces of the bulges 48 there will be an over centre or snap action in the engagement of the clip 10 to the panel 12 wherein the

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release in tension of the socket 36 and the release of the compression in protrusion P1 enable the remainder of the engagement to occur without any further application of the downward force or pressure.

- 5 The lower inclined surfaces of the bulges 21 and upper inclined surfaces 49 of the bulges 48 can be considered in a general sense to be in the form of or act as cams in that they direct the motion of each other as they move relative to each other.

10 A surface covering system 13 comprising the clips 10 and panels 12 is a "vertical" system as engagement is affected by force or pressure applied in the "vertical" direction only, or more accurately in a direction perpendicular to the major surface 14. This direction is vertical when the panels 12 are laid on a horizontal surface.

15 With the clips 10 engaged with the projections P a floor covering is created by engaging the male and female joint sides. Typically the longitudinal male joint sides 20 are engaged with the longitudinal female joint sides 18. At the ends of the panels the transverse male joint sides 24 are engaged with the transverse female joint sides 22. In particular the panels 12 can be laid by engaging for example male longitudinal sides 20 with the clips extending from the female longitudinal sides 18.

20 In the current embodiment shown in Figure 5 connection is made by aligning the panel 12b so that its recess R1 and projection P1 lie above the now exposed portion of the first protrusion 34a and the adjacent exposed socket 36b. Applying a force or pressure in a plane perpendicular to the major surface 14 in a downward direction causes the
25 socket 36b to spring open with the corresponding bulges 48 flexing away from each other opening the neck 54 to enable the projection P1 to enter into the body 56. More particularly, the bulges 21 of protrusion P1 bear and slide down opposed bulges 48 of the socket 36b in response to the force or pressure. This causes tension in the socket 36b and a corresponding compression in the projection P1. This tension causes the
30 flexing of the side walls 46 of the socket 36b in an outward direction and may also result in a compression of the projection P1 as it passes through the neck 54. After the respective vertical faces of the bulges 21 and 48 pass each other there will be an over centre or snap action in the engagement of the clip 10 to the plank 12 wherein the
35 release in tension of the socket 36b and the release of the compression in protrusion P1 enable the remainder of the engagement to occur without any further application of the downward force or pressure.

40 When engaging the clips 10 with a panel 12 downward pressure can be applied by a person of a weight of about 70 kilograms traversing the major surface 14 over the peripheral band 32 and an underlying clip 10 with a small hopping or one legged jumping or small stomping motion. In this way joining of adjacent planks 12, or a plank

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12 and clip 10, can be achieved without the need to constantly kneel and stand as is required with prior art systems. The engagement may also be aided by light tapping with a rubber mallet. The ease of installation not only widely expands the range of do-it-yourself installers by reducing the skill and strength level required it also has significant benefits to all installer including professions by way of minimising physical stress and exertion.

When panels 12 with the clips 10 are used in large area such as for example in commercial premises a modified compactor can be used to apply the force or pressure. The compactor is envisaged as being in the form similar to those used for compacting sand prior to laying pavers, but having a soft smooth non scratch base lining. The lining may comprise but is not limited to a rubber, foam, felt, or cardboard sheet.

The structure of the clips 10 enables relative rotation or pivoting between the two joined panels 12 by approximately plus or minus 3° while maintaining engagement between the panels 12. The positive and negative rotation is depicted in Figures 6a and 6b. Given the nature of the clip 10, this rotation can be accommodated by flexing the clip 10 by equal amounts on opposite sides of the line of symmetry S. However, depending on the specific conditions under which the clip 10 is used, a greater proportion or indeed all in rotation maybe accommodated by the clip 10 on one side only of the line of symmetry S.

With reference to Figure 6a, the panel 12b is rotated by -3° (3° in a clockwise direction) relative to panel 12a. This is facilitated by the spring 44 flexing outwardly about the line of symmetry S. In turn this causes the bulges 48 on the side walls 36n common to the first protrusion 34a to press harder against their adjacent projections P1 and P1 respectively. There will also be a slight flexing of the opposite free side walls 46n away from the adjacent sides of their respective projections P1 and P1. This is due to the adjacent bulges 21 on the protrusions pushing on the recesses 50 the free side walls. This causes separation of the surfaces 18 and 20 creating a gap G at the upper major surfaces 14a and 14b. Nevertheless the panels 12a and 12b remain vertically and horizontally engaged. Vertical engagement between the panels is maintained along the locking planes LP by the bulges 48 in the clip 10 overhanging the bulges 21 in the projections P. Horizontal arrestment is provided by the projections P being maintained in their sockets 36 and more particularly by the side walls 46 of clip 10 being maintained on opposite sides of a corresponding projection P.

Figure 6b shows the panel 12b being rotated by $+3^\circ$ (3° in an anticlockwise direction) relative to the panel 12a. The rotation is facilitated by an inward flexing of spring 44 about the line of symmetry S and pivoting of the panels 12a and 12b against each

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other an upper region of respective abutting side walls 18 and 20. This action also causes an outward flexing of the outermost or free side walls 46 of sockets 36. This is due to the upper inclined surfaces of the projections P1 near the surfaces 21 bearing on and sliding along the surfaces 53 of the sockets 36. It will also be seen that this rotation creates a gap G between the panels 12 adjacent the protrusion 34. Nevertheless the panels 12a and 12b remain vertically and horizontally engaged. Vertical engagement between the panels is maintained along the locking planes LP by the bulges 48 in the clip 10 overhanging the bulges 21 in the projections P. Horizontal arrestment is provided by the projections P being maintained in their sockets 36 and more particularly by the side walls 46 of clip 10 being maintained on opposite sides of a corresponding projection P.

The relative rotation between panels 12 joined by clips 10 is of assistance in the installation of the substrates/panels particularly on uneven surfaces such as an undulating concrete floor. This is of great importance to the "do-it-yourself" user although benefits also flow through to the professional layer. Consider for example an uneven undulating surface on which it is desired to lay a click type floor covering having say a prior art joint system where the tongue is inserted laterally or at an inclined angle into a groove or recess. The undulation may be in the form of a concave recess or shallow in a portion of the surface having a width several times greater than the width of the panels. Depending on the degree or slope of the concavity it may be extremely difficult if not impossible to insert a tongue of a "to be" installed panel into the groove of a previously laid panel. This arises because the two panels do not and will not lie in the same plane, but rather are angled relative to each other due to the concavity. Additionally, when installing floor boards of a length from about 1m on an uneven surface, banana-ing or lateral bowing occurs of the previously installed floor board by virtue of on installer kneeling on it when trying to lay the next floor board. The kneeled on board will bend under the weight of the installer due to the uneven underlying surface. This makes it very difficult to get full longitudinal engagement without gapping. In these circumstances, even professional installers have difficulty in laying the floor and will need to rely on substantial physical exertion and experience. The do-it-yourself installer will often give up and either returns the flooring to the retailer on the basis that it does not "click" together or end up paying for a profession installer.

To provide perspective of the effect of the relative rotation capabilities of the clip 10 in comparison to the prior art references made to Figures 7a-7d. Conventional flooring systems are able to accommodate a concavity or a convex hump in an underlying substrate for example a concrete floor of 3 – 5mm over a length of 1m, being the industry standard. Undulations greater than this either prohibit the use of many prior art systems or at least make them very difficult to install. Assuming that they can be

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installed the undulation can subsequently cause prior art joint systems to disengage horizontally and thus gap excessively. Specifically in the event that the undulation is in the form of a hump or convex undulation there is the possibility of either total horizontal separation between the adjacent panels and/or splitting or shearing of the joints. In the event that the undulation is a concavity prior art joints are liable to shear or break due to excessive tensile force being applied to the joints.

In Figures 7a-7d (which are schematic only and not drawn to scale) the 3 – 5mm surface undulation which can be accommodated by the prior art system is shown as shaded area 60. In comparison the + or – 3° rotation available by application of embodiments of the clips 10 over a 1m length provide a total possible displacement of 52mm. Figures 7a and 7b relate to the – 3° rotation, while Figures 7c and 7d relate to the + 3° rotation. This enables substrates coupled together utilising embodiments of the clip 10 to be successfully laid on floors without horizontal disengagement or separation where the floor may have for example a concave undulation which over a distance of one metre drops by 52mm below adjacent planar surface portion of the floor. Maintaining horizontal engagement maintains the structural integrity of the floor. This is beneficial in terms of the appearance of the floor which in turn can add value to an associated house. It should also be understood that floors are often under dynamic tensile and compressive load due to variations in temperature and humidity. They are also under static load from furniture or other household items. Horizontal separation, which is evidenced by a widening of a gap between the panels, is often indicative of a release of tension in the floor. Once this tension has been released it can be extremely difficult if not impossible to reconnect the disengaged panel or fully connect a new panel. This leaves the home owner with the only option of using unsightly filler to make good the gap caused by the separation. This in turn is likely to have a negative impact on the value of the home.

The process of removal of a damaged plank will now be described with particular reference to Figures 8a-9o. The removal and replacement is facilitated by use of an extraction system 90 which operates to lift the panel in a direction perpendicular to the major surface 14, holding it in a plane parallel to that in which it lay prior to lifting. When the panel is a flooring panel this action keeps the panel in a horizontal plane. The system 90 attaches to the panel and penetrates through the panel so as to bear against an underlying support surface. The system 90 is configured to provide mechanical advantage/leverage so that a user is not required to supply the full or strength to directly lift the panel which is engaged on opposite side by other panels.

In the following embodiment the extraction system 90 comprises a jack 92 shown in Figures 8a and 8b. However other forms of extraction system 90 can be used which attach to and lift the panel while maintaining the panel in the same disposition while

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being lifted and provide mechanical advantage.

In this embodiment the jack 92 is a simple hand screw jack which is applied to a plank being removed. The screw jack 92 has an elongated threaded shaft 96 provided at one end with a cross bar handle 98. An opposite end of the shank 96 is engaged within a threaded boss 100 formed on a clamp plate 102. The plate 102 is of a square shape with the boss 100 located centrally in the plate 102. The boss 100 overlies a through hole in the plate 102 through which the shaft 96 can extend. Distributed about the plate are four through holes 104 for receiving respective fastening screws 106.

10

Figure 9a depicts three side by side interlocked planks 12a, 12b and 12c coupled together with a plurality of clips 10 and overlying a surface 110. Central plank 12b has a major surface 14 having a damaged portion 126. The nature of the damage is immaterial to the removal and replacement of the panel 12b and can include but is not limited to a scratch, gash, burn or water damage. It should also be understood that unless the one of planks 12a or 12c is immediately adjacent a wall then other planks 12 will be interlocked with each of planks 12a and 12c.

15

In order to replace the damaged plank 12b, a drill 112 (see Figure 9b) is used to drill a hole 114 through the plank 12b for each jack 92 used in the extraction process. The hole 114 is formed of a diameter sufficient to enable the passage of shank 96. The length of the plank 12b being removed dictates the number of jacks 92 that may be required. Thus in some instances, extraction can be effected by the use of one jack 92 whereas others may require two or more jacks. For ease of description the extraction process is described by use of a single jack 92 only.

20

25

Upon completion of the hole 114, the clamp plate 102 is fixed to the plank 12b by way of the four screws 106 that pass through corresponding holes 104. This is illustrated in Figure 9c.

30

The next stage in the removal process is shown in Figure 9d involves engaging the shank 96 with the threaded boss 100 and then screwing down the shaft 96 by use of the handle 98 to lift the plank 12b above the surface 110. It should be immediately recognised that this action requires rotation of the panels 12a and 12c relative to panel 12b while maintaining their engagement. This rotation is a relative negative rotation as will be explained shortly. However simultaneously there is also a positive rotation between the panels engaged on either side of panels 12a and 12c opposite the panel 12b.

35

The jack 92 is operated to lift the damaged panel 12b vertically upward by a distance sufficient to provide clearance between the clip 10 and the surface 110 so that the clip

40

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10 has room to be spaced from the projections P of the panel from which it is to be removed. At a minimum this distance will be at least the height of the clips 10. However increasing this distance by several more millimetres and up to say about twice the height of the clips 10 will provide additional clearance to accommodate for flexing of the panels and clips during removal.

Lifting the damaged panel 12b by this distance will induce a negative rotation between the damaged panel 12b and the adjacent adjoining panels 12a and 12c. The negative rotation is in the order of 7° – 12° . This is explained with particular reference to Figure 9d which shows an angle θ_1 between the major surfaces 14 of panels 12a and 12b; and an angle θ_2 between major surfaces 14 of panels 12b and 12c. Prior to lifting of the panel 12b, it should be understood that the angles θ_1 and θ_2 will be 180° assuming that the surface 110 is flat. Formation of a negative angle between adjoining panels 12 is indicative of the angle θ_1 exceeding 180° . The amount by which the angles θ_1 and θ_2 exceed 180° during the disengagement is equated to the negative rotation of the panels during this process. For example if angle θ_1 is say 187° then the relative negative rotation between panels 12a and 12b is 7° .

It will be understood by those skilled in the art that the vertical raising of any prior art system having a lateral projection (e.g. a tongue) that seats in a groove or recess of an adjacent panel is impossible without breaking the tongue or fracturing the panel with the groove. Thus this action if attempted with a prior art system is very likely to result in the damaging of one more panels which were not previously damaged or in need of replacement.

The jack 92 mechanically lifts and self supports the panel 12b, panels 12a, 12c and panels adjacent to panels 12a and 12c. Thus the installer does not need to rely on their own strength to lift and hold the panels. In contrast some prior art systems use suction cups similar to those used by glaziers to grip a panel to be removed. The installer must then use their strength to lift the panel. While this is difficult enough it becomes impossible if the panel is also glued to the surface 110. The jack 92 which provides a mechanical advantage is able to operate in these circumstances. In addition as the jack self supports the panels 12 the installer is free to use both hands in the repair process and indeed is free to walk away from the immediate vicinity of the panel 12b.

The jack 92 can be provided with a scale to give an installer an indication of when panel 12b has been lifted by the required distance to enable disengagement of the panel 12b with clips 10. The scale could comprise for example a coloured band on the shank 96 which becomes visible above the boss 100 when shank has been screwed down to lift the panel sufficiently from surface 110. Several bands could be provided

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on the shank for panels of different width.

In order to fully disengage the panels a downward force or pressure is applied to both panels 12a and 12c starting near one end. This will result in the at least the clips 10
 5 nearest that end being pushed out of engagement with the panel 12b but being maintained on the adjacent panels 12a and 12c. This process is continued for the length of the panels 12a and 12c to disengage all of the clips 10 joining panel 12b. One very efficient and simple way of doing this is by walking along the panels 12a and 12c while the panel 12b remains supported by the jack(s) 92. Alternately the
 10 downward force or pressure can be applied by use of light blows with a rubber mallet M. The downward force can be applied substantially simultaneously on both panels 12a and 12c, or alternately one can firstly apply the force to say panel 12a first to disengage it from panel 12b, and then apply the force to panel 12c to disengage it from panel 12b. In the following description of the removal and replacement of panel 12b
 15 the downward force is being applied substantially simultaneously to panel 12a and 12c, but the for sake of brevity the process will be described with reference to the interaction the application of force on panel 12a.

The total disengagement of the panel 12b with the clips 10 on adjacent panels 12a and
 20 12c is depicted sequentially in Figures 9e-9k. In this sequence Figures 9f, 9h and 9j depict in greater detail interaction between the clip 10 and panel 12 during the disengagement. These Figures in particular provide detail of the disengagement between panels 12a and 12b. However, exactly the same process will be occurring simultaneously in relation to the disengagement of the clips 10 between the panels 12b
 25 and 12c.

Figures 9e and 9f depict, subsequent to the lifting of panel 12b by use of jacks 92, the initial effect of applying downward pressure to the panel 12a. Due to the lifting of panel 12b the clip 10 is already flexing about the line of symmetry S. The application of
 30 downward pressure on the panel 12a will now cause the bulge 48 on the side wall 46n of socket 36b to slide down the bulge 21 on the left hand side of the projection P1 of panel 12b. This is accompanied by an outward flexing (relative to the socket 36b) of the side wall 46n which in turn is accommodated by the compression of spring 44.

35 On the right hand side protrusion P1 the bulge 48 of the free side wall 46m has also started sliding down the bulge 21 causing the side wall 46m to also flex outwardly. There is now a gap between the side walls 18 and 20 of panels 12a and 12b and the major surface 14 on panel 12b is raised above the major surface of panel 12a.

40 Figures 9g and 9h depict the disengagement process in a more advanced state than that shown in Figures 9e and 9f. The bulges 48 of socket 36b have slid further down

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vertical surfaces 17 of the bulges 21 on both sides of the protrusion P1. This action springs open the neck 54 of the socket 36b. This is accommodated by: the compression of spring 44 and corresponding flexing of adjacent side wall 46n of socket 36b; and, the outward flexing of the free side wall 46m of socket 36b.

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Figures 9i and 9j depict this process in a further advanced state where the vertical walls of the bulges on both sides of the socket 36b have slid past and below bulges 21 on both sides of the protrusion P1. Clip 10 is now totally disengaged from the panel 12b as shown in Figure 9j. As mentioned above, this process is occurring on both
 10 sides of panel 12b and as a result as shown in Figure 9i the panel 12b is now released as a bare panel with no attached clips 10. The clips 10 remain engaged with the panels 12a and 12c as shown in Figure 9k.

Figures 9l-9o depict the process for replacing the damaged panel 12b with a fresh
 15 panel 12b1. As shown in figure 9l, the fresh panel 12b1 is placed between the existing panels 12a and 12c with the protrusions P1 resting on: the neck 54 of socket 36b of the clip 10 attached to panel 12a; and, the neck 54 of socket 36a of the clip 10 attached to panel 12c. Next, downward pressure is applied centrally to panel 12b1 or alternately along its edges in a direction perpendicular to the major surfaces 14 in
 20 order to spring open the sockets 36a and 36b of the underlying clips to receive the corresponding protrusions P of the panel 12b1. This springing is effected by outward flexing of both sidewalls 46 of both sockets 36 as shown in Figures 9m and 9n. The downward force or pressure can be applied in many ways including: by light stomping or hopping along the panel 12b1; use of a mallet; or, the use of a small hand
 25 manoeuvred compactor similar to that used for compacting sand but provided with a cushioned or non-abrasive pressure plate so as to not scratch or otherwise damage the underlying panels 12.

Figures 10a-10c depict a second embodiment of the clip designated as clip 10z. Clip
 30 10z is used with modified panels 12z. Panels 12z differ from the panels 12 depicted in Figures 4a-4c by the inclusion of an additional protrusion P2 and recess R3 in the peripheral band 32. Another difference between the panels 12 and 12z is the replacement of the V-shaped groove 32 in the panel 12 with a simple inwardly inclined planar surface which leads from the adjacent side wall to the adjacent recess.

35

Clip 10z differ from the clip 10 by the addition of third and fourth panel engaging portions 35c and 35d which include respective sockets 36c and 36d. The sockets 36c and 36d are formed contiguously with sockets 36a and 36b respectively. A second protrusion 34b is created between each pair of the adjacent sockets 36. Thus there is
 40 a second protrusion 34b between sockets 36a and 36c; and a second protrusion 34b between sockets 36b and 36d. The protrusions 34b differ from the protrusion 34a in

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that their respective stops 38b extend in a horizontal plane for the whole distance between adjacent sockets and are not provided with a central spring equivalent to the spring 44 of protrusion 34a. Additionally, the protrusions 34b are slightly narrower than the protrusion 34a. This arises, because the recesses R2 into which they engage are
5 narrower in width than the combined width of the recesses R1 for the two adjacent panels 12z. The side walls 46m at the free ends of outer most sockets 36c and 36d seat inside the outer most recess R3 of the adjacent panels 12z. The lands 42 of the upper end of each free wall 46m lie parallel to the lands 42 of the protrusion 34a and bears against or is close to the upper horizontal surface of recess R3.

10

The sockets 36 of the clip 10z are of the same general configuration as but narrower than the sockets in the clip 10. Each of the sockets in clip 10z is provided with opposite side walls 46 having respective bulges 48 and recesses 50 creating respective necks 54 and body portions 56. The bulges 48 and recess 50 on each side
15 wall of the added sockets 36c and 36d also form respective inflexions.

The additional sockets 36 create additional vertical locking plane LP and horizontal arrestment for the joined substrates 12z. With reference to Figure 10b, it can be seen that there is a total of four vertical locking planes LP created when each panel 12z is
20 engaged with a clip 10z, giving eight locking planes LP in total for the adjacent panels 12z engaged by a common clip 10z. Each vertical locking plane LP extends perpendicular to the major surfaces 14 and 16 and intersects the respective inflexions of each side wall 46 and the immediately adjacent side of an engaged projection P.

25 The operation and use of the clip 10z and corresponding panels 12z are in essence the same as that described above in relation to the clips 10 and panels 12. The sockets 36 in the clip 10z spring open to receive or release a corresponding protrusion P in the same manner as described in relation to clip 10. In particular for the sockets 36 immediately adjacent the protrusion 34a, the springing open is provided largely, but
30 not exclusively, by the inward flexing of the common side walls 46n and corresponding compression of spring 44. The springing open of the outer sockets 36c and 36d is by and large provided by the outward flexing of the outermost free side walls 46m of those sockets.

35 Figures 11a-11c depict an embodiment of the clip which is based on the clip 10z. Specifically, Figure 11a depicts a clip 10y which differs from clip 10z by virtue of the configuration of the respective protrusions 34 and width of the sockets 36. In clip 10y, the common or central protrusion 34a is provided with a stop 38 which extends in a plane parallel to the major surface 14 of an overlying panel 12 for the whole distance
40 between the sockets 36a and 36b. The protrusion 34b in the clip 10y is in the same form as the central protrusion 34a of the clip 10. Thus, each of the protrusions 34b in

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clip 10y is provided with a spring 44 adjoining adjacent lands 43 of the corresponding protrusion. The sockets 36c and 36d of clip 10y are narrower, i.e. have a shorter bottom wall 52, than the corresponding sockets of clip 10z. Naturally due to this difference the clip 10y works with panels 12y of a different configuration to the panels 10z. This difference being in the width of the second projections P2 which are narrower in panel 12y.

Figure 11b depicts a clip 10x which differs from the clip 10y by virtue of the configuration of the second protrusions 34b. Specifically second protrusions 34b are of the same configuration as the protrusion 34a of clip 10y. Thus, all of the protrusions 34 in the clip 10x are identical and provided with stops 38 which extend parallel to the major surface 14 of the panels 12 for the entirety of the distance between adjacent sockets.

Figure 11c depicts an embodiment of a clip 10w which differs from the clip 10y by virtue of the configuration of the first protrusions 34a. Specifically the first protrusion 34a is of the same configuration as the second protrusions 34b of clip 10y. Thus, each of the protrusions 34 in the clip 10w is provided with a spring 44 between adjacent lands 43. Otherwise, the clip 10w is the same as clip 10y.

The clips 10x and 10w work with the same panels 12z as clip 10z.

Figure 12 depicts a further embodiment of a clip 10v which differs from the clip 10 of Figures 1-2 by the omission of the spring 44 in the first protrusion 34a and the smooth or continuous curving of the side walls 46 of the sockets 36. Each side wall 46 is formed with a bulge 48 and contiguous recess 50. A further difference between the clip 10 and the clip 10v is the provision of a bottom wall 33 on the protrusion 34 which is coplanar and contiguous with the bottom walls 52 of the sockets 36. This has the effect of closing the space 37 beneath the protrusion 34. The springing open of the sockets 36 arises from the outward flexing of the free side walls 46 of the sockets 36. When using clip 10v or other clips where the side walls 46 are smoothly curved the profiles of the recesses R and projections P in the panels 12v are similarly formed with smooth or continuously curved surfaces to match those of the side walls 46 as shown in Figure 12.

Figure 13 depicts a further embodiment of a clip 10u which differs from the clip 10v by the addition of third and fourth sockets 36c and 36d and second protrusions 34b. The protrusions 34b are created by forming the sockets 36c and 36d with side walls 46 that are separate and spaced from the side walls of sockets 36a and 36b. Thus each second protrusion 34b comprises two adjacent but spaced apart side walls 46. As a result of this configuration the sockets 34a and 34b each have one free side wall 46m

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and both sockets 36c and 36d have two free side walls 46n and 46m. Each side wall 46 is in the shape or configuration of an inflexion and has a free upper end creating a land 43 on which a wall of an overlying recess R can sit. Each of the free side walls 46 in this embodiment act as independent springs. The clip 10u works with panels 12u which differ from the panels 12v by the inclusion of an additional projection P2 and recess R2 to mate with the third and fourth sockets 36c and 36d and second protrusions 34b.

In a variation to the embodiments of clips 10v and 10u the bottom wall 33 formed on the centre protrusion 34 can be omitted. This will provide a greater degree of resilience or flexibility about a longitudinal centre plane (i.e. line of symmetry) of these clips. In this event the space 37 will be open.

Figure 14a illustrates an alternate form of surface or floor covering system 13' which uses a clip 10' and panels 12' similar but different, to the clip 10 and panel 12 shown in Figures 1a - 3. These difference result in the panel engaging portions 35 forming locking planes LP' that lie outside of the corresponding socket 36. In particular for each panel engaging portion 35, there is one locking plane LP that is inside of the socket and one locking plane LP' that is outside of the socket.

The clip 10' differs from clip 10 by the provision of a turned in tail or extension 49 on the lands 42 at the free ends of the clip 10'. The tail 49 forms a knee 51 at the end of land 42. The panel 12' differs from panel 12 by a reconfiguration of the recesses R2 so that the knees 51 engage within a cavity or rebate 19' on an innermost side of the recess R2. The innermost side is the side of the recess R2 closest to a centre line of panel 12' parallel to the recess R2. The provision of the cavity/rebate 19' creates a relative bulge or bump 21' over which the knee 51 and land 42 pass en-route into or out of the cavity/rebate 19'. A further aspect of the reconfiguration of recess R2 is that the side surface 17' which is common to the outer adjacent projection P1 is formed as a vertical planar surface. However in a slight modification a small bevel can be provided to transition from the bottom horizontal surface of projection P1 to the side surface 17'. Additionally the knees 51 can be smoothed or rounded rather than having linear segments.

Figure 14b shows a further embodiment of the surface or floor covering system 13" which differs from that shown in Figure 14a by way of a further modified clip 10" and panel 12". The clip 10" is formed with vertical side walls 46m" and side walls 46n" formed contiguously with the outer most lands 42 to in effect form second protrusions 34b. The panel 12" differs from panel 12' by a "squared" bulge or bump 21" and a backward tapering of the adjacent portion of recess R2. Each second protrusion 34b engages in a corresponding cavity/rebate 19' on an innermost side of the recess R2.

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The opposite side wall 17' of a recess R2 is formed with a vertical planar wall. The second protrusions 34b act as springs snapping into and out of the recesses R2 via the cavity/rebate 19'.

- 5 In the embodiments shown in Figures 14a and 14b the panel engaging portions 35 receive respective projections P1 in their respective socket 36 but engage the panels 12 along or about: one locking plane LP that lies within; and, one locking plane LP' outside, the respective sockets.
- 10 Figure 14c illustrates an embodiment of a flooring system 13''' which uses a clip 10''' and a panel 12'''. The clip 10''' differs from clip 10 by the inclusion of contiguous side walls 46n at the distal ends of outermost lands 42. The panel 12''' differs from panel 12 by incorporation of the cavity/rebate 19' and bulge or bump 21" of the panel 12 ". Thus now the second protrusion 34b engages the panel 12''' on opposites of the recess R2.
- 15 As a result the panel engaging portions 35 forms three locking planes with the panel 12''', two locking planes LP being within or on the inside of the corresponding socket 36 and one planes LP' being outside of the socket 36.

- 20 Figures 15a – 15c illustrate a further embodiment of the clip 10s. The clip 10s has the same general and basic features of the earlier embodiments of the clip 10. In particular clip 10s comprises a first protrusion 34a, and first and second panel engaging portions 35a and 35b one on either side of the protrusion 34a. Clip 10s also has a third panel engaging portion 35c which lies adjacent the panel engaging portion 35a. The protrusion 34a is configured to extend between adjacent substrates 12s which are to be coupled by the clip 10s. An arm 200 extends transversely from one side of the protrusion 34a into, and forming part of, the second panel engaging portion 35b. The panel engaging portion 35b is composed in part of by the bottom wall 52, and two opposing side walls 46n1 and 46n2. The wall 46n1 is common to the protrusion 34a and extends upwardly and integrally from the inside of the bottom wall 52. There is a small radius joining the wall 46n1 and the inside surface of the bottom wall 52. The side wall 46n2 has a lower portion 202 which is inclined at an angle of approximately 45° upwardly from the bottom wall 52, and a second integral portion 204 which extends perpendicular to the bottom wall 52. The side wall 46n2 is formed integrally with a protrusion 34s. In this embodiment the protrusion 34s is formed with a central through hole which extends perpendicular to the bottom wall 52 and thus the major surfaces of the panels 12s. A mechanical fastener in the form of a screw 206 extends through and beyond the hole in the protrusion 34s.
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- 40 The panel engaging portion 35b can be considered to act as a socket 36b. The socket 36b has a neck 54s created between a free end of the arm 200 and an upper inside edge of the protrusion 34s. The neck 54s leads to a widened body portion of a socket

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36b.

Each of the first and third panel engaging portions 35a and 35c is formed with opposed pairs of side walls 46n and 46m. These walls extend generally upright from an inside surface of the bottom wall 52. Each of these walls is provided with a plurality or rack of teeth 208. The teeth 208 act and can be described as ratchet teeth. A channel or space 57 is provided between the side wall 46m of panel engaging portion 35a and the wall 46n of panel engaging portion 35c. This allows for inward flexing of these side walls. Moreover the panel engaging portions 35a and 35c can also be considered to act as and form corresponding sockets. The inward flexing of the side walls between which the space 57 is formed is equivalent to these sockets springing open.

The clip 10s operates with a panel 12s which has a similar general configuration to the panels 12 described herein before. In particular the panel 12s has upper and lower major surfaces 14 and 16, and side walls 18, 20, 22 and 24 lay wholly within the footprint of the major surface 14. A notch 26s circumscribes the side walls 18 – 20 and lies in a plane parallel to the major surfaces 14 and 16. The panel 12s is also formed with a series of recesses R and protrusions P formed into its major surface 16 however the configuration of the protrusions and recesses along two of the sides are different to those on the remaining two sides. Figure 15a illustrates two panels 12s in section view with the longitudinal side 18 of one panel abutting the longitudinal side 20 of the other. Thus Figure 15a illustrates the profile on opposite longitudinal sides 18 and 20 of a panel 12s. Two protrusions P1 and P3 are formed in the major surface 16 of panel 12s running parallel to and near side wall 18. A further protrusion P2 is formed in the major surface 16 running along and near the side wall 20. Protrusions P1 and P3 are the same general configuration with opposite sides 210 extending perpendicular to the major surfaces 14 and 16, and respective bottom surfaces 212 that lie parallel to the major surfaces 14 and 16. Opposite ends of the bottom surfaces 212 join the sides 210 via contiguous bevelled surfaces 214. The provision of the bevelled surfaces 214 assist in locating the projections P1 and P3 in their respective panel engaging portions 35a and 35c.

The projection P2 is formed in part by providing a U shaped channel 216 in the side wall 20 below the notch 26. The provision of the channel 216 results in the projection P2 having a “J” like profile. Below the channel 216 the projection P2 has a planar wall 218 lying perpendicular to the major surfaces 14 and 16. The wall 218 transitions via a small bevel to a bottom wall 220 that extends parallel to the major surface 16. The bottom wall 220 is formed contiguously with a wall 222 which is inclined toward the major surface 14. This wall is formed contiguously with a further wall 224 that extends perpendicular to the major surface 14.

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- Recess R1 is formed in the side wall 18 below the notch 26 and comprises in part the wall 210 of the adjacent projection P1. A further recess R3 is formed between the projections P1 and P3, and a recess R5 is formed in the bottom major surface 16 on opposite side of the projection P3. On a side of the panel 12s adjacent the side wall 20, a recess R2 is formed below the notch 26 and adjacent the projection P2. The recess R2 may be considered as including the channel 216. A further recess R4 is formed in the major surface 16 on an opposite side of the projection P2 to accommodate the protrusion 34s.
- 10 The configuration of projections P1 and P3 and recesses R1, R3 and R5 along the side wall 18 are also provided along a transverse side wall 22. Further, the configuration of the recesses R1 and R4 and the projection P2 are also provided in the surface 16 adjacent the transverse side wall 24.
- 15 In order to use the clip 10s to engage or couple two panels 12s together, the panel engaging portion 35b is first engaged with the projection P2 along the side 20. This is achieved by angling or inclining the clip 10s relative to the panel 12s so that the protrusion P2 is passed through the neck 54s and hooked or located under the arm 200. The clip 10s and/or panel 12s are rotated relative to each other so that the
- 20 bottom wall 52 lies parallel with the major surface 16 with the arm 200 located in the channel 216. As shown in Figure 5b, this creates a locking plane LP perpendicular to the major surfaces 14 and 16 preventing vertical separation between the clip 10s and the panel 12s. In this configuration the projection 34s is seated in the recess R4. Clip 10s is now fixed to the panel 12s by screwing the screw 206 through the protrusion 34s
- 25 into the overlying panel 12s. This has the effect of converting the side 20 of the panel 12s into a notional "female" side.
- A second panel 12s can now be engaged with a clip 10s by way of simply locating the projections P1 and P3 over the panel engaging portions 35a and 35c and applying a
- 30 force in a plane perpendicular to the major surfaces 14 and 16. In the event that the panels 12s are laid as a floor, the required force is a downward force which may be applied in the same way as described herein by person pushing down firmly with their foot on the panel 12s, or use of a compactor like machine, or alternately using a rubber mallet.
- 35 The projections P1 and P3 and panel engaging portions 35a and 35c are relatively configured so that an interference fit is created during the insertion process. The ratchet teeth 208 on the side walls 46n and 46m extend transversely into the protrusions P1 and P3 from opposite sides. Thus the side walls 46n and 46m in effect
- 40 overlap the projections P1 and P3 at multiple locations. This creates respective vertical locking planes LP as shown in Figure 15b. Each of the panel engaging

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portions 35a and 35c create two locking planes. The mechanical fastener 206 incorporated with the panel engaging portion 35b may be considered as creating a further locking plane preventing vertical separation between the clip 10s and the panel 12s. Thus when considered in this manner the panel engaging portion 35b provides in total two locking planes LP.

As shown in Figure 15c, the clip 10s may be provided with a plurality of, in this event two, screws 206 at spaced apart locations along the protrusion 34s.

Figures 15d-15f depict a further embodiment, clip 10s' which differs from clip 10s by the replacement of screw 206 with a nail 206'. However in a further variation the nail can be replaced with a barb. Generally speaking the nail can be considered as a separate part of the clip 10s' whereas the barb can be considered as is an integrally formed nail.

Figure 16 illustrates a further embodiment of the clip 10r. The clip 10r is in the general sense similar to the clip 10s illustrated in and described in relation to Figures 15a – 15c. In this regard the clip 10r has a second panel engaging portion 35b which is of substantially identical configuration and operation to that for the clip 10s. Thus the second panel engaging portion 35b comprises a transversely extending arm 200, a protrusion 34s provided with a central hole through which a screw 206 can extend to penetrate and fix into an overlying panel 12r. The arm 200 seats within a channel 216 formed in a side wall 20 of the panel 12r. The panel 12r has a projection P2 of identical configuration to projection P2 of the panel 12s. Thus when the projection P2 of panel 12r is received or engaged by the panel engaging portion 35b a first locking plane LP is created by the arm 200 seating in the groove 216. With the projection P2 engaged in the panel engaging portion 35b, the screw 206 is screwed through the protrusion 34s into the panel 12r effectively fixing the clip 10r to the panel 12r. The substantive difference between the clips 10r and 10s lie in the clip 10r having only a single further panel engaging portion 35a, and its configuration.

The panel engaging portion 35a is configured to engage a ball or bulbous like projection P1 and an adjacent recess R3 which are cut or otherwise formed into the major surface 16 along the side wall 18. Respective inner walls 46n and 46m of the panel engaging portion 35a are provided with respective bulges 232 and 234 which extend transversely inward toward each other. Both the side walls 46n and 46m initially curve outwardly below their respective bulges 232 and 234 and then curve inwardly toward each other before turning through approximately 90° forming legs 236 and 238 that extend perpendicular to their major surfaces 14 and 16. Leg 236 is left free or spaced from bottom wall 52 while leg 238 joins the bottom wall 52. This provides addition spring action for the wall 46n. The respective curved portions of the

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side walls 46n and 46m below the bulges 232 and 234 in effect form a generally curved socket to receive the projection P1. The spacing between the legs 236 and 238 of the side walls enables the side walls 46n and 46m to flex resiliently toward and away from each other thus enabling the panel engaging portion 35a to spring open to allow entry or release of a projection P1. A side wall 46p of the panel engaging portion 35a opposite the side wall 46m is also provided with a laterally outward extending bulge 240. Below the bulge 240 the wall 46p is formed with a concaved depression 242.

Looking more closely at the panel 12r it will be seen that the projection P1 is formed with a concave groove 26 and a contiguous generally convex surface portion 244. Additionally, or alternately, adhesive material may be deposited in the slot 246 to provide an adhesive bond to the clip 10r. The lower surface 248 turns upwardly into the recess R3 and includes a generally planar surface portion 250 which is rebated slightly into the projection P1. The surface 250 leads to an arcuate root 252 of the recess R3 and this subsequently leads to a convex bulge 254. The bulge 254 is followed by a concave surface portion 256 which ultimately straightens to a vertical wall 258 and then to a tapered or bevelled wall 260. The wall 260 leads to the lower major surface 16.

Once the clip 10r is engaged and fixed to the panel 12r along or adjacent side 20, a second panel 12r can be engaged with the clip 10r by seating the protrusion P1 over the socket portion of panel engaging portion 35a and applying a pressure or force to push the projection P1 into the portion 35a. When this occurs, the bulges 323, 324 and 240 of panel engaging portion 35a will overlap the protrusions 244, 250 and 254 of the panel 12r. This then creates three additional locking planes LP resisting vertical separation between the panel 12r and the panel engaging portion 35a. It will be further noted from Figure 16b, that various spaces or voids are formed between the portion of the panel 12r engaged within the panel engaging portion 35a. These, together with the relative configuration of the projections P1, recess R3, and panel engaging portion 35a in their own right enable rotation of $\pm 3^\circ$ while maintaining both horizontal and vertical engagement and arrestment with the panel engaging portion 35a.

In one variation of clip 12r, both legs 236 and 268 can join with bottom wall 52. In a further variation both legs 236 and 268 be free of and spaced from bottom wall 52

It will be understood by those skilled in the art that embodiments of the clip 10 enable the provision of vertical flooring or surface covering systems where panels can be engaged and significantly disengaged (i.e. application of force) in a plane perpendicular to the plane containing the major surfaces 14 and 16.

Each embodiment of the clips 10 is has a web like structure in that they can be

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manufactured by bending, folding, stamping or extruding a web or strip of material, for example a metal or metal alloy web; or bending, folding, moulding or extruding a thermoplastic including thermosetting plastic web of material folding; or by laying up or moulding of composite material webs. It is envisaged that each of the embodiments of the clips 10, 10' and 10z-10w may be formed from a single planar web/strip using any one of the above methods. For the embodiments of the clips 10v, 10u and 10s and 10r it is envisaged that manufacture will be by way of moulding or extrusions. .

In all of the above described embodiments engagement between a clip 10 and a panel 12 is by way of mechanical coupling or engagement. This may be either self-engagement alone in the event of a projection P being gripped by a panel engaging portion 35 or socket 36; or additionally by use of one or more mechanical fasteners such as screws 206 or barbs/nails. However engagement between a clip 10 and panels 12 may be enhanced by use of a re-stickable adhesive. The expression "re-stickable adhesive" as used through this specification is intended to define or have reference to an adhesive that is able to be pulled off and re-adhered, does not set or cure to a solid rigid mass and maintains long term (e.g. over many years) the characteristics of flexibility, elasticity and stickiness or tackiness. The characteristic of being re-stickable is intended to mean that the adhesive when applied to a surface can be subsequently removed by application of a pulling or shearing force and subsequently reapplied many times (for example up to 10 times) without substantive reduction in the strength of the subsequent adhesive bond. Thus the adhesive provides a removable or non-permanent fixing. The characteristics of flexibility and elasticity require that the glue does not solidify, harden or cure but rather maintains a degree of flexibility, resilience and elasticity. These types of adhesives are sometimes known as fugitive or booger glues and may be in the form of pressure sensitive hot melt glues. Examples of commercially available adhesives which may be incorporated into the present invention include but are not limited to: SCOTCH-WELD™ low melt gummy glue; and GLUE DOTS™ from Glue Dots International of Wisconsin, USA. The use of re-stickable glues/adhesives provides different physical effects to glues traditionally used in flooring systems which are designed to permanently stick or adhere two surfaces together and cannot be removed without damaging one of the surfaces.

Surface covering systems incorporating embodiments of the clip 10 and panels 12 may incorporate beads B of re-stickable adhesive by the formation of longitudinal grooves or recesses in the bottom surface of the projections P in the panels 12. This is shown for example in Figures 17a – 17c. In this figure, the panels 12 are essentially the same as the panels 12 shown in the embodiment in Figures 10a – 10c but with the addition of grooves 270 in the bottom walls of the projections P. Beads of re-stickable adhesive B are applied to the grooves 270. The panels 12 are joined by the clips 10z in the

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same way as described herein before in relation to Figures 10a – 10c. However in addition to the mechanical engagement of the clip 10z to the panels 12 there is also additional adhesive bonds between the panels 12 and the clips 10z.

- 5 Due to the nature of the re-stickable adhesive panel 12 is still able to be removed from a clip 10z in the same way as described herein above in relation to Figures 9a – 9j. A general characteristic of this type of adhesive is that the adhesive remains on the surface to which it is originally applied, in this case the surface of the panels 12. Thus when a panel 12 is disengaged from a clip 10z, the bead B of glue would ordinarily
10 remain and lift off with the panel 12 rather than remaining on the clip 10z.

- In various embodiments, the panels 12 to which the adhesive beads B are applied may be made from wood or bamboo. It is noted that manufacturers of re-stickable adhesives may advise that specific re-stickable adhesives are not suitable for use with
15 wood or like products such as bamboo. However such a recommendation is made moot by applying a polymer coating or sealant on an under surface 16 of the panels 12 or at least surfaces of the projections P. Thus provided the adhesive is suitable for use with a polymer surface it can be used on polymer coated wooden or bamboo panels.

- 20 It will be noted that as the panels 12 are formed with side walls 18 – 24 that lie within the footprint of the major surface 14, surface covering systems incorporating such panels 12 are particularly efficient and economical in the use of the material from which the panels 12 are made. This follows from the discussion earlier in the specification in relation to the surface coverage of panels made from a nominal motherboard. Surface
25 covering systems incorporating the panels 12 and clips 10 form vertical systems enabling the engagement and disengagement of panels and clips by relative movement in a direction perpendicular to the major surfaces. When used for flooring, the resultant surface covering forms what is known in the art as a floating floor in that the panels 12 are not permanently adhered to an underlying substrate or structure.
- 30 The other common type of flooring system which utilises wooden or wood based panels is known as a direct stick system. These systems utilise adhesives which permanently fix the panels to an underlying substrate. Some purchasers prefer direct stick systems to floating flooring as it provides a harder more solid feel and does not generate noise such as creaking or squeaking when being walked on. This noise is
35 usually generated by “bounce” in floating flooring system where panels are able to flex or move downwardly due to either gaps between the under surface of the panels and the substrate, and/or the compression of an underlay.

- However a disadvantage of direct stick flooring is that it is very messy to apply, and
40 once the adhesive has cured, which it is specifically designed to do, removable and/or repair of one or more damaged panels is problematic. The removal of a direct stick

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panel generally requires the use of power tools to initially cut through a section of the panel, and then substantial physical exertion in scraping the remainder of the panel and adhesive from the underlying surface. This generates substantial dust and noise and of course usually comes at substantial expense due to the associated time required.

The use of the re-stickable adhesive as described above with reference to Figures 17a – 17c may be extended by providing one or more beads or lines of re-stickable adhesive to the major surface 16 and indeed to an under surface of the bottom wall 52 of the clips 10. The use of the re-stickable adhesive will eliminate bounce and noise often found with conventional floating floors, and provide a degree of cushioning due to the flexible and elastic characteristics of the adhesive which does not set or cure. Further, the characteristic of the adhesive also enables movement of the panels 12 due to changes in environmental conditions such as temperature and humidity. This is not possible with direct stick flooring.

The provision of re-stickable adhesive also enables for the take up of undulations or variations in the underlying surface on which the panels 12 are laid. This is facilitated by providing adhesive beads or strips of a thickness measured perpendicular to the major surface 16 of between 1 – 6mm and more particularly 2 – 4mm. In addition to taking up variations in the underlying surface, the adhesive also provides acoustic benefits in: (a) eliminating noise and squeak which may otherwise arise from bounce or deflection of traditional floating floors; (b) dampening vibrations (i.e. noise) transmission between adjacent panels; and, (c) dampening transmission of vibration in multi-storey buildings from an upper level to an immediately adjacent lower level. This again is to be contrast with direct stick glues which due to their curing into a rigid bond, do not in any way dampen vibration or noise transmission. The removal of panels 12 with the re-stickable adhesive is performed in exactly the same manner as described herein above. Because the re-stickable adhesive is specifically designed to be removed and reapplied, it still allows engaged panels 12 to be removed in the manner described earlier in this specification with reference to Figures 9a-9k. This does not in any way damage or destroy either the panel or the underlying surface. The only difference being in the removal process that the jacks 92 may need to be turned further or with slightly greater torque in order to effect the release of the adhesive.

It will be recognised by those skilled in the art that clips 10 in accordance with the embodiments of the present invention enable a convenient and very easy method and system for installing and removing panels or substrates 12 to cover a surface. The removal and installation is effected by application of a force or pressure in plane perpendicular to the major surfaces of the substrates 12. Thus the clips 10 and associated panels 12 can be classes as a vertical surface covering system. The

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provision of the clips 10 also relieves substantial stress from the substrates 12. Many prior art flooring or surface covering systems rely on direct mechanical interlocking between complimentary portions of the adjoining substrates. This creates tension and shear points in the coverings (i.e. substrates) that are susceptible to breakage. In contrast the clips 10 may be made from materials stronger than the substrates 12 and can bear the tensile loads. Further the clips have both lateral and torsional resilience and in effect act a suspension system interlinking adjacent substrates.

Now that the embodiments of the clip 10 have been described in detail it will be apparent to those skilled in the relevant art that numerous modifications and variations may be made without departing from the basic inventive concepts. For example, the depth and width of the sockets in each clip 10 can be varied in accordance with the material and thickness of the substrate used. For example, when the substrate 12 is relatively thin, the sockets 36 may broader and shallower than for relatively thick substrates. Also the side walls 46 in the depicted embodiments are shown as smoothly curved or "squared" in that they comprise a number of contiguous planar surfaces. The smooth curving or squaring of the side walls 46 in each of the embodiments is interchangeable. In yet a further variation a clip can be provide with a combination of smoothly curved and squared side walls. Moreover the features of different embodiments are not limited to the depicted embodiment. Persons of ordinary skill in the art will immediate recognise that a feature from one embodiment may be incorporated in another. For example the modifications made to the clip 10 and/or panels 12 of Figures 1a and 1b to arrive at the embodiments of Figures 14a-14c can be readily applied to the clips and panels shown in Figures 10a-13a. This has the effect of changing the location of the locking planes so that on locking planes lies outside of a socket of an outer most panel engaging portion on opposite side of the clip, as per Figures 14a and 14b; or adding third locking plane for such panel engaging portions on the outside of their corresponding socket as per Figure 14c.

All such modifications and variations together with others that would be obvious to persons of ordinary skill in the art are deemed to be within the scope of the present invention the nature of which is to be determined from the above description and the appended claims.

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CLAIMS:

1. A clip for joining together first and second substrates in a vertical flooring system where each substrate has: opposite first and second major surfaces and one or more recesses and projections formed in a peripheral band in and circumscribing the second major surface, the clip comprising:
 - a first protrusion configured to engage and extend between each of the two substrates; and
 - first and second panel engaging portions, one on each side of the first protrusion, the clip configured to engage at least one of the substrates by relative motion in a direction perpendicular to the major surfaces;
 - the first protrusion having one or more planar surface portions lying parallel to the first major surface wherein a space is formed beneath the one or more planar surface portions;
 - each panel engaging portion having opposite side walls and a bottom wall wherein the side walls extend upward from and are contiguous with the bottom wall, the first panel engaging portion configured to receive a projection of a first substrate and engage the first substrate in a manner to form at least two locking planes, the locking planes lying perpendicular to the major surfaces, and the second panel engaging portion configured to receive a projection of a second substrate and engage the second substrate in a manner to form at least two further locking planes, wherein the clip mechanically grips the engaged substrates along at least four of the locking planes.
2. The clip according to claim 1 wherein the first protrusion is dimensioned to lie wholly below the first major surfaces when the clip is engaged with the substrates.
3. The clips according to claim 1 or 2 wherein the side walls and bottom wall of at least one of the first and second panel engaging portions forms a socket.
4. The clip according to any one of claims 1 to 3 wherein the clip is arranged to enable relative rotation or pivoting of the substrates joined by the clip by at least 3° while maintain engagement of both substrates.
5. The clip according to any one of claims 1 to 4 wherein the clip is provided with torsional resilience enabling resilient twisting or flexing of the clip about a longitudinal axis of the clip.
6. The clip according to any one of claims 1 to 5 wherein at least one of the first and second panel engaging portions is configured to engage a panel by overhanging

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one or more locations, in a direction perpendicular to the major surfaces of the panel, an adjacent surface of a projection of that panel.

5 7. The clip according to any one of claims 1 to 5 wherein at least one of the first and second panel engaging portions is arranged to spring open to receive or release a projection.

10 8. The clip according to any one of claims 1 to 7 wherein at least one of the panel engaging portions comprises a bulge on each side wall, the bulges extending transversely inward toward each other to form a neck, the bulges disposed to overhang portions of a received projection to form respective ones of the locking planes.

15 9. The clip according to any one of claims 1 to 8 wherein the first and second panel engaging portions are of the same configuration and the second panel engaging portion engages the outermost projection of a second substrate about two locking planes, one on each side of thereof.

20 10. The clip according to claim 7 or 8 wherein each bulge comprises either: a plurality of contiguous planar surfaces; or a smoothly curved convex surface.

25 11. The clip according to any one of claims 1 to 10 wherein the side walls and bottom wall of each panel engaging portion form a socket and each panel engaging portion is configured so that two of its corresponding locking planes line within the respective socket.

30 12. The clip according to any one of claims 1 to 10 wherein the side walls and bottom wall of each panel engaging portion form a socket and each panel engaging portion is configured so that a first of its locking planes lies inside, and second of its locking planes lies outside, of the corresponding socket.

35 13. The clip according to any one of claims 1 to 10 wherein the side walls and bottom wall of each panel engaging portion form a socket and each panel engaging portion is configured to form three locking planes, where two of the three locking planes line within the corresponding socket, and a remaining locking lies outside the corresponding socket.

40 14. The clip according to any one of claims 1 to 10 wherein the side walls and bottom wall of each panel engaging portion form a socket and each side wall is provided with an inflexion, the inflexions facing each other to form a neck, the neck arranged to spring open to receive or release a protrusion.

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15. The clip according to any one of claims 1 to 14 wherein the clip is symmetrical in shape and configuration about a plane of symmetry passing through the first protrusion and perpendicular to a plane containing the bottom wall of the first sockets.
- 5 16. The clip according any one of claims 1 to 15 wherein the first protrusion is arranged to flex laterally.
17. The clip according any one of claims 1 to 16 wherein the first protrusion comprises two planar surface portions a spring formed integrally with and extending
10 between the two planar surface portions.
18. The clip according any one of claims 1 to 16 wherein the first protrusion comprises one planar surface portion.
- 15 19. The clip according to claim 16 or 17 wherein the space is open below the one or more two planar surface portions.
20. The clip according any one of claims 1 to 16 wherein the first protrusion comprises one planar surface portion and a bottom wall lies below the one planar
20 surface portion and extends between and joins the bottom walls of the first and second panel engaging portions.
21. The clip according to any one of claim 1 to 20 comprising third and fourth panel engaging portions integrally formed with the first and second panel engaging portions
25 respectively; the third panel engaging portion configured to engage a projection adjacent to the outermost projection of the first substrate to form two further locking planes, one on each side of the adjacent projection, the further locking planes lying perpendicular to the major surfaces; the fourth panel engaging portion configured to engage projection adjacent to the outermost projection of the second substrate to form
30 two further locking planes, one on each side of the adjacent projection; wherein the clip mechanically grips the two engaged substrates along eight locking planes.
22. The clip according to claim 21 wherein the third and fourth panel engaging portions are of the same configuration as the first and second panel engaging portions.
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23. The clip according to claim 21 or 22 comprising two second protrusions, one formed integrally between the first and third panel engaging portions; and another formed integrally between the second and fourth panel engaging portions.
- 40 24. The clip according to claim 23 wherein each of the second protrusions is arranged to flex laterally.

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25. The clips according to claim 23 or 24 wherein the side walls and bottom wall of each of the third and fourth panel engaging portion form third and fourth sockets respectively.

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26. The clip according to claim 25 wherein each of the third and fourth sockets comprises a bulge on each side wall, the bulges extending transversely inward toward each other to form a respective neck, the bulges disposed to overhang portions of a received projection to form respective ones of the further locking planes.

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27. The clip according to claim 26 wherein the clip is arranged so that the necks of the third and fourth sockets spring open to receive or release a respective projection.

28. The clip according to claim 26 or 27 wherein each bulge of the third and fourth sockets comprises a plurality of contiguous planar surfaces.

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29. The clip according to claim 26 or 22 wherein each bulge of the third and fourth sockets comprises a smoothly curved convex surface.

20 30. The clip according to any one of claims 1 to 29 wherein the projection engaging portions are self-engaging.

31. The clip according to any one of claims 1 to 30 wherein the clip is formed from a web of material.

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32. A clip for joining together first and second substrates in a vertical flooring system where each substrate has: opposite first and second major surfaces and one or more recesses and projections formed in a peripheral band in and circumscribing the second major surface, the clip comprising:

30 a first protrusion configured to extend between each of the two substrates; and first and second panel engaging portions, one on each side of the first protrusion, the clip configured to engage at least one of the substrates by relative motion in a direction perpendicular to the major surfaces;

35 each panel engaging portion having opposite side walls and a bottom wall, wherein the side walls extend upward from and are contiguous with the bottom wall, the first panel engaging portion configured to engage an outermost projection of a first substrate to form two locking planes, one on each side of the projection, the locking planes lying perpendicular to the major surfaces, and the second panel engaging portion configured to engage an outermost projection of a second substrate to form at least one further locking plane, wherein the clip mechanically grips the engaged
40 substrates along at least three of the locking planes;

- 40 -

the second panel engaging portion having one or more mechanical fasteners arranged to extend through the bottom wall and into an overlying substrate to fasten the clip to the overlying substrate.

5 33. The clip according to claim 32 wherein the or each mechanical fastener is one of: a screw, nail or barb.

34. The clip according to claim 33 wherein the or each mechanical fastener extends from the side wall of the second panel engaging portion distant the first
10 protrusion.

35. The clip according claim 33 wherein the or each mechanical fastener extends through the side wall of the second panel engaging portion distant the first protrusion.

15 36. The clip according to claim 33 wherein when the or each mechanical fastener is a nail or barb, the or each mechanical fastener is formed integrally with the side wall of the second panel engaging portion distant the first protrusion.

37. The clip according to any one of claims 32 to 36 wherein the first protrusion
20 comprises a transverse arm extending into and forming part of the second panel engaging portion.

38. The clip according to any one of claims 32 to 37 wherein the first panel
25 engaging portion comprises a plurality of ratchet teeth extending along at least one of its side walls and orientated to face the other of its side walls.

39. The clip according to any one of claims 32 to 38 wherein the first panel
30 engaging portion comprises a plurality of ratchet teeth extending along each of its side walls and orientated to face each other.

40. The clip according to any one of claims 32 to 39 comprising a third panel
engaging portion adjacent the first projection engaging portion and distant the first
protrusion, the third projection engaging portion configured to engage an adjacent
projection to the outermost projection of the first substrate to form two further locking
35 planes.

41. The clip according to claim 40 wherein the third panel engaging portion
comprises opposite side walls, and a bottom wall wherein the side walls extend upward
from and are contiguous with the bottom wall.

40

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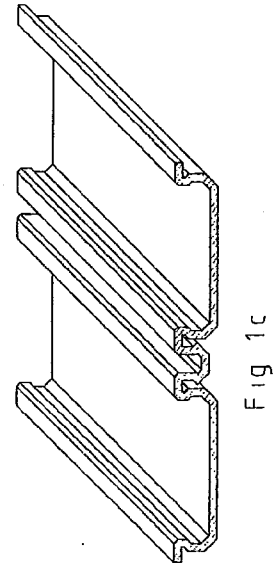
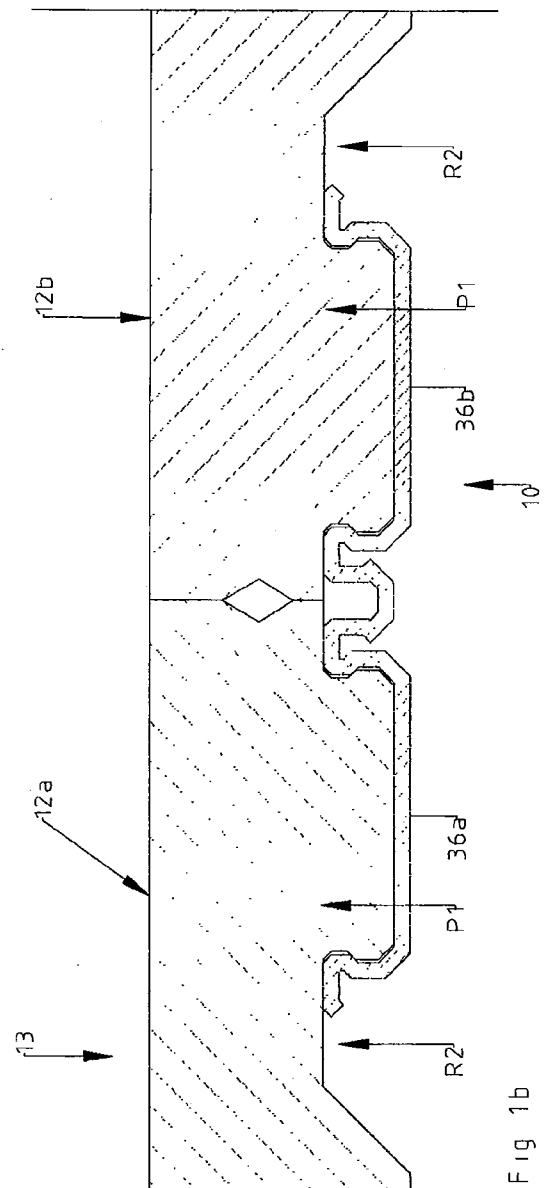
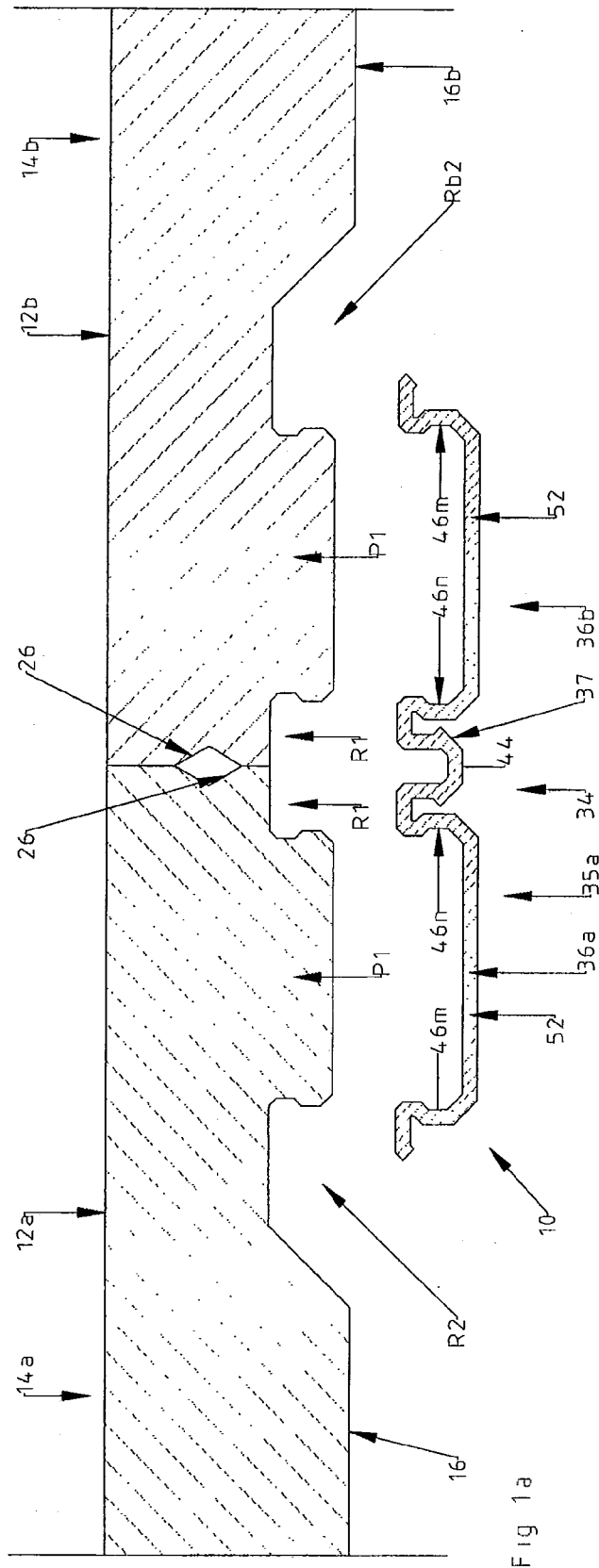
42. The clip according to claim 41 wherein the third panel engaging portion comprises a plurality of ratchet teeth extending along at least one of its side walls and orientated to face the other of its side walls.
- 5 43. The clip according to claim 41 wherein the third panel engaging portion comprises a plurality of ratchet teeth extending along each of its side walls and orientated to face each other.
44. The clip according to claim 41 or 42 wherein a side wall of the third panel
10 engaging portion nearest the first protrusion is spaced from a side wall of the first panel engaging portion distant the first protrusion.
45. The clip according to any one of claims 32 to 37 wherein the first panel
15 engaging portion comprises a bulge on each of its side walls, the bulges extending transversely inward toward each other and disposed to overhang portions of a received projection to form respective ones of the locking planes.
46. The clip according to claim 45 wherein the side wall of the first engaging portion
20 distant the first protrusion is provided, on a surface facing away from the first protrusion, with a transversely outward extending bulge.
47. The clip according to claim 46 wherein the surface facing away from the first
25 protrusion is formed in the configuration of an inflexion with said bulge forming a portion of the inflexion.
48. The clip according to any one of claims 45 to 47 wherein the first panel
engaging portion comprises a socket and the side walls of the first panel engaging
portions together form side walls and a root of the socket.
- 30 49. The clip according to any one of claims 32 to 48 wherein the first protrusion is dimensioned to lie wholly below the first major surfaces when the clip is engaged with the substrates.
50. The clips according to any one of claims 32 to 49 wherein the side walls and
35 bottom wall of at least one of the first and second panel engaging portions forms a socket.
51. The clip according to any one of claims 32 to 50 wherein the clip arranged to
40 enable relative rotation or pivoting of the substrates joined by the clip by at least 3° while maintain engagement of both substrates.

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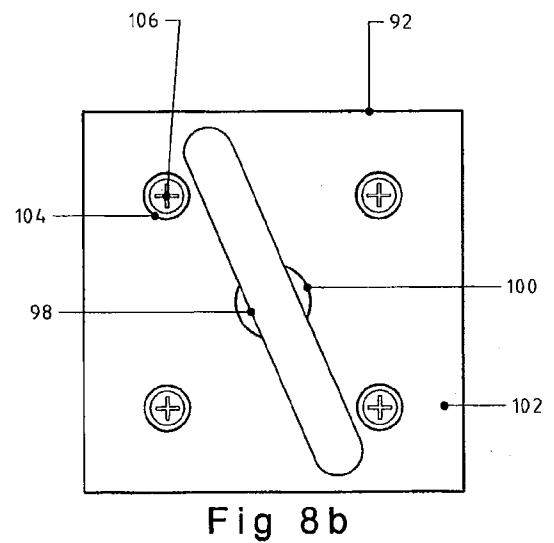
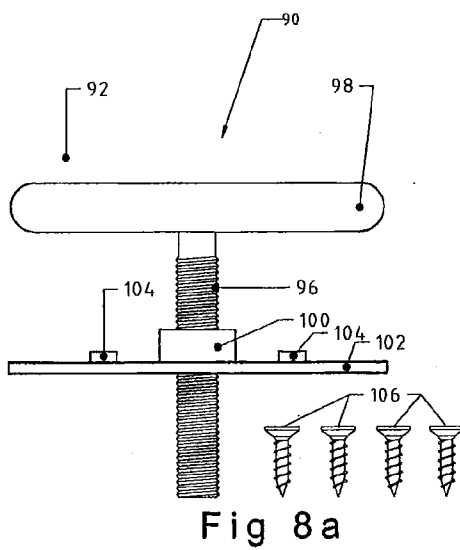
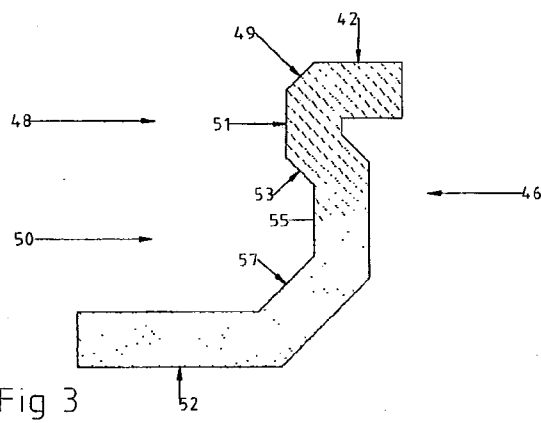
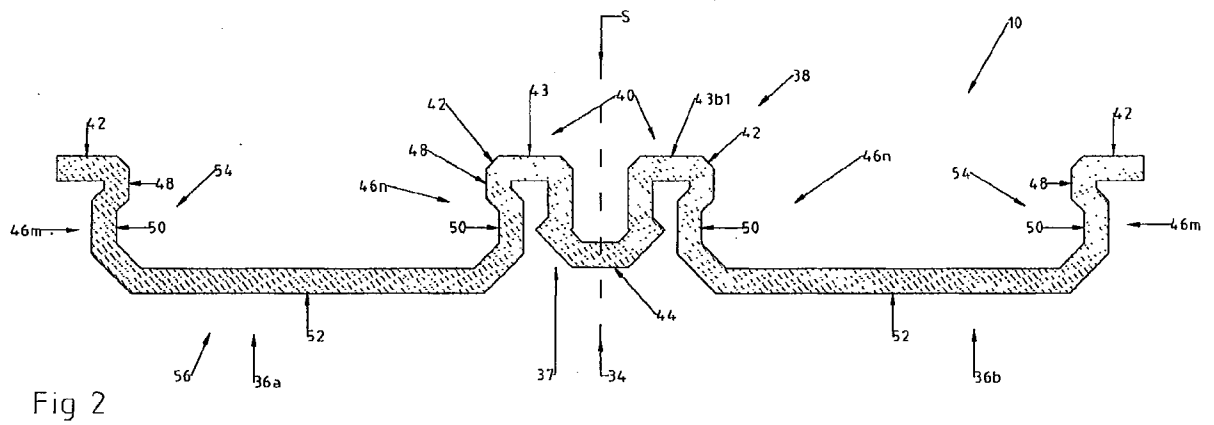
52. The clip according to any one of claims 32 to 51 wherein the clip is provided with torsional resilience enabling resilient twisting or flexing of the clip about a longitudinal axis of the clip.
- 5 53. The clip according to any one of claims 32 to 52 wherein at least one of the first and second panel engaging portions is configured to engage a panel by overhanging one or more locations, in a direction perpendicular to the major surfaces of the panel, an adjacent surface of a projection of that panel.
- 10 54. The clip according to any one of claims 32 to 53 wherein at least one of the first and second panel engaging portions is arranged to spring open to receive or release a projection
55. A surface covering system comprising:
15 a plurality of substrates each having: opposite first and second major surfaces; one or more recesses and projections formed in a peripheral band in and circumscribing the second major surface; and,
a plurality of clips in accordance with any one of claims 1 to 54 for engaging adjacent substrates.
- 20 56. The system according to claim 55 wherein the substrate comprises side walls lying in planes extending between the opposite major surfaces wherein the side wall lie within a footprint of the first major surface
- 25 57. The system according to claim 56 wherein comprising one or more beads of re-stickable adhesive provided between the substrates and the clips to facilitate re-stickable adhesive bonding of the substrates to the clips.
58. The system according to any one of claims 55 to 57 wherein the projections on
30 the substrates are provided with grooves or channels in which the beads of re-stickable adhesive reside when the substrates are engaged by the clips.
59. The system according to any one of claims 55 or 58 comprising a quantity of re-stickable adhesive bonded to the first major surface; and, one or more release strips
35 covering the re-stickable adhesive on the first major surface.
60. The system according to any one of claims 55 to 59 comprising an extraction system configured to lift a first substrate engaged along opposite sides with other substrates in a direction perpendicular to the major surface thereby holding the first
40 substrate it in a plane parallel to that in which it lay prior to lifting.

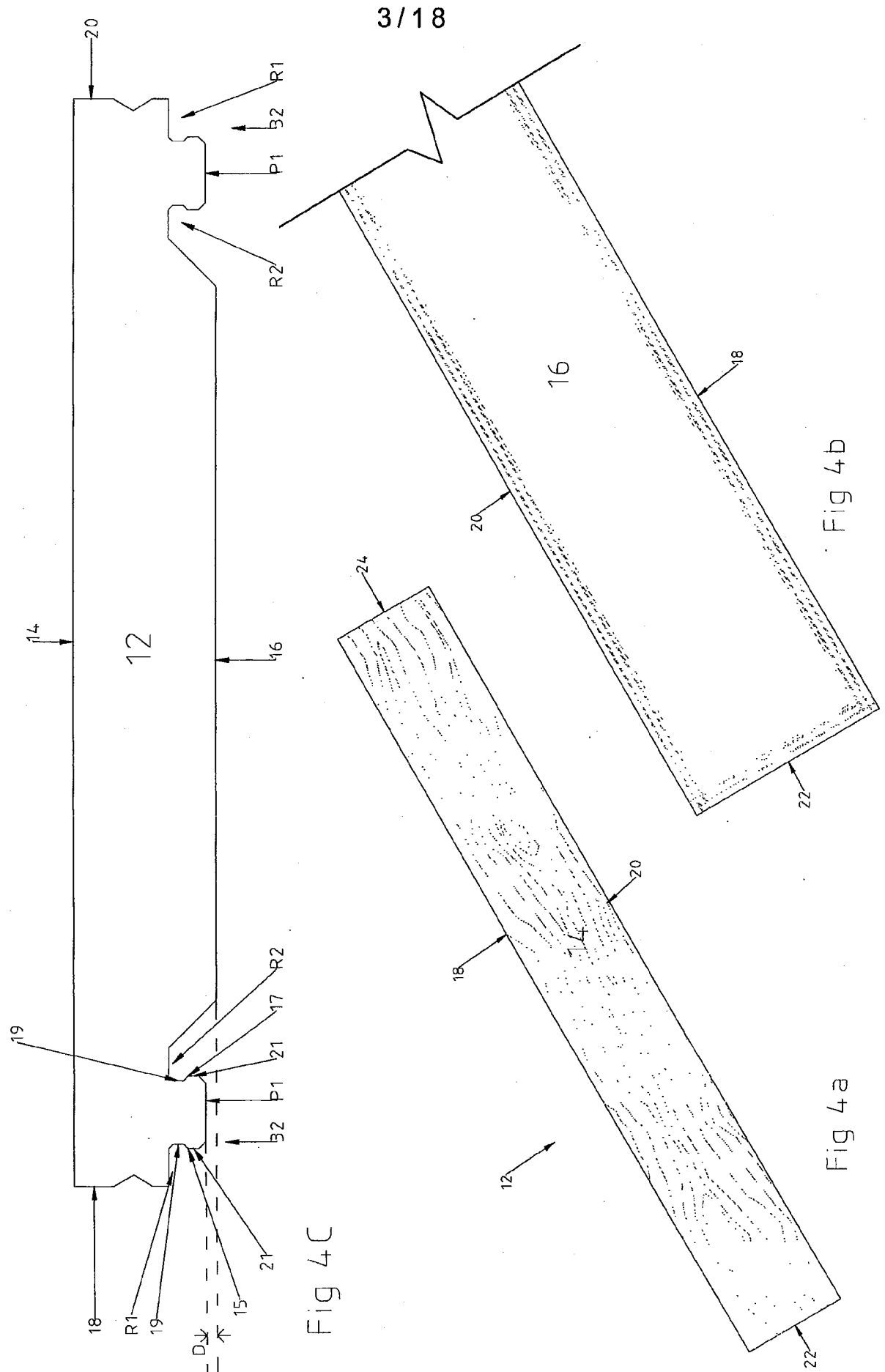
- 43 -

61. A surface covering system comprising:
- a plurality of substrates, each substrate having: opposite first and second major surfaces wherein the first major surface is arranged to face an underlying support to be covered by the system, and one or more recesses and projections formed in a
 - 5 peripheral band in and circumscribing the second major surface; and,
 - a plurality of clips each provided with two or more panel engaging portions configured to adjacent substrates;
 - the substrates and clips relatively configured to enable two or more substrates to be coupled together by respective clips by motion of the substrates relative to the
 - 10 clips in an engagement direction which is perpendicular to the major surfaces and to enable engaged substrates to be disengaged by: (a) lifting a first substrate in a direction opposite to the engagement direction to facilitate rotation of adjacent engaged substrates along opposite sides of the first substrate to lie in planes declined from the first substrate; and (b) subsequently applying a force in the engagement direction to
 - 15 the second joints of the engaged substrates.



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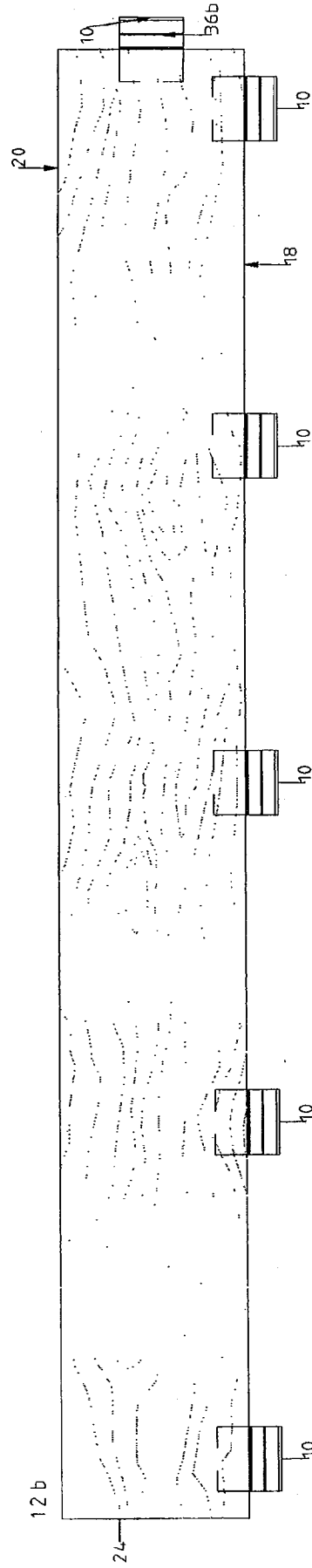
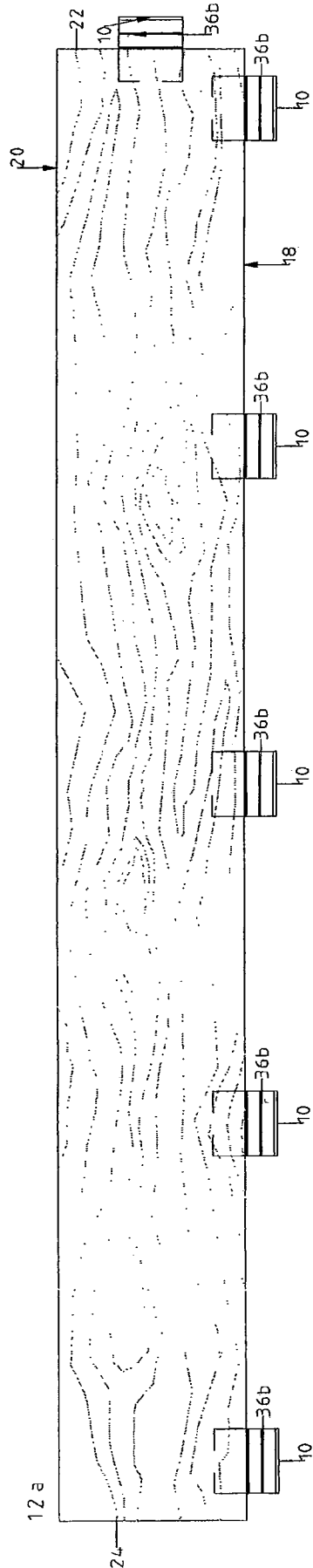
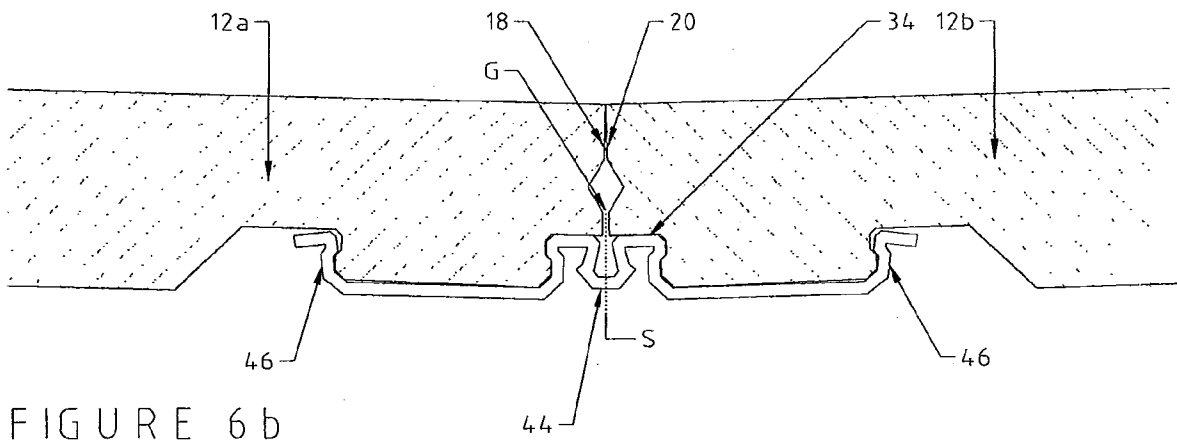
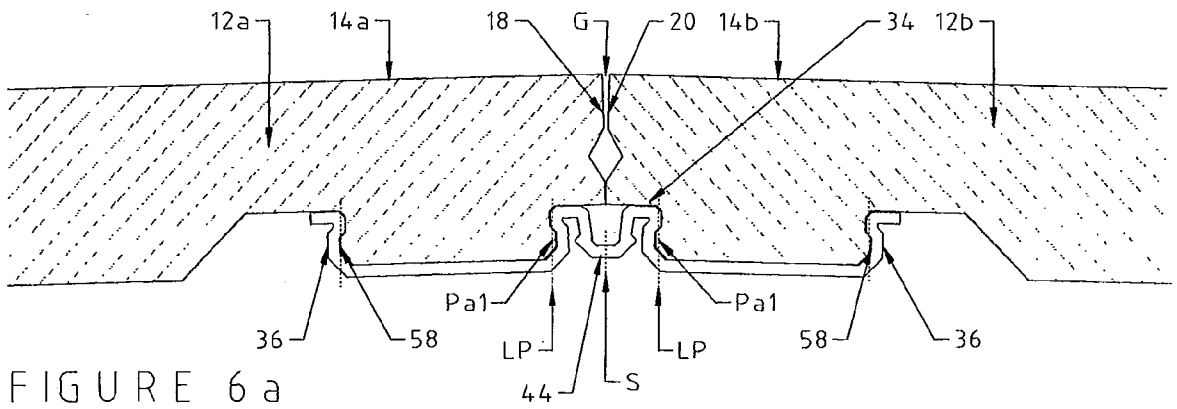


Fig 5

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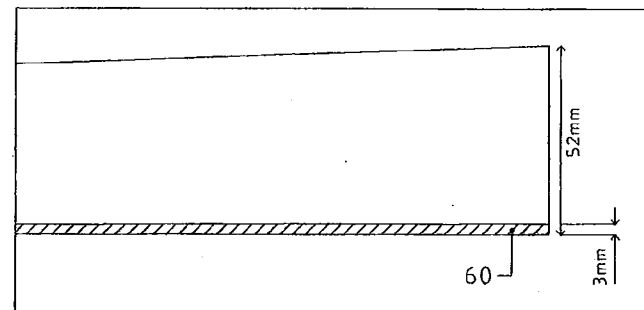
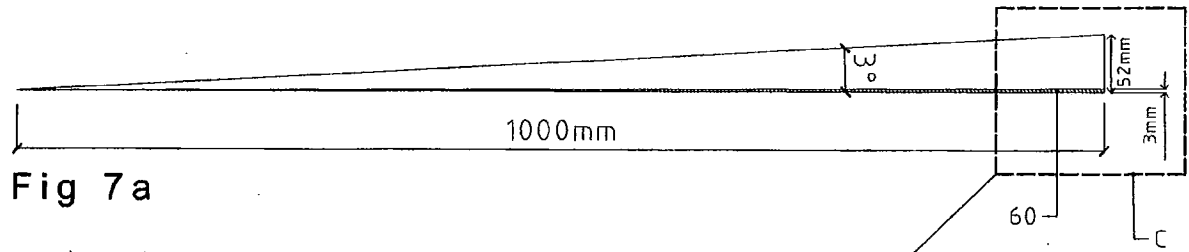


Fig 7b

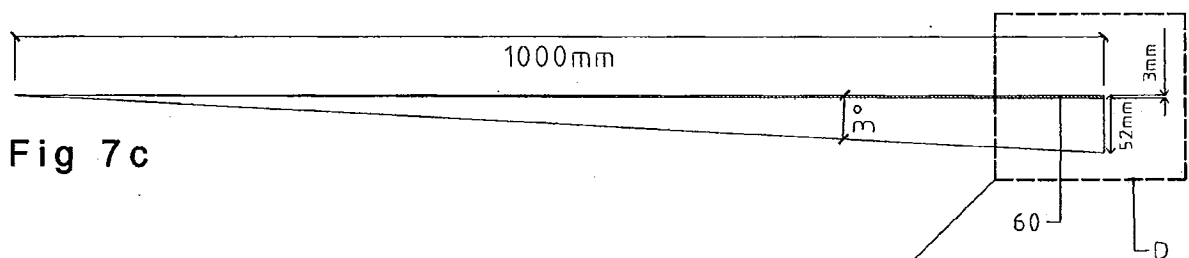


Fig 7c

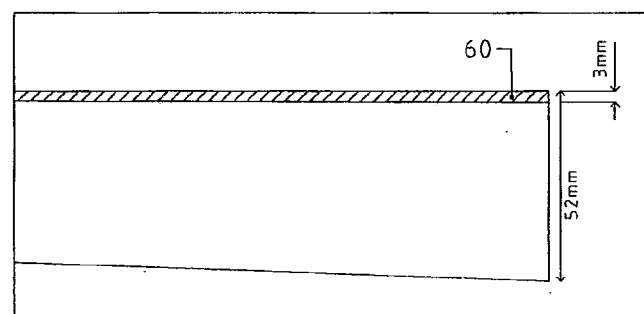
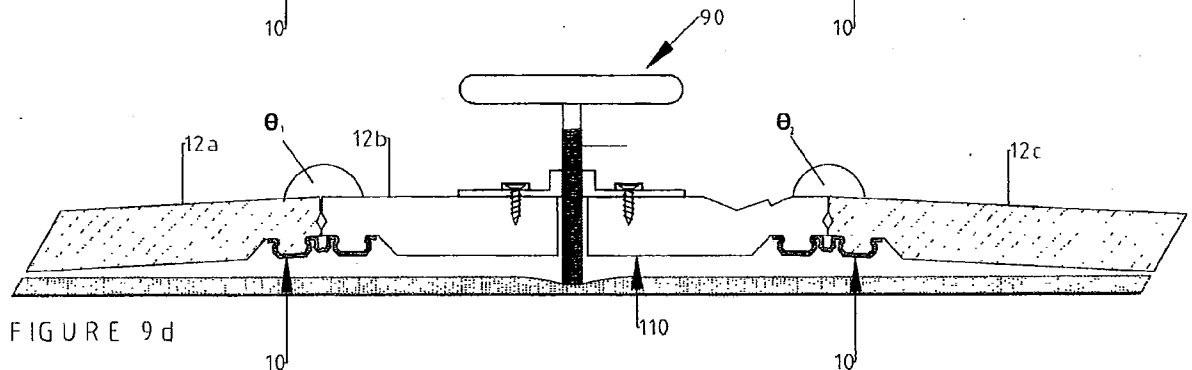
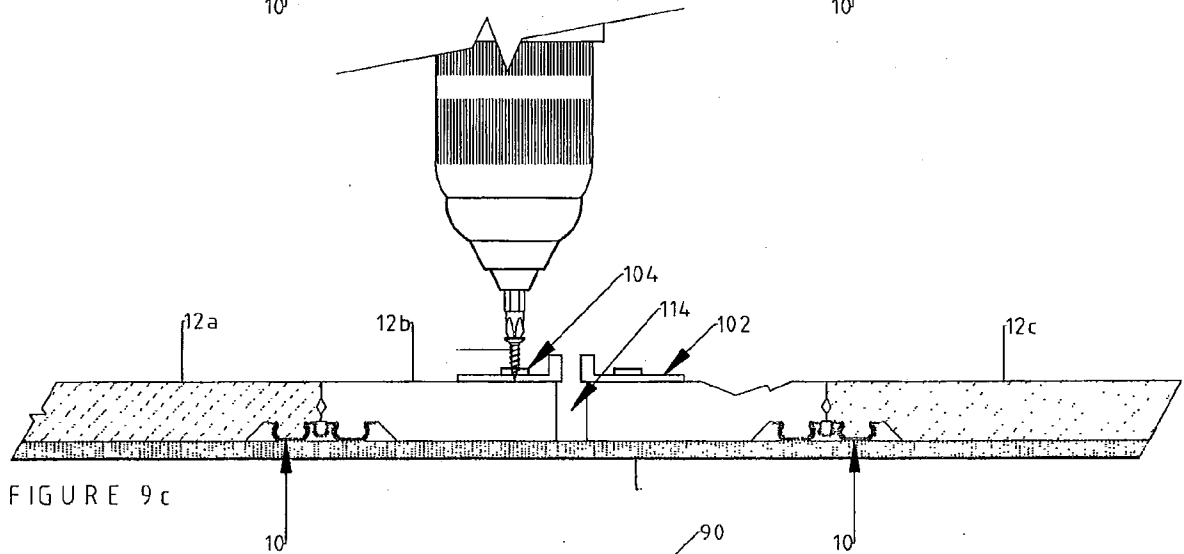
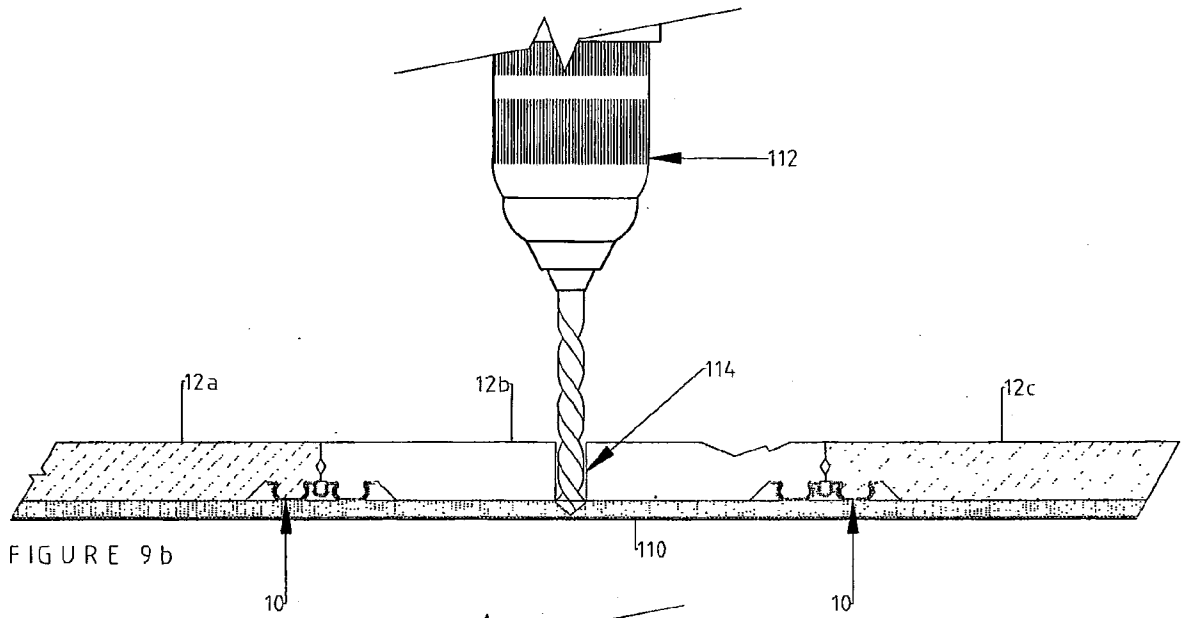
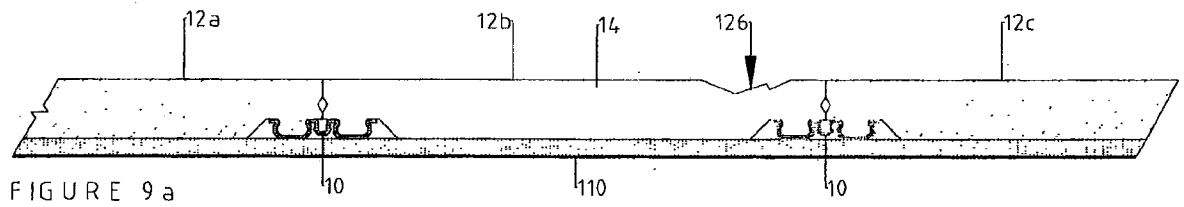
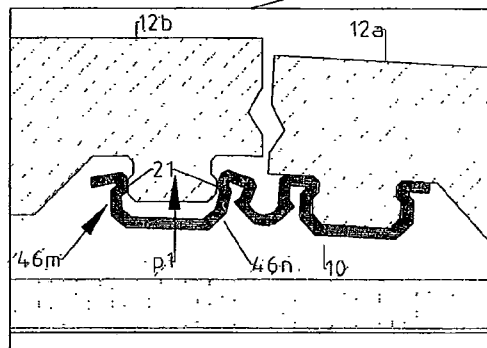
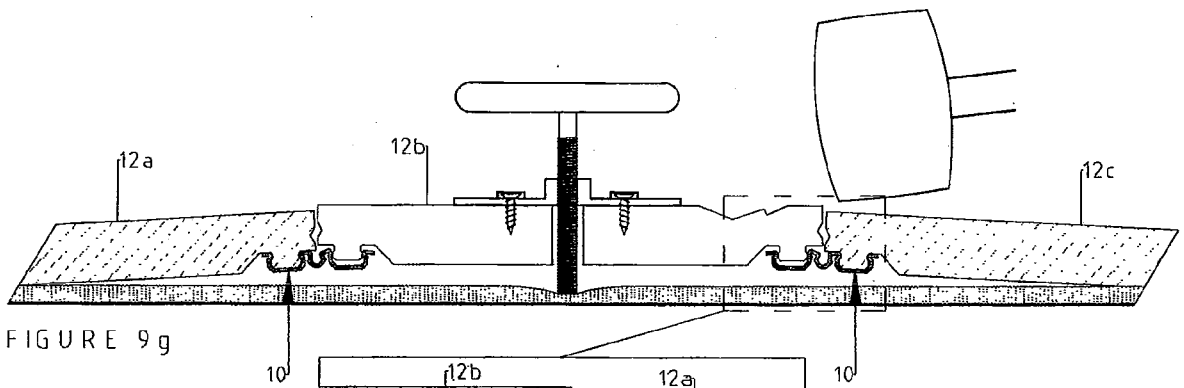
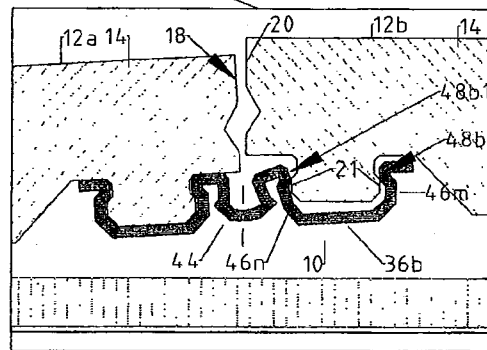
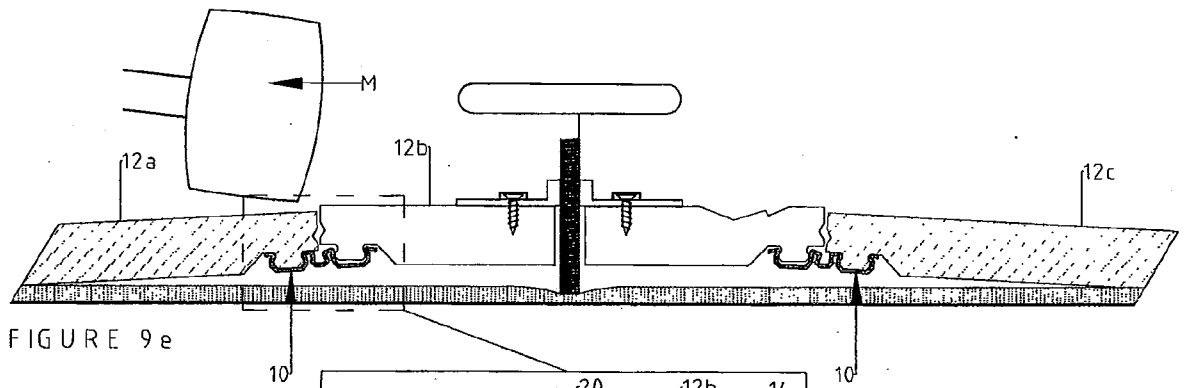


Fig 7d

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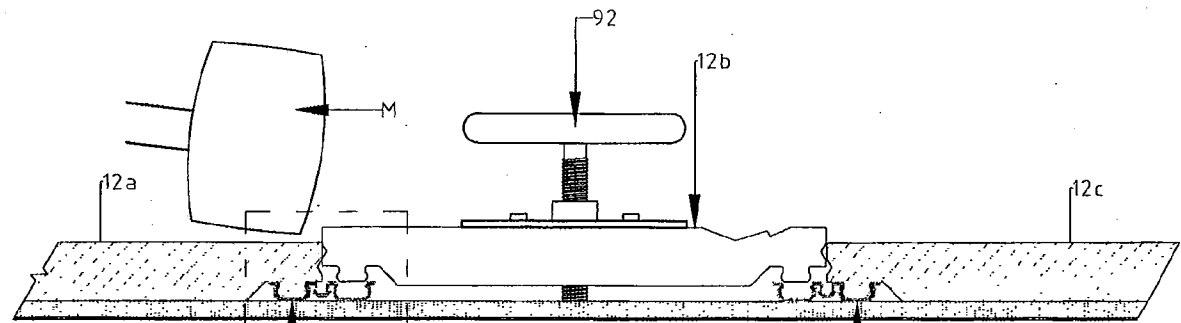


FIGURE 9i

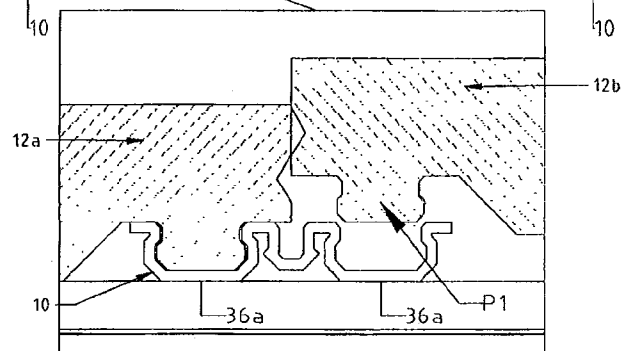


FIGURE 9j

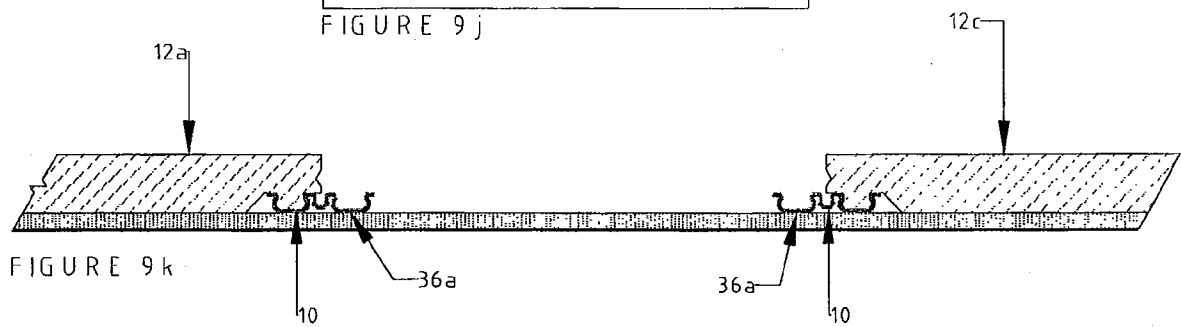


FIGURE 9k

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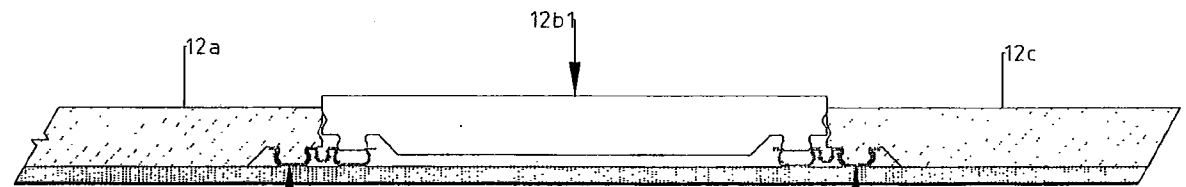


FIGURE 9l

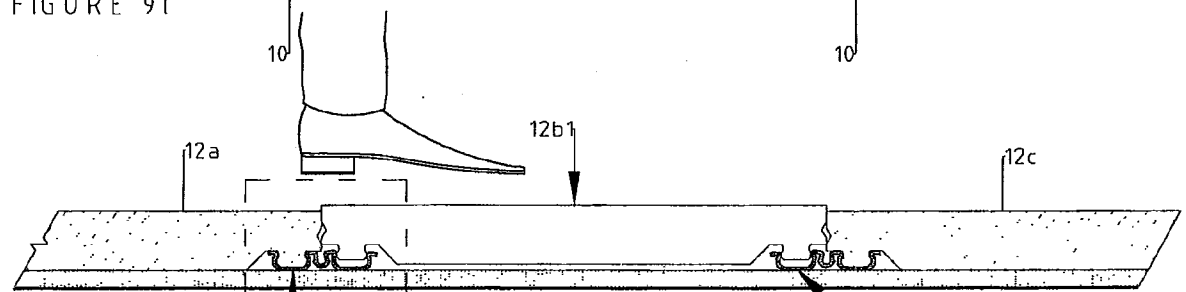


FIGURE 9m

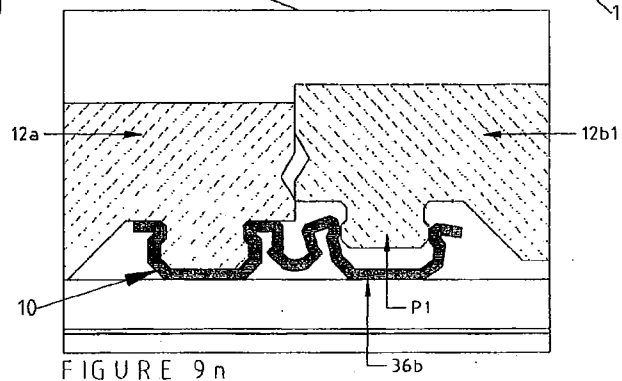


FIGURE 9n

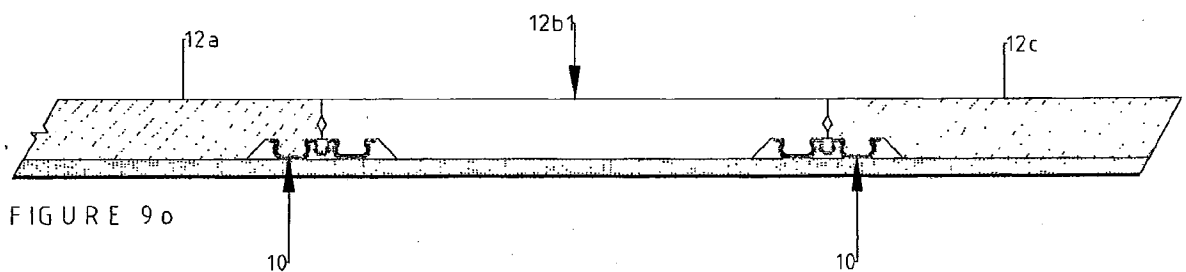


FIGURE 9o

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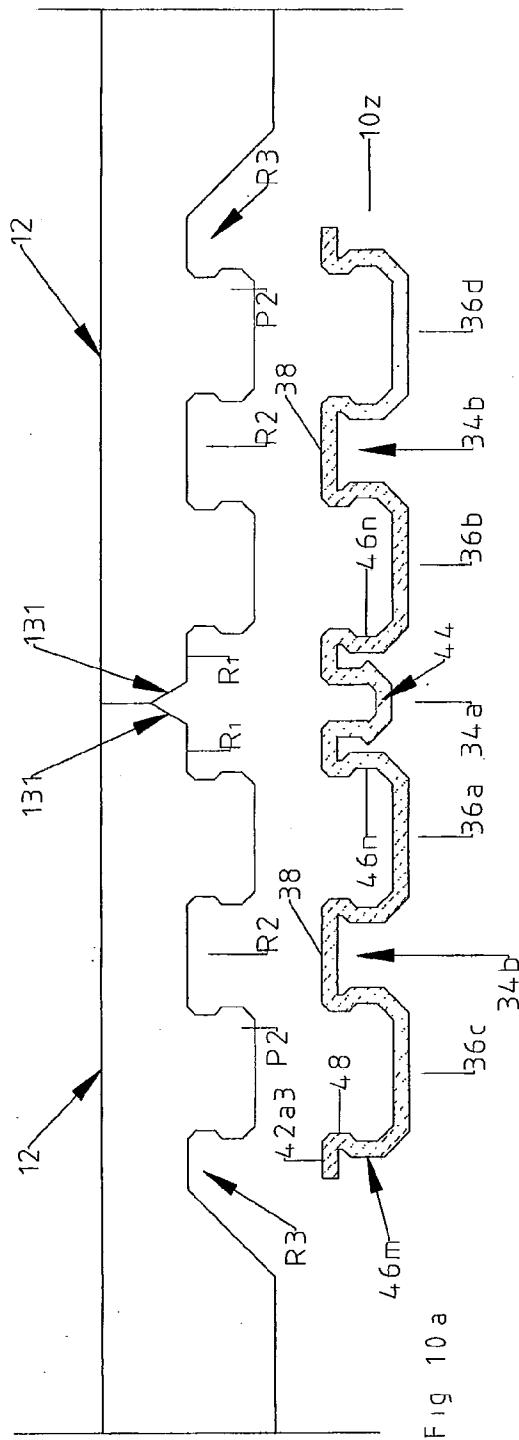


Fig 10 a

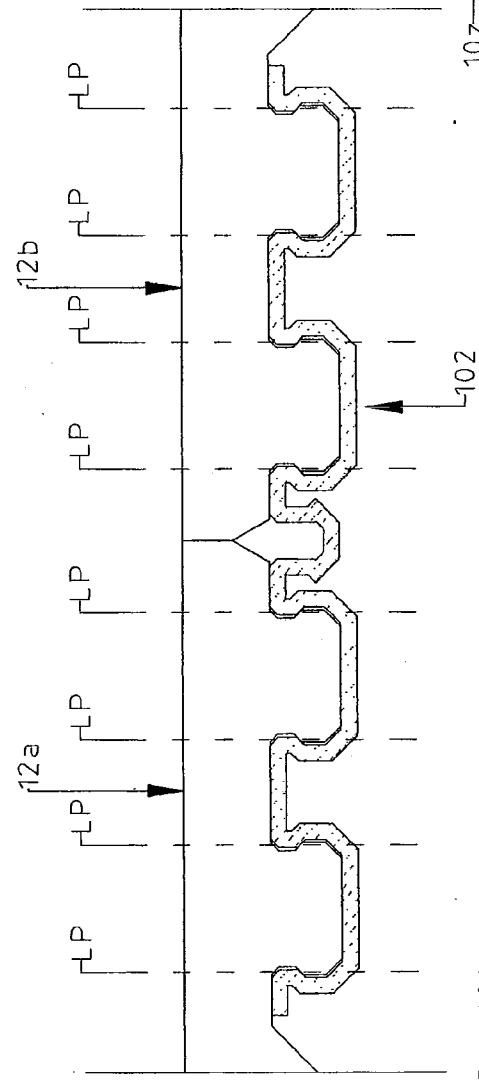


Fig 10 b

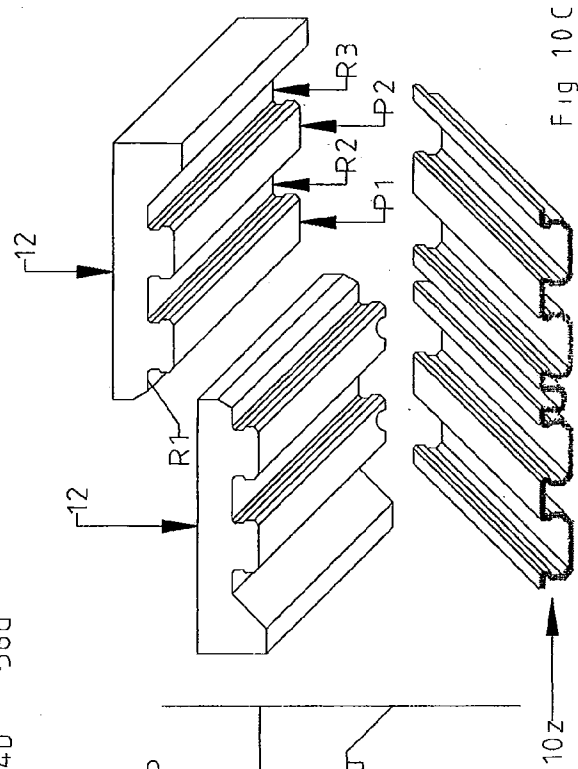
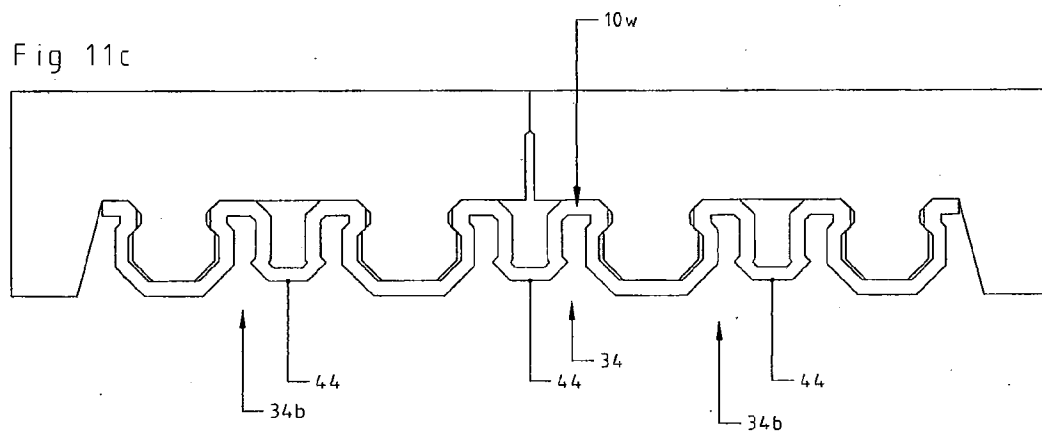
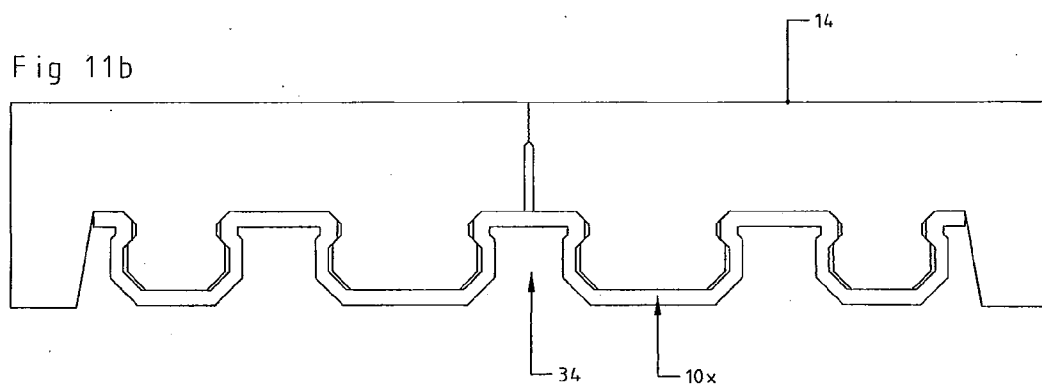
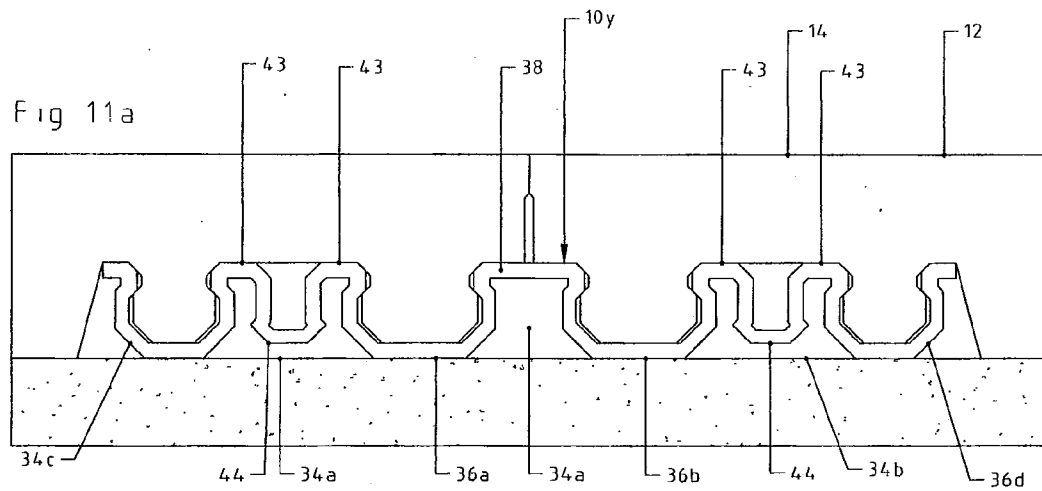


Fig 10 c

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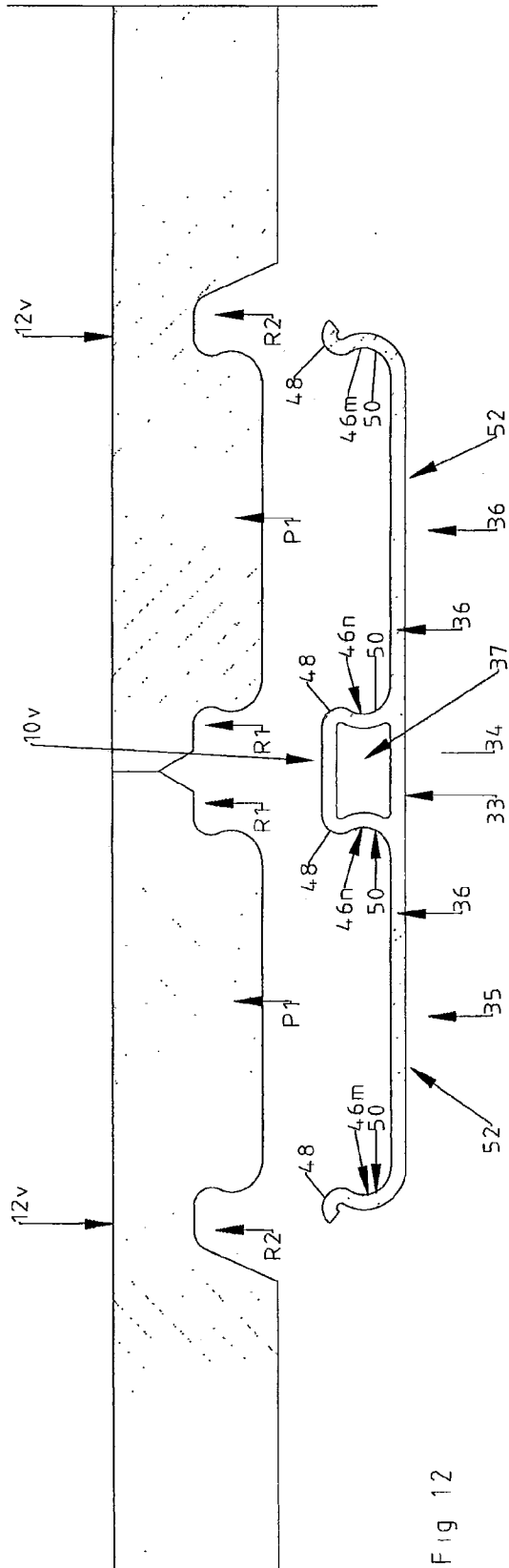


Fig 12

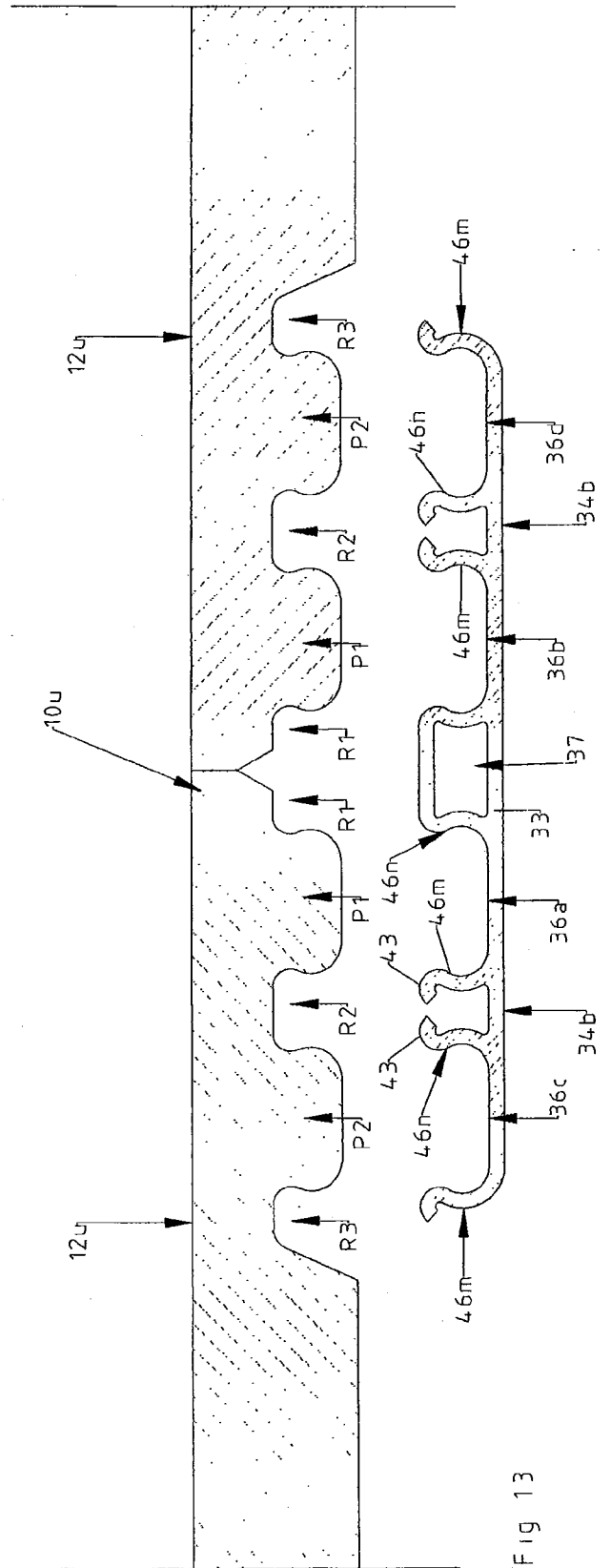
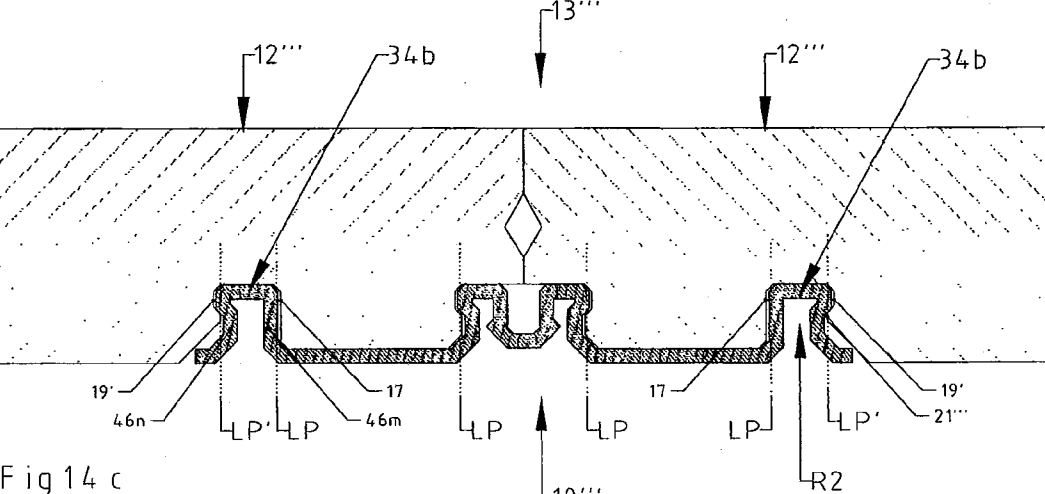
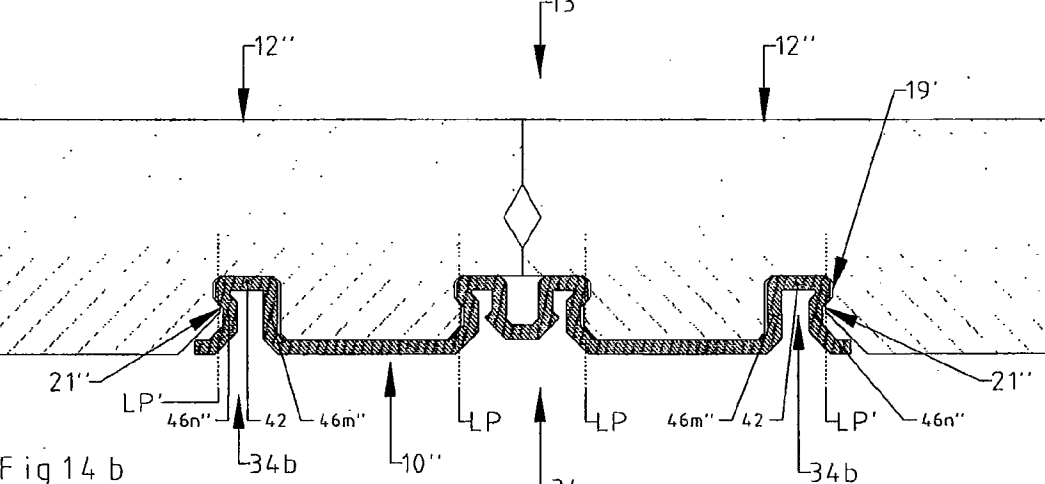
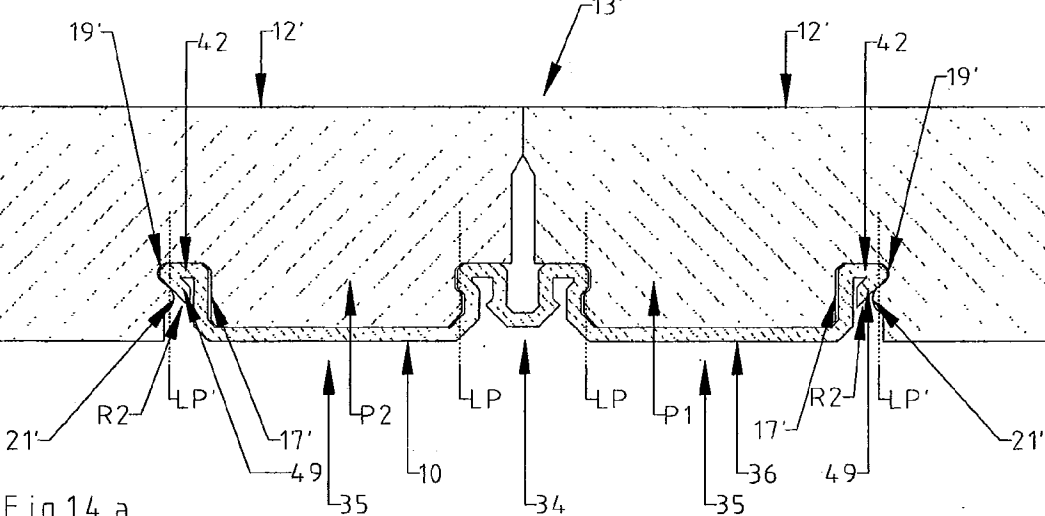
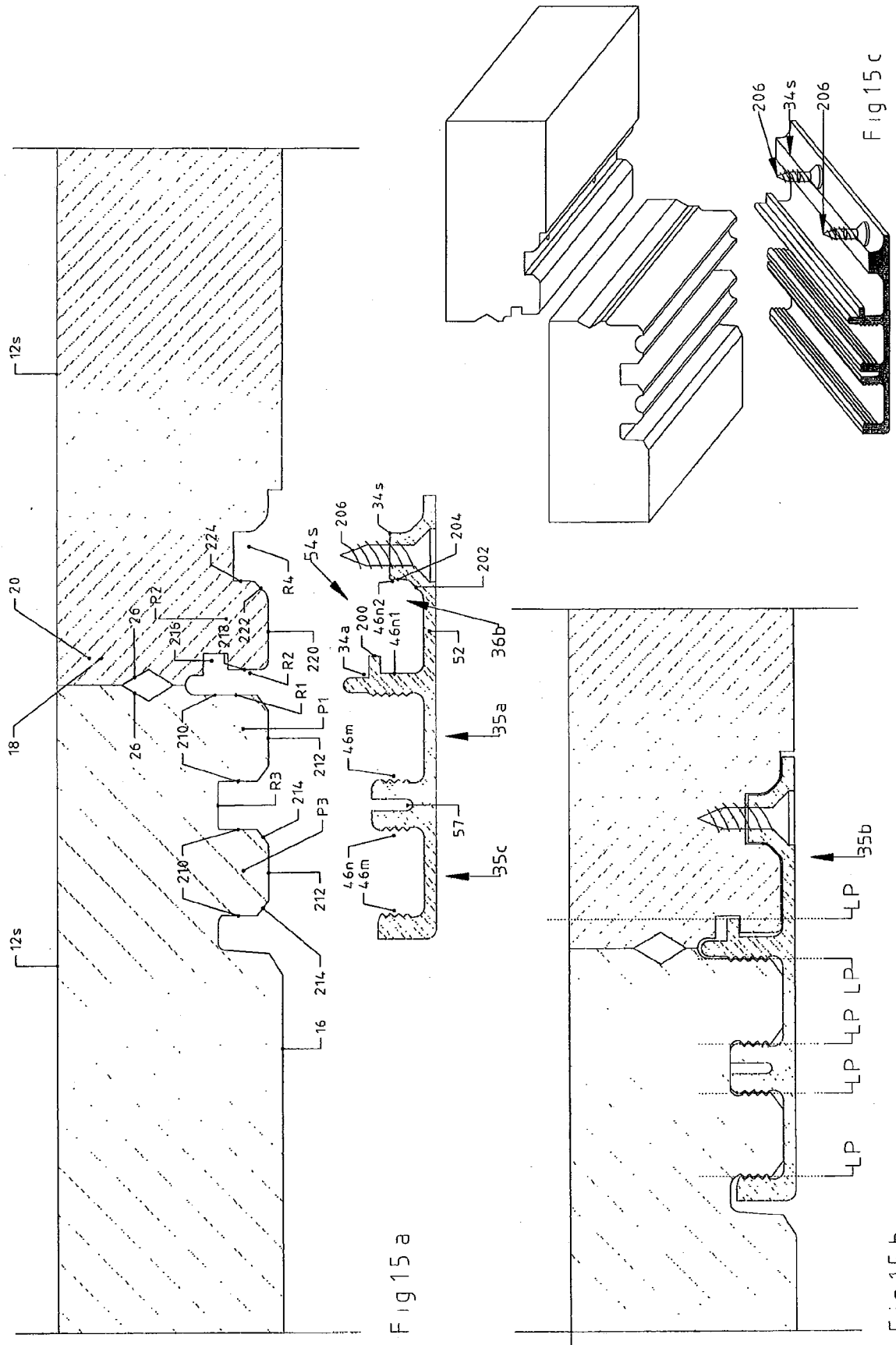


Fig 13

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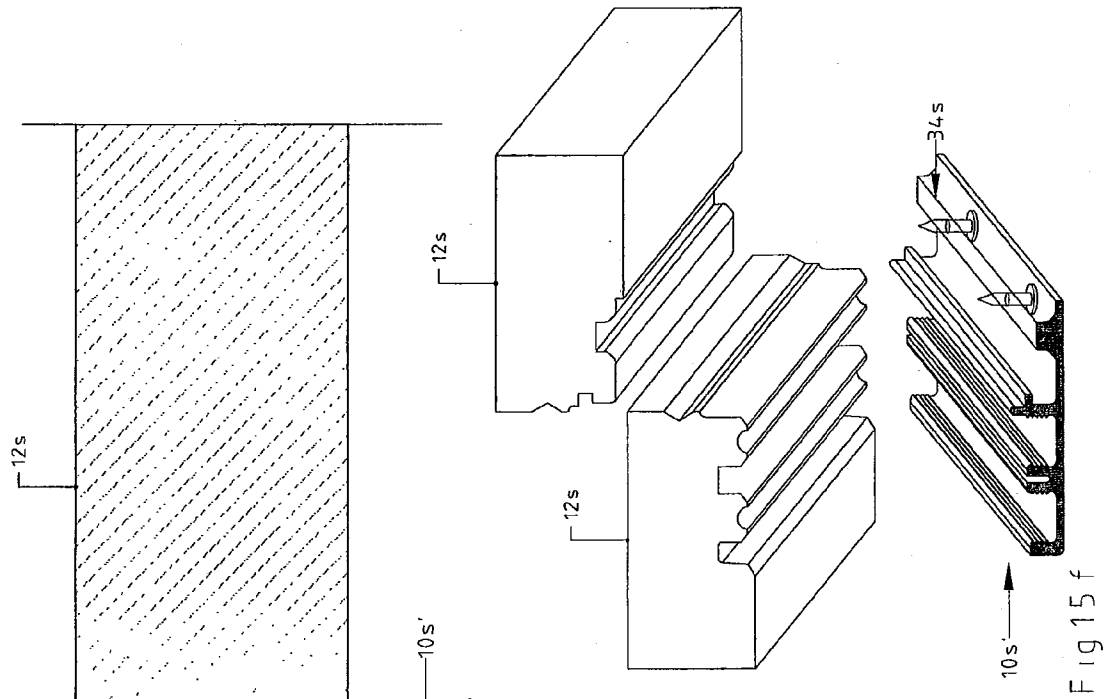


Fig 15 c

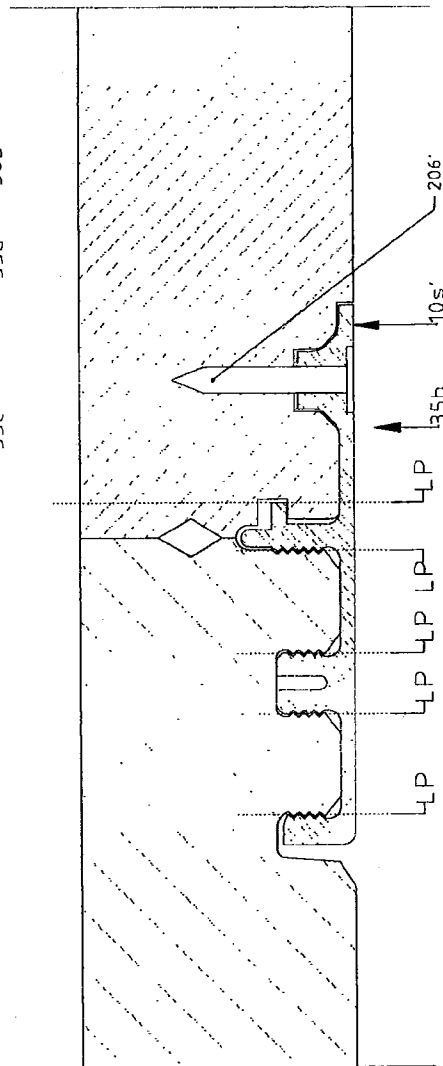


Fig 15 e

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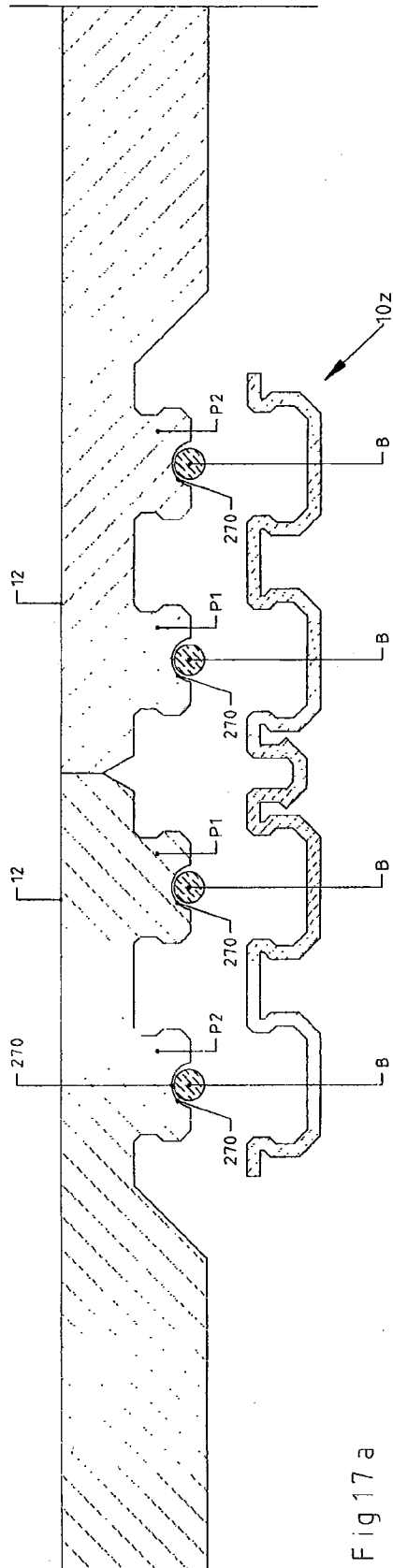


Fig 17 a

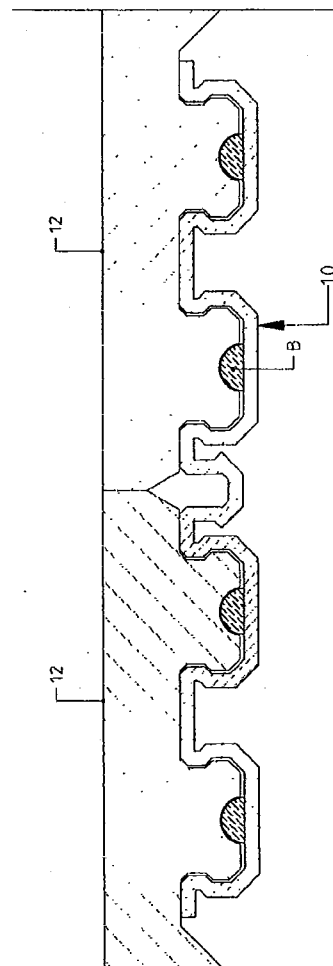


Fig 17 b

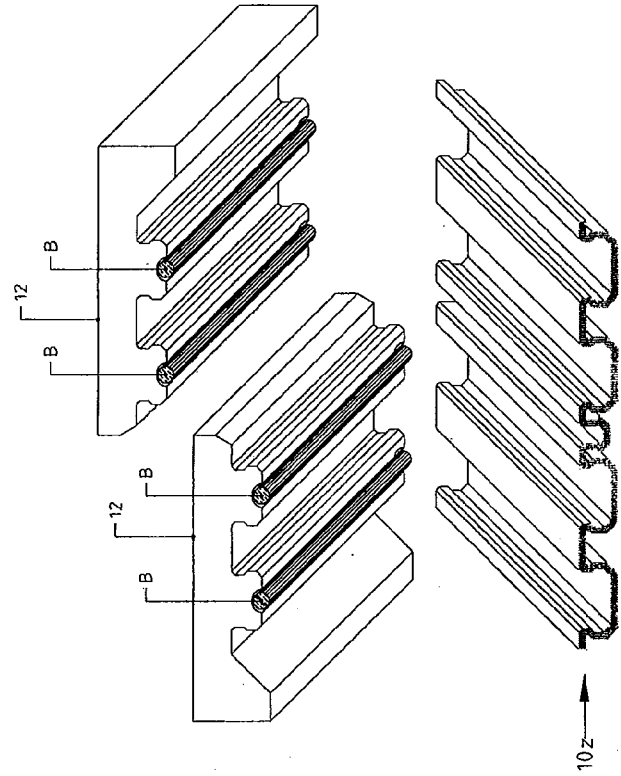


Fig 17 c

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2012/000575

A. CLASSIFICATION OF SUBJECT MATTER

E04F 15/02 (2006.01) E04F 21/20 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC: IPC E04C 2/40, E04F13, E04F15, E04F21, E04G 21/14/low, F16B 5/06, F16B 5/07 & Keywords: board, plank, panel, groove, recess, clip, resilient, join, connect, press-fit and like terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
20 July 2012Date of mailing of the international search report
20 August 2012

Name and mailing address of the ISA/AU

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Authorized officer

John Ho
AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No. 0262832329

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2012/000575
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/011173 A1 (IOVENE) 02 February 2006 See figures 7-8, 10-11	1-12, 14-31, 55-56
Y	See figures 7-8, 10-11	32-54, 57-59, 60-61
Y	WO 1994/001632 A1 (NYSTROM) 20 January 1994 See item 70 in figures 8-9	57-59
Y	US 2009/0071090 A1 (YANG) 19 March 2009 See figures 3-4	32-54
Y	GB 21205 A (LINEY) 08 September 1910 See figures 1-2 and page 2 lines 3-32	60-61

Form PCT/ISA/210 (fifth sheet) (July 2009)

SUBSTITUTE SHEET (RULE 26)

International application No.

PCT/AU2012/000575**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See Supplemental Box for Details

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

Supplemental Box

Continuation of: **Box III**

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups:

- Claims 1-60 are directed to a clip for joining together first and second substrates, and a surface covering including a plurality of clips for engaging adjacent substrates respectively. The feature of a clip configured to engage at least one of the substrates by relative motion in a direction perpendicular to a major surface thereof and including a first protrusion configured to extend between each of the two substrates and first and second panel engaging portions; one on each side of the first protrusion whereby each panel engaging portion having opposite walls and a bottom wall for receiving a projection of the substrate and engaging the substrate in a manner to form at least two locking planes; the locking planes lying perpendicular to the major surfaces of the substrates is specific to this group of claims.
- Claim 61 is directed to a surface covering system. The feature of two or more substrates configured to be coupled by respective clips by motion of the substrates relative to the clips in engagement direction which is perpendicular to the major surfaces of the substrates whereby the substrates can be disengaged by lifting a first substrate in a direction opposite to the engagement direction to facilitate rotation and decline of an adjacent substrate from the first substrate and subsequently applying a force in the engagement direction to the second joints of the engaged substrates is specific to this group of claims.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

When there is no special technical feature common to all the claimed inventions there is no unity of invention.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only feature common to all of the claimed inventions and which provides a technical relationship among them is the use of a clip configured to engage at least one of the substrates by relative motion in a direction perpendicular to the major surfaces of the substrates.

However this feature does not make a contribution over the prior art because it is disclosed in:

<US 6543210 B2 (Rostoucher, et al.) 8 April 2003>

Therefore in the light of this document this common feature cannot be a special technical feature. Therefore there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied *a posteriori*.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2012/000575

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
WO 2006/011173 A1	02 Feb 2006	EP 1771630 A1	11 Apr 2007
		EP 1771630 B1	19 Aug 2009
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