(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 January 2007 (18.01.2007)

PCT

(10) International Publication Number
WO 2007/008139 A1

(51) International Patent Classification:
E04F 15/02 (2006.01)

(21) International Application Number:
PCT/SE2006/000812

(22) International Filing Date: 3 July 2006 (03.07.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0501639-9 11 July 2005 (11.07.2005) SE

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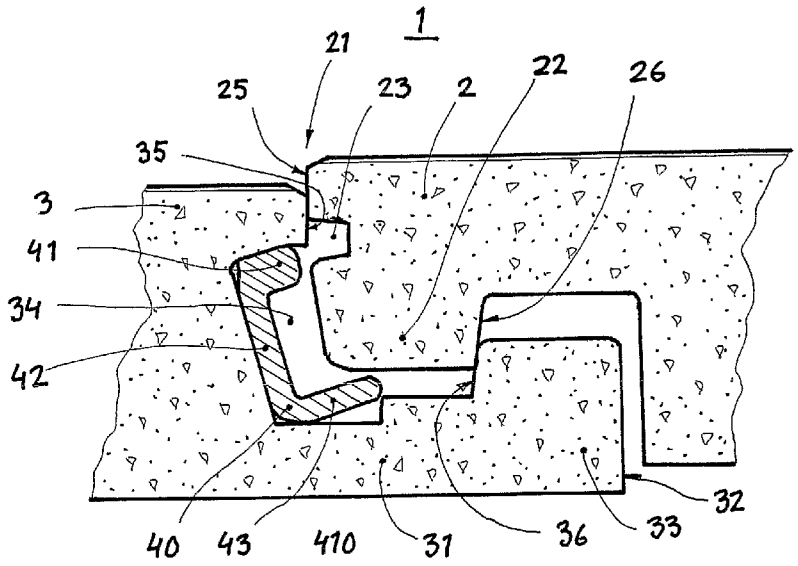
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) **Title:** A JOINT FOR PANELS.



(57) **Abstract:** A joint (1) having a first edge (2) and a second edge (3), the first edge (2) being provided with a distal edge (21) and a downwards protruding heel (22). The distal edge (21) is further provided with an upper joint edge (25) beneath which a groove (23) is arranged. The second edge (3) is provided with lower cheek (31) having a distal end (32) at which an upwards protruding lower cheek heel (33) is arranged. The second edge (3) is further provided with an upper joining edge (35) beneath which an undercut (34) is arranged. A moveable locking element (40) is arranged in the space created by the undercut (34). The moveable locking element (40) have a locking tongue (41), a locking tongue leg (42) and a manoeuvring leg (43).

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A joint for panels.

The present invention relates to a joint used for connecting panels.

Prefabricated floor boards provided with tongue and groove at the edges are quite common nowadays. These can be installed by the average handy man as they are very easy to install. Such floors can, for example, be constituted of solid wood, fibre board or particle board. These are most often provided with a surface layer such as lacquer, or some kind of laminate. The boards are most often installed by being glued via tongue and groove. The most common types of tongue and groove are however burdened with the disadvantage to form gaps of varying width between the floor boards in cases where the installer hasn't been thorough enough. Dirt will easily collect in such gaps. Moisture will furthermore enter the gaps which will cause the core to expand in cases where it is made of wood, fibre board or particle board, which usually is the case. The expansion will cause the surface layer to rise closest to the edges of the joint which radically reduces the useful life of the floor since the surface layer will be exposed to an exceptional wear. Different types of tensioning devices, forcing the floor boards together during installation can be used to avoid such gaps. This operation is however more or less awkward. It is therefore desirable to achieve a joint which is self-guiding and thereby automatically finds the correct position. Such a joint would also be possible to utilise in floors where no glue is to be used. Different types of joint with mechanical locking have been made available. These are commonly known as click joints or snap-action joints and they rely on resilient action in upper and/or lower cheeks of the groove portion of the joint. It is very common to use fibre board or particle board as core material and the resilient properties of these

materials are somewhat limited. It is therefore the object of the present invention to work around the problem by not completely relying on the limited resiliency allowed by the core material.

It has through the present invention been made possible to improve the assembly procedure as well as achieving an improved locking between panels. Accordingly the invention relates to a joint having a first edge and a second edge. The first edge is provided with a distal edge and a downwards protruding heel. The distal edge is further provided with an upper joint edge beneath which a groove is arranged. The second edge is provided with lower cheek having a distal end at which an upwards protruding lower cheek heel is arranged. The second edge is further provided with an upper joining edge beneath which an undercut is arranged. The invention is characterised in a moveable locking element is arranged in the space created by the undercut. The moveable locking element has a locking tongue, a locking tongue leg and a manoeuvring leg. The second edge is intended to join with the first edge through vertical motion. The moveable locking element, or more precisely the locking tongue of the locking element, will be displaced by the vertical motion when the two edges are moved towards each other. The displacement can be seen as a rotation where the locking tongue is brought to rotate around a selected pivot point. Resilient action may also realise this rotating action.

According to a preferred embodiment of the invention the downwards protruding heel presses on the manoeuvring leg, thereby urging the locking tongue to move forward and engage the groove. An upper locking surface of the locking tongue is suitably longer than the portion of the locking tongue that can engage the groove.

The lower cheek heel suitably have a front face and that the downwards protruding heel have a rear face. The front face and the rear face are then preferably intended to interact, the interaction resulting in the upper joint edge and the upper joining edge being urged together in an assembled joint.

According to one alternative embodiment of the invention the lower cheek heel suitably have a front face and the downwards protruding heel have a rear face while the manoeuvring leg have a face section. The front face and the rear face are then preferably intended to interact, having the face section in an intermediate position, the interaction resulting in the upper joint edge and the upper joining edge being urged together in an assembled joint.

According to one special embodiment of the invention the locking element is provided with a hinge. This will allow a snap-action cam lock effect.

A moveable locking element like described in the present invention may suitably be made through extrusion moulding and it can be made of thermoplastic material, thermosetting material or even of metal.

The invention also relates to a joint having a first edge and a second edge where the first edge is provided with a tongue and a rear groove. The second edge is provided with a lower cheek having a distal end, an inner locking groove, a tongue groove and a locking member surface. The invention is characterised in a moveable locking member is arranged on the locking member surface. The moveable locking member have an inner locking tongue, a manoeuvring cheek and an outer locking tongue. The second edge is intended to join with the first edge through horizontal motion.

Suitably, a manoeuvring area beneath the tongue presses on the manoeuvring cheek urging the inner locking tongue to move downwards and engage the inner locking groove. The manoeuvring area beneath the tongue suitably presses on the manoeuvring cheek also urging the outer locking tongue to move upwards and engage the rear groove.

A moveable locking element like described in the present invention may suitably be made through extrusion moulding and it can be made of thermoplastic material, thermosetting material or even of metal.

The joint of the present invention is suitably used on products such as floor panels or wall panels. According to an embodiment of a floor panel according to the present invention includes a core which is covered with an upper decorative surface. The core most often consists of wood particles or fibre bonded together with glue or resin. Such core boards are commonly known as Medium Density Fibre board (MDF), High Density Fibre board (HDF), Oriented Strand Board (OSB) or particle board. It is, however, also possible to utilise the invention on cores made of solid wood. Since the core material is sensitive to moisture it may be advantageous to treat the area closest to the joint if the floor is to be exposed to moisture. This treatment may suitably include resin, wax or some kind of lacquer. It will not be necessary to treat the joint if the panels are to be glued since the glue itself will protect the joint from moisture penetration. The decorative upper surface may consist of a decorative paper possibly impregnated with melamine-formaldehyde resin. One or more layers of so called overlay paper of cellulose, impregnated with melaimine-formaldehyde resin is suitably placed on top of the decorative paper. One or more of the above layers may be sprinkled with hard particles, of for example aluminium oxide, silicon carbide or silicon oxide in connection to the

impregnation in order to improve the abrasion resistance. The paper impregnated with resin is cured before, or in connection to applying it to the core. The paper layers are suitably laminated together before they are applied to the core in cases where the upper decorative surface is constituted by more than one paper layers. The lower side may suitably be coated with a lacquer or a resin impregnated paper. It is also possible to arrange an impregnated support paper between the decor and the core.

Among possible upper surfaces to apply to the core may be mentioned;

-Thermosetting laminates including at least a decorative paper impregnated with melamine-formaldehyde resin. Overlay paper and hard particles may be added to this as described earlier in the present application.

-The upper decorative surface may also be constituted by an acrylic foil, an acrylic lacquer and combinations thereof. It might also be constituted by a foil or a lacquer of poly olefins or poly olefin derivatives.

-It is also possible to coat a decorative surface with an acrylic lacquer containing, or being sprinkled with, hard particles of α-aluminium oxide, silicon carbide or silicon oxide. The coating is most often achieved through use of a roller or through curtain coating. Among suitable acrylic lacquers can be mentioned radiation curing ones which are cured with electron beam or ultraviolet light forming free radicals in the uncured lacquer.

-It is further possible to use wood veneer, most often coated with oil, wax or lacquer.

The invention is further described together with drawing showing different embodiments of the invention whereby,

-figure 1a - b shows a first embodiment of a joint 1 according to the invention.

-figure 2a - b shows a second embodiment of a joint 1 according to the invention.

-figure 3a - b shows a third embodiment of a joint 1 according to the invention.

-figure 4a - b shows a fourth embodiment of a joint 1 according to the invention.

-figure 5a - b shows a fifth embodiment of a joint 1 according to the invention.

-figure 6a - b shows a sixth embodiment of a joint 1 according to the invention.

-figure 6c shows an alternative version of the sixth embodiment shown in figure 6a - b of a joint 1 according to the invention

-figure 7a - b shows a seventh embodiment of a joint 1 according to the invention.

-figure 8a - b shows a eighth embodiment of a joint 1 according to the invention.

-figure 9 shows a ninth embodiment of a joint 1 according to the invention.

-figure 10a - b shows a tenth embodiment of a joint 1 according to the invention.

Accordingly figure 1a - b shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a first embodiment of the invention. Figure 1a shows the joint 1 just before the joining and figure 1b shows the joint 1 after assembly. The first edge 2 is provided with a distal edge 21 and a downwards protruding heel

22. The distal edge 21 is further provided with an upper joint edge 25 beneath which a groove 23 is arranged. The second edge 3 is provided with a lower cheek 31 having a distal end 32 at which an upwards protruding lower cheek heel 33 is arranged. The second edge 3 is further provided with an upper joining edge 35 beneath which an undercut 34 is arranged. A moveable locking element 40 is arranged in the space created by the undercut 34. The moveable locking element 40 have a locking tongue 41, a locking tongue leg 42 and a manoeuvring leg 43. The second edge 3 is intended to join with the first edge 2 through vertical motion. The downwards protruding heel 22 hereby presses on the manoeuvring leg 43 urging the locking tongue 41 to move forward and engage the groove 23. To ensure this, an upper locking surface 410 of the locking tongue 41 is longer than the portion of the locking tongue 41 that can engage the groove 23. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26. The front face 36 and the rear face 26 are intended to interact which is resulting in the upper joint edge 25 and the upper joining edge 35 being urged together in an assembled joint 1.

Figure 2a - b shows, in cross-section, a joint 1 having a first edge 2 and a second edge 3 according to a second embodiment of the invention. Figure 2a shows the joint 1 just before the joining and figure 2b shows the joint 1 after assembly. The first edge 2 is provided with a distal edge 21 and a downwards protruding heel 22. The distal edge 21 is further provided with an upper joint edge 25 beneath which a groove 23 is arranged. The second edge 3 is provided with a lower cheek 31 having a distal end 32 at which an upwards protruding lower cheek heel 33 is arranged. The second edge 3 is further provided with an upper joining edge 35 beneath which an undercut 34 is arranged. A moveable locking element 40 is

arranged in the space created by the undercut 34. The moveable locking element 40 have a locking tongue 41, a locking tongue leg 42 and a manoeuvring leg 43. The second edge 3 is intended to join with the first edge 2 through vertical motion. The manoeuvring leg 43 is here extended to increase the locking force. The downwards protruding heel 22 hereby presses on the manoeuvring leg 43 urging the locking tongue 41 to move forward and engage the groove 23. To ensure this, an upper locking surface 410 of the locking tongue 41 is longer than the portion of the locking tongue 41 that can engage the groove 23. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26. The front face 36 and the rear face 26 are intended to interact which is resulting in the upper joint edge 25 and the upper joining edge 35 being urged together in an assembled joint 1.

Figure 3a - b shows, in cross-section, a joint 1 having a first edge 2 and a second edge 3 according to a third embodiment of the invention. Figure 3a shows the joint 1 just before the joining and figure 3b shows the joint 1 after assembly. The first edge 2 is provided with a distal edge 21 and a downwards protruding heel 22. The distal edge 21 is further provided with an upper joint edge 25 beneath which a groove 23 is arranged. The second edge 3 is provided with a lower cheek 31 having a distal end 32 at which an upwards protruding lower cheek heel 33 is arranged. The second edge 3 is further provided with an upper joining edge 35 beneath which an undercut 34 is arranged. A moveable locking element 40 is arranged in the space created by the undercut 34. The moveable locking element 40 have a locking tongue 41, a locking tongue leg 42 and a manoeuvring leg 43. The second edge 3 is intended to join with the first edge 2 through vertical motion. The manoeuvring leg 43 is here extended further to increase the locking force. The

downwards protruding heel 22 hereby presses on the manoeuvring leg 43 urging the locking tongue 41 to move forward and engage the groove 23. To ensure this, an upper locking surface 410 of the locking tongue 41 is longer than the portion of the locking tongue 41 that can engage the groove 23. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26 and the manoeuvring leg have a face section 430. The front face 36 and the rear face 26 are intended to interact, having the face section 430 in an intermediate position. The interaction results in the upper joint edge 25 and the upper joining edge 35 being urged together in an assembled joint 1.

Figure 4a - b shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a fourth embodiment of the invention. Figure 4a shows the joint 1 just before the joining and figure 4b shows the joint 1 after assembly. The first edge 2 is provided with a distal edge 21 and a downwards protruding heel 22. The distal edge 21 is further provided with an upper joint edge 25 beneath which a groove 23 is arranged. The second edge 3 is provided with a lower cheek 31 having a distal end 32 at which an upwards protruding lower cheek heel 33 is arranged. The second edge 3 is further provided with an upper joining edge 35 beneath which an undercut 34 is arranged. A moveable locking element 40 is arranged in the space created by the undercut 34. The moveable locking element 40 have a locking tongue 41, a locking tongue leg 42 and a manoeuvring leg 43. The second edge 3 is intended to join with the first edge 2 through vertical motion. The manoeuvring leg 43 is provided with a hinge which allows a cam lock effect. The downwards protruding heel 22 hereby presses on the manoeuvring leg 43 urging the locking tongue 41 to move forward and engage the groove 23. To

ensure this, an upper locking surface 410 of the locking tongue 41 is longer than the portion of the locking tongue 41 that can engage the groove 23. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26. The front face 36 and the rear face 26 are intended to interact which is resulting in the upper joint edge 25 and the upper joining edge 35 being urged together in an assembled joint 1.

Figure 5a - b shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a fifth embodiment of the invention. Figure 5a shows the joint 1 just before the joining and figure 5b shows the joint 1 after assembly. The fifth embodiment is an alternative embodiment of the invention. The first edge 2 is provided with a distal edge 21 and a downwards protruding heel 22. The distal edge 21 is further provided with an upper joint edge 25 beneath which a groove 23 is arranged. The second edge 3 is provided with a lower cheek 31 having a distal end 32 at which an upwards protruding lower cheek heel 33 is arranged. The second edge 3 is further provided with an upper joining edge 35 beneath which an undercut 34 is arranged. A moveable locking element 40 is arranged in the space created by the undercut 34. The moveable locking element 40 have a locking tongue 41, a locking tongue leg 42 and a manoeuvring leg 43. The second edge 3 is intended to join with the first edge 2 through vertical motion.

A front surface 22^1 of the downwards protruding heel 22 hereby presses on the manoeuvring leg 43 urging the bent manoeuvring leg 43 to straighten whereby the locking tongue 41 moves forward and engage the groove 23. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26. The front face 36 and the rear face 26 are intended to interact which is

resulting in the upper joint edge 25 and the upper joining edge 35 being urged together in an assembled joint 1.

Figure 6a - b shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a sixth embodiment of the invention. Figure 6a shows the joint 1 just before the joining and figure 6b shows the joint 1 after assembly. Figure 6c shows an alternative embodiment of the embodiment shown in figure 6a - b. Beginning with figure 6a - b, the first edge 2 is provided with a distal edge 21 and a downwards protruding heel 22. The distal edge 21 is further provided with an upper joint edge 25 beneath which a groove 23 is arranged. The second edge 3 is provided with a lower cheek 31 having a distal end 32 at which an upwards protruding lower cheek heel 33 is arranged. The second edge 3 is further provided with an upper joining edge 35 beneath which an undercut 34 is arranged. A moveable locking element 40 is arranged in the space created by the undercut 34. The moveable locking element 40 have a locking tongue 41, a locking tongue leg 42 and a manoeuvring leg 43. The moveable locking element 40 is further provided with a pivot groove 43^I. The lower cheek 31 is provided with a pivot edge 31^I. The pivot groove 43^I and the pivot edge 31^I are intended to interact. The second edge 3 is intended to join with the first edge 2 through vertical motion.

A front surface 22^I of the downwards protruding heel 22 hereby presses on the manoeuvring leg 43 urging the manoeuvring leg 43 to tilt with the pivot edge 31^I as an axis of rotation whereby the locking tongue 41 moves forward and engage the groove 23. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26. The front face 36 and the rear face 26 are intended to interact which is resulting in the upper joint edge 25 and the upper joining edge 35 being urged together in an assembled joint 1. The lower cheek 31,

the downwards protruding heal 22 and the manoeuvring leg 43 are further designed so that the outermost portion of the manoeuvring leg 43 is held in place by the downwards protruding heal 22 and the lower cheek 31 when the joint is assembled.

Figure 6c mainly correspond to figure 6a - b above. The upper portion of the lower cheek 31 containing lower cheek heal 33, front face 36 and pivot edge 31^1 is, however made of a separate material which is joined with the core material with for example glue. It is, however also possible to attach this portion by nailing, prizing or snapping it into position.

Figure 7a - b shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a seventh embodiment of the invention. Figure 7a shows the joint 1 just before the joining and figure 7b shows the joint 1 after assembly. The seventh embodiment is an alternative embodiment of the invention where the joint is assembled through horizontal motion. The joint 1 have a first edge 2 and a second edge 3 wherein the first edge 2 is provided with a tongue 50 and a rear groove 51. The second edge 3 is provided with a lower cheek 61 having a distal end 62, an inner locking groove 63, a tongue groove 64 and a locking member surface 65. A moveable locking member 70 is arranged on the locking member surface 65. The moveable locking member 70 have an inner locking tongue 71, a manoeuvring cheek 72 and an outer locking tongue 73. As said above the second edge 3 is intended to join with the first edge 2 through horizontal motion according to this, seventh embodiment of the invention. A manoeuvring area 52 beneath the tongue 50 presses on the manoeuvring cheek 72 urging the inner locking tongue 71 to move downwards and engage the inner locking groove 63. At the same time the outer locking tongue 72 will move upwards and engage the rear groove 51.

Figure 8a - b shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a eighth embodiment of the invention. Figure 8a shows the joint 1 just before the joining and figure 8b shows the joint 1 after assembly. The eighth embodiment is an alternative embodiment of the invention where the joint is assembled through horizontal motion. The joint 1 have a first edge 2 and a second edge 3 wherein the first edge 2 is provided with a tongue 50 and a rear depression 53. The second edge 3 is provided with a lower cheek 61 having a distal end 62, an inner locking groove 63 and a tongue groove 64. A moveable locking member 70 is arranged on first edge 2. The moveable locking member 70 have a manoeuvring cheek 72 and an outer locking tongue 73. As said above the second edge 3 is intended to join with the first edge 2 through horizontal motion according to this, eighth embodiment of the invention. The outer locking tongue 73 is urged upwards into the rear depression 53 during the assembly. It will then snap down into engagement with inner locking groove 63 once in the fully assembled position.

Figure 9 shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a ninth embodiment of the invention. Figure 9 shows the joint 1 just before the joining. The ninth embodiment is an alternative embodiment of the invention where the joint is assembled through horizontal motion. The joint 1 have a first edge 2 and a second edge 3 wherein the first edge 2 is provided with a tongue 50 and a rear groove 51. The second edge 3 is provided with a lower cheek 61 having a distal end 62, a inner locking groove 63 and a tongue groove 64. A moveable locking member 70 is arranged on the first edge 2. The moveable locking member 70 have an inner locking tongue 71, a manoeuvring cheek 72 and

an outer locking tongue 73. As said above the second edge 3 is intended to join with the first edge 2 through horizontal motion according to this, ninth embodiment of the invention. The outer locking tongue 73 and the inner locking tongue 71 are urged upwards during the assembly. The outer locking tongue 73 will then snap down into engagement with inner locking groove 63 once in the fully assembled position.

Figure 10a - b shows in cross-section a joint 1 having a first edge 2 and a second edge 3 according to a tenth embodiment of the invention. Figure 10a shows the joint 1 just before the joining and figure 10b shows the joint 1 after assembly. The first edge 2 is provided with a distal edge 21 and a downwards protruding heel 22. The distal edge 21 is further provided with an upper joint edge 25 beneath which an undercut space 23^{I} is arranged. The second edge 3 is provided with a lower cheek 31 having a distal end 32 at which an upwards protruding lower cheek heel 33 is arranged. The second edge 3 is further provided with an upper joining edge 35 beneath which an undercut 34 is arranged. A moveable locking element 40 is arranged in the space created by the undercut space 23^{I}. The moveable locking element 40 have a locking tongue 41, a locking tongue leg 42 also acting as a manoeuvring leg 43. The second edge 3 is intended to join with the first edge 2 through vertical motion. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26. The lower cheek heel 33 have a front face 36 while the downwards protruding heel 22 have a rear face 26 and the moveable locking element 40 have a face section 430. The front face 36 and the rear face 26 are intended to interact, having a face section 430 in an intermediate position. The interaction results in the upper joint edge 25 and the upper joining

edge 35 being urged together in an assembled joint 1. The locking tongue 41 will engage the undercut 34 when the edges 2 and 3 respectively are fully assembled.

The invention is not limited by the embodiments shown as they can be varied in different ways within the scope of the invention.

What is claimed is:

1. A joint (1) having a first edge (2) and a second edge (3) wherein the first edge (2) is provided with a distal edge (21) and a downwards protruding heel (22), that the distal edge (21) further is provided with an upper joint edge (25) beneath which a groove (23) is arranged and,

   -wherein the second edge (3) is provided with a lower cheek (31) having a distal end (32) at which an upwards protruding lower cheek heel (33) is arranged, that the second edge (3) further is provided with an upper joining edge (35) beneath which an undercut (34) is arranged and,

   -wherein a moveable locking element (40) is arranged in the space created by the undercut (34), said moveable locking element (40) having a locking tongue (41), a locking tongue leg (42) and a manoeuvring leg (43).

2. A joint (1) according to claim 1 wherein the second edge (3) is intended to join with the first edge (2) through vertical motion.

3. A joint (1) according to claim 1 wherein the downwards protruding heel (22) presses on the manoeuvring leg (43) urging the locking tongue (41) to move forward and engage the groove (23).

4. A joint (1) according to claim 3 wherein an upper locking surface (410) of the locking tongue (41) is longer than the portion of the locking tongue (41) that can engage the groove (23).

5. A joint (1) according to claim 1 wherein the lower cheek heel (33) have a front face (36) and that the downwards protruding heel (22) have a rear face (26).

6. A joint according to claim 5 wherein the front face (36) and the rear face (26) are intended to interact, the interaction resulting in the upper joint edge (25) and the upper joining edge (35) being urged together in an assembled joint (1).

7. A joint (1) according to claim 1 wherein the lower cheek heel (33) have a front face (36), that the downwards protruding heel (22) have a rear face (26) and that the manoeuvring leg have a face section (430).

8. A joint according to claim 5 wherein the front face (36) and the rear face (26) are intended to interact, having the face section (430) in an intermediate position, the interaction resulting in the upper joint edge (25) and the upper joining edge (35) being urged together in an assembled joint (1).

9. A joint according to claim 1 wherein the locking element (40) is provided with a hinge.

10. A joint according to claim 1 wherein the locking element (40) is made of a thermoplastic material.

11. A joint according to claim 1 wherein the locking element (40) is made of a metal.

12. A joint according to claim 1 wherein the locking element (40) is made of a thermosetting material.

13. A joint (1) having a first edge (2) and a second edge (3) wherein the first edge (2) is provided with a tongue (50) and a rear groove (51) and,

-wherein the second edge (3) is provided with a lower cheek (61) having a distal end (62), an inner locking groove (63), a tongue groove (64) and a locking member surface (65) and,

-wherein a moveable locking member (70) is arranged on the locking member surface (65), said moveable locking member (70) having an inner locking tongue (71), a manoeuvring cheek (72) and an outer locking tongue (73).

14. A joint (1) according to claim 13 wherein the second edge (3) is intended to join with the first edge (2) through horizontal motion.

15. A joint (1) according to claim 13 wherein a manoeuvring area (52) beneath the tongue (50) presses on the manoeuvring cheek (72) urging the inner locking tongue (71) to move downwards and engage the inner locking groove (63).

16. A joint (1) according to claim 13 or 15 wherein a manoeuvring area (52) beneath the tongue (50) presses on the manoeuvring cheek (72) urging the outer locking tongue (72) to move upwards and engage the rear groove (51).

17. A joint according to claim 1 wherein the locking element (40) is made of a thermoplastic material.

18. A joint according to claim 1 wherein the locking element (40) is made of a metal.

19. A joint according to claim 1 wherein the locking element (40) is made of a thermosetting material.

Fig. 1a

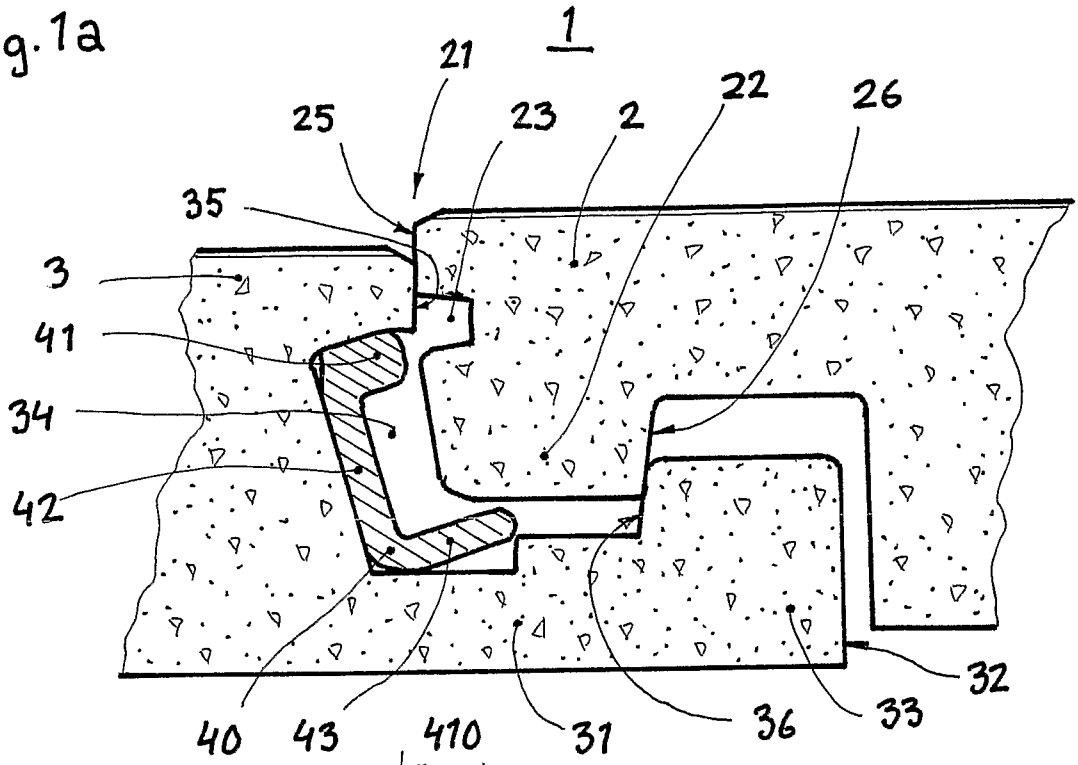


Fig. 1b

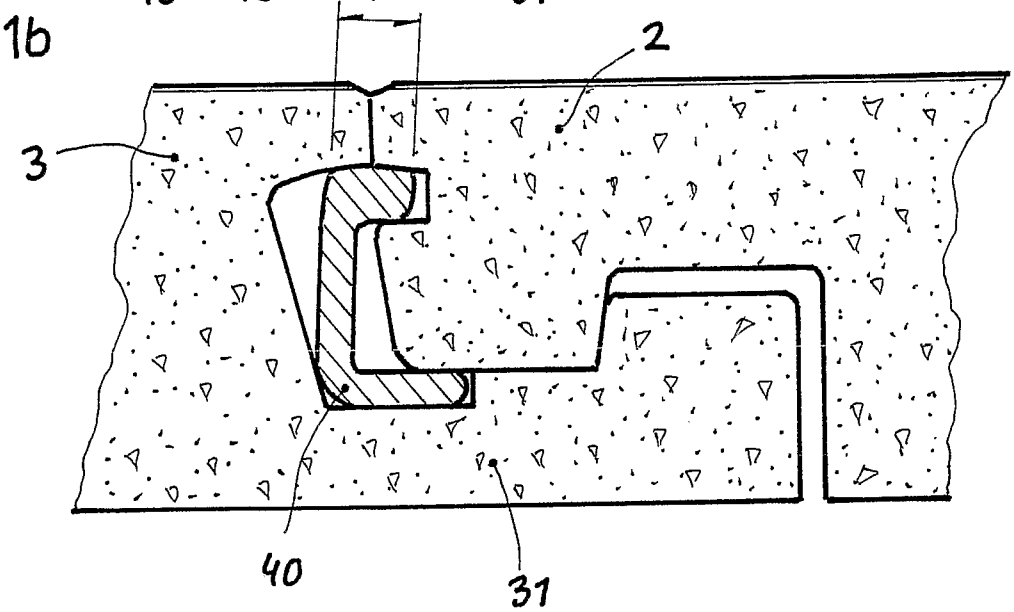


Fig. 2a

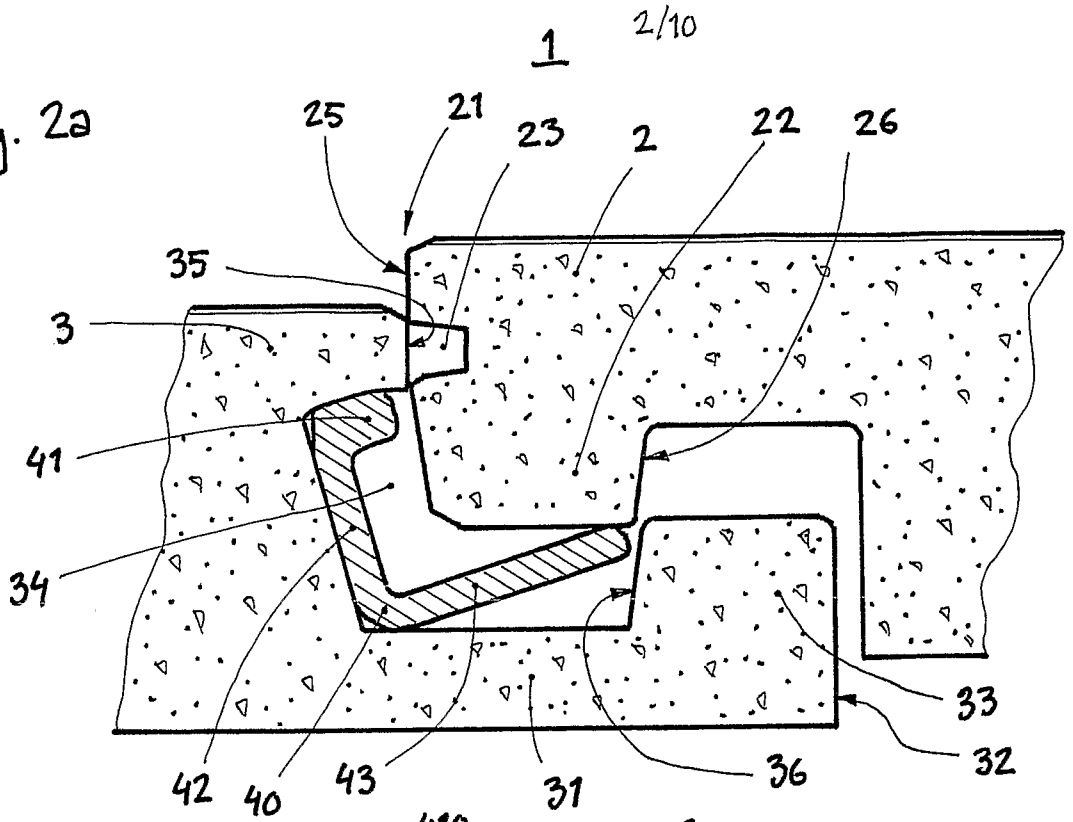


Fig 2b

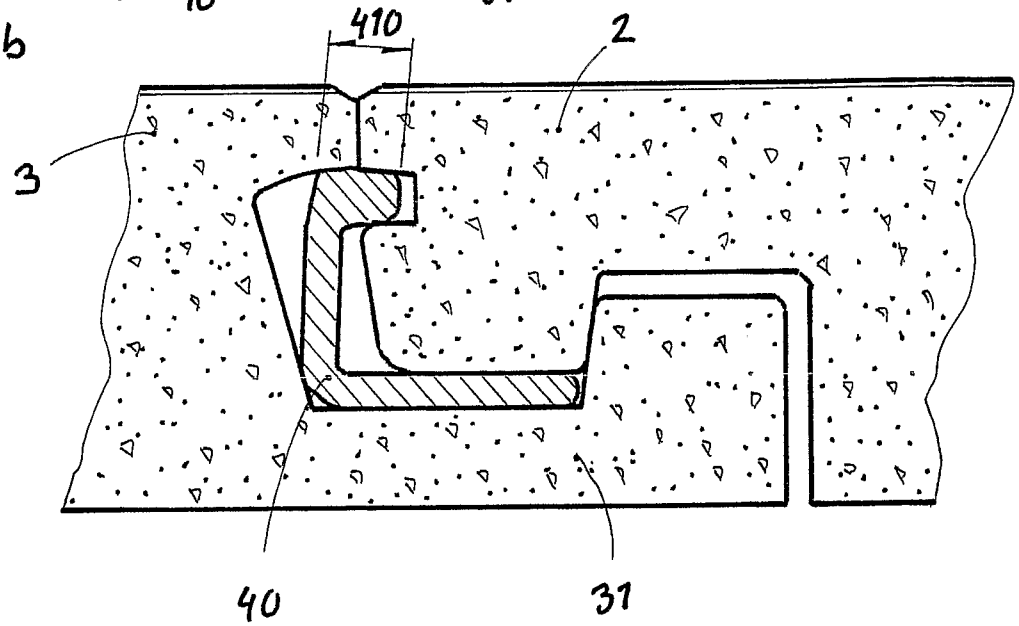


Fig. 3a

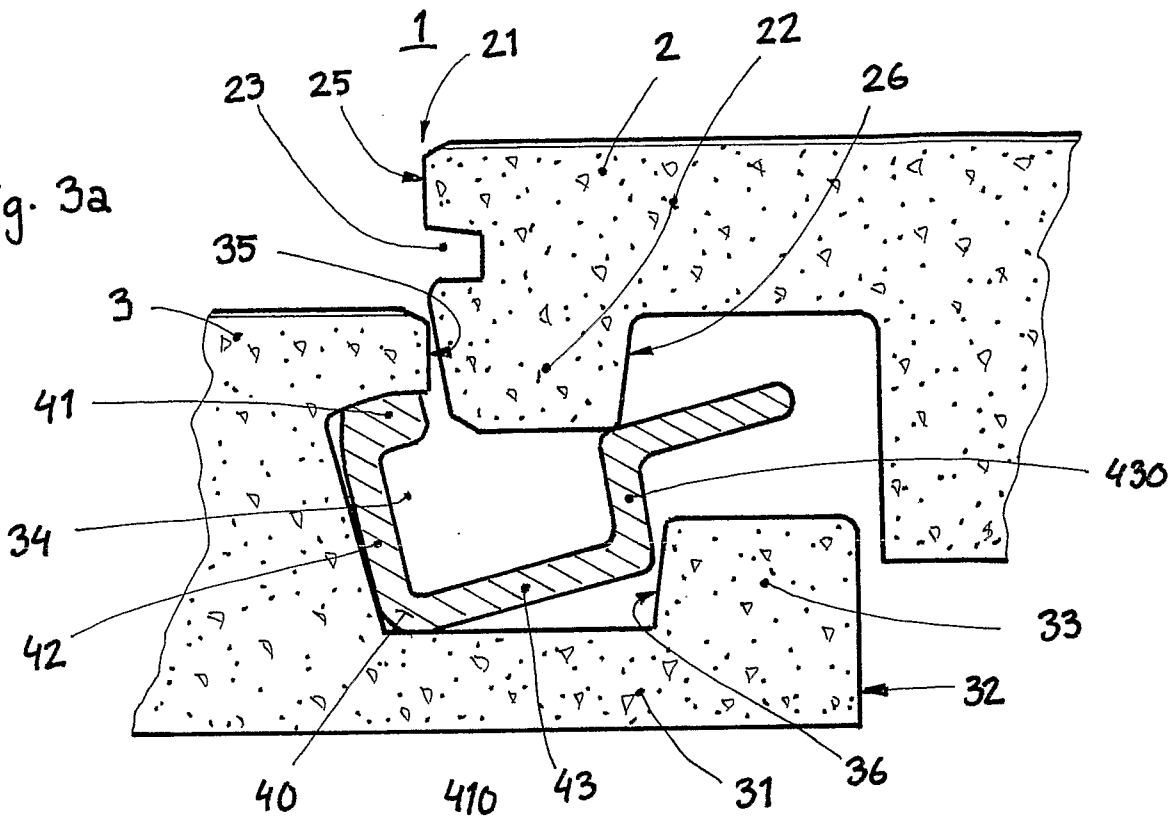


Fig. 3b

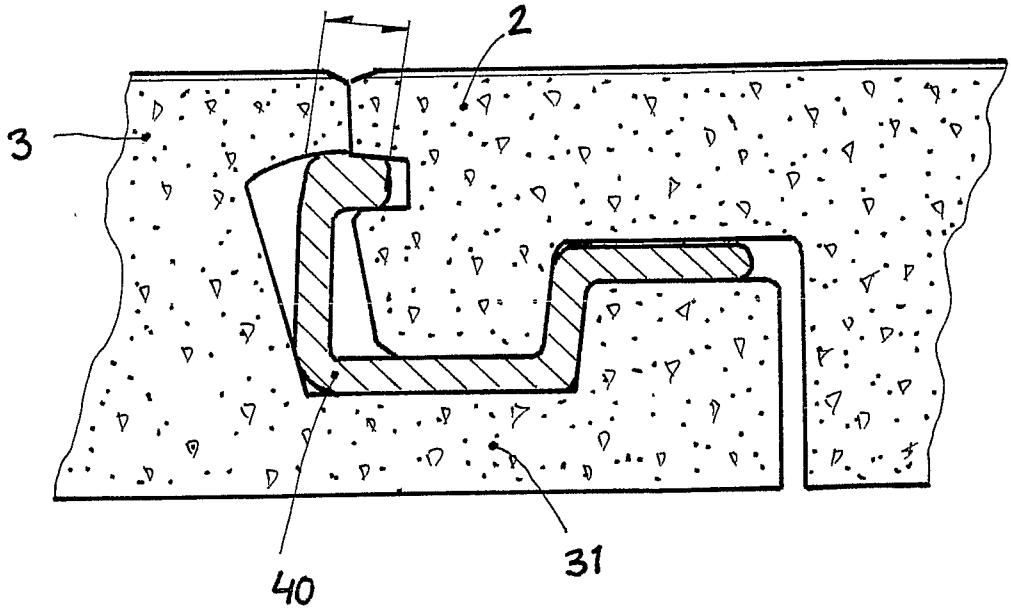


Fig. 4a

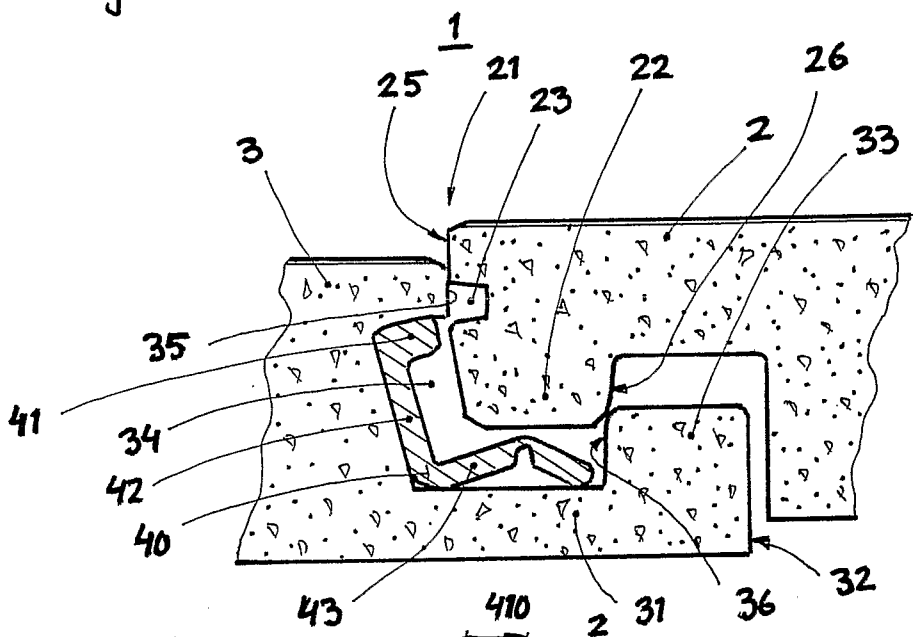


Fig. 4b

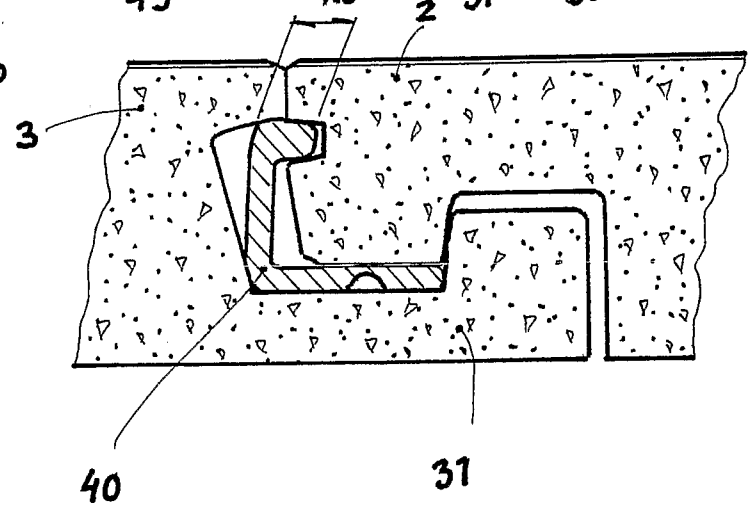


Fig. 5a

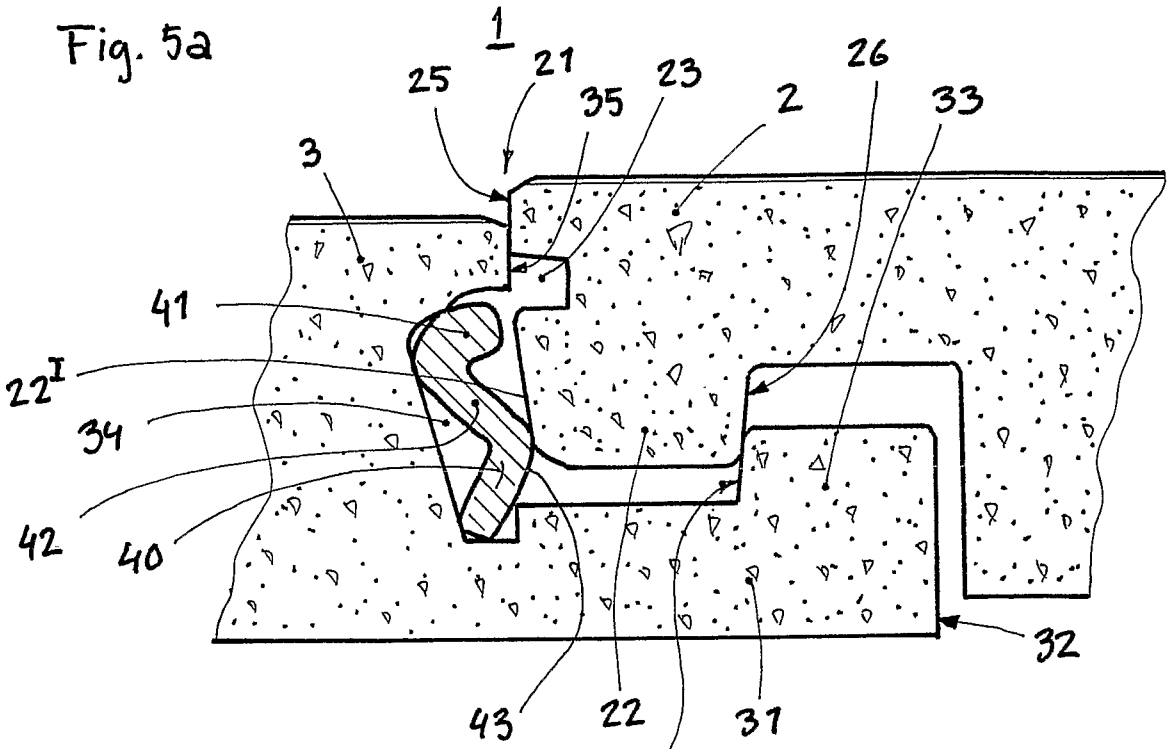


Fig. 5b

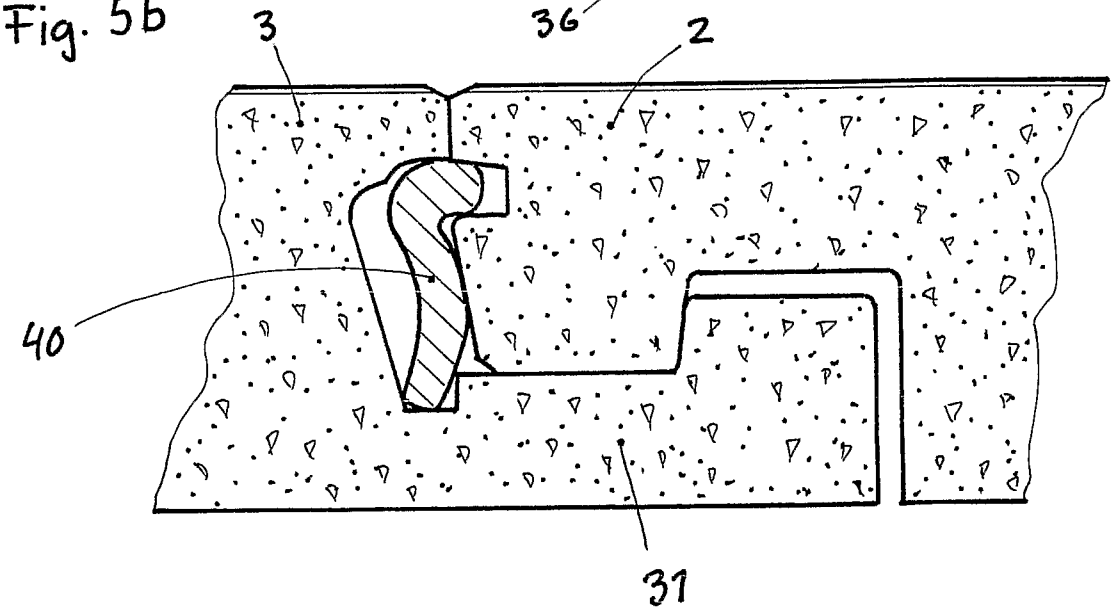


Fig 6a

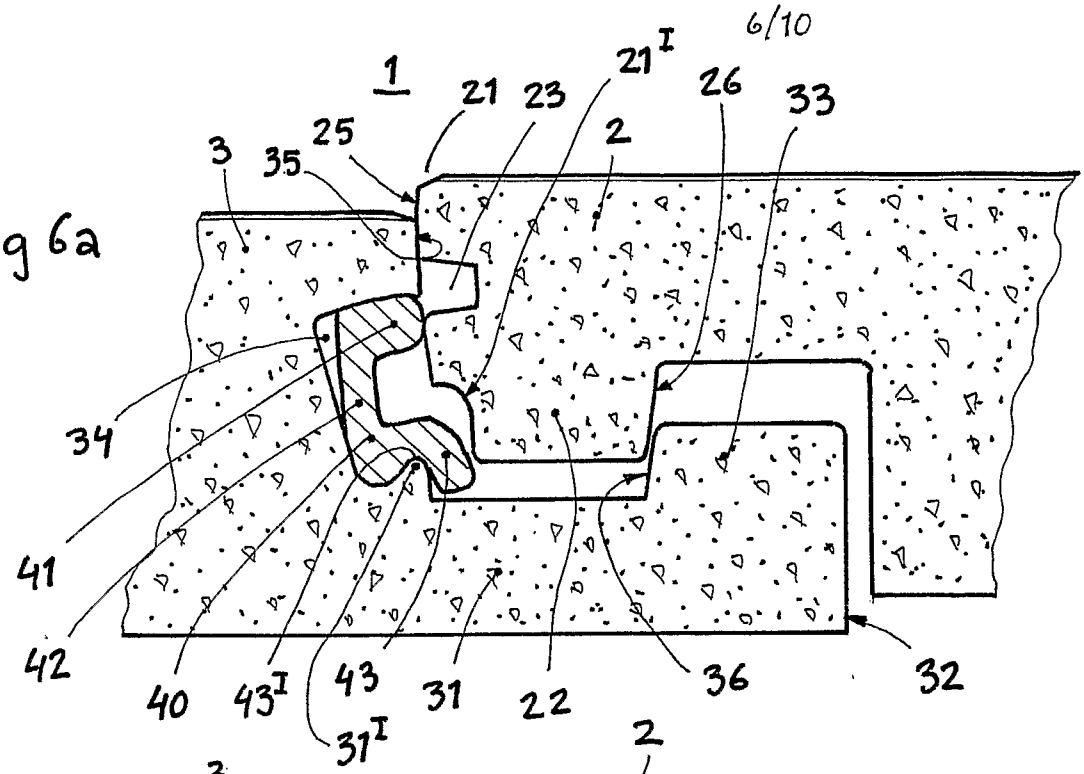


Fig. 6b

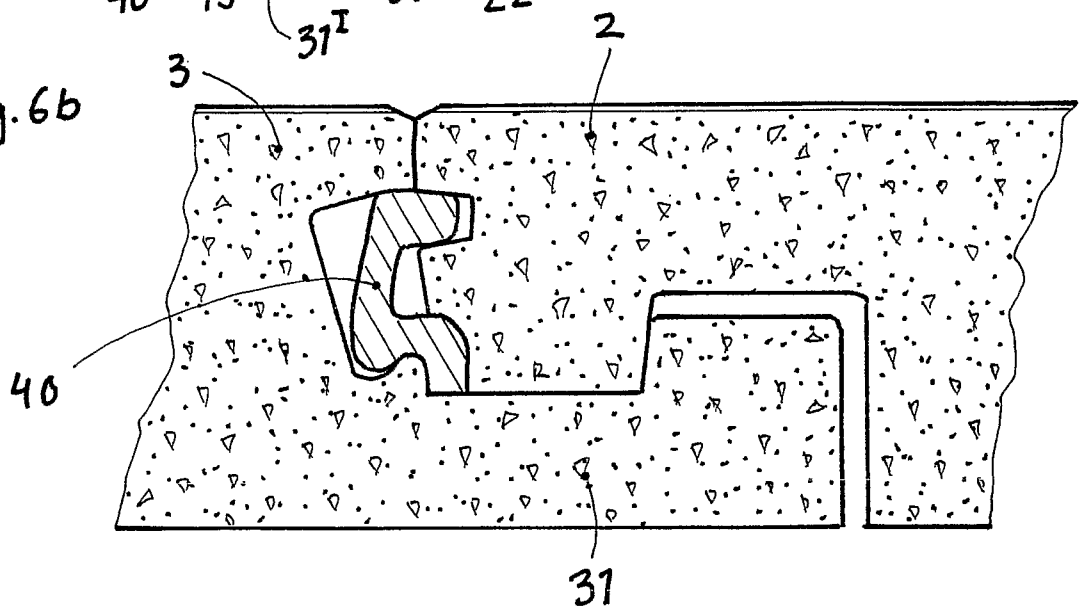


Fig 6c

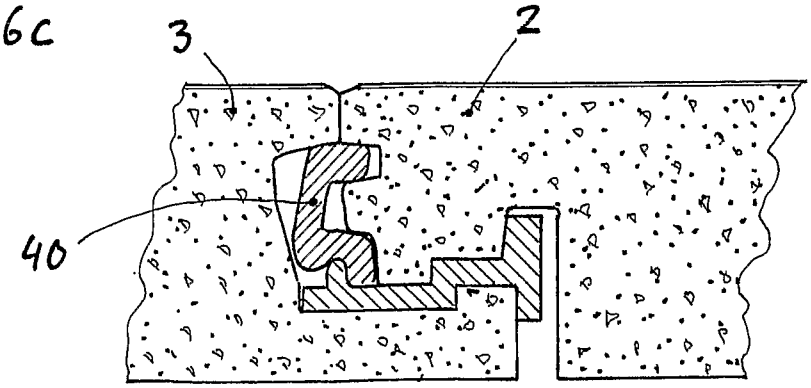


Fig. 7a

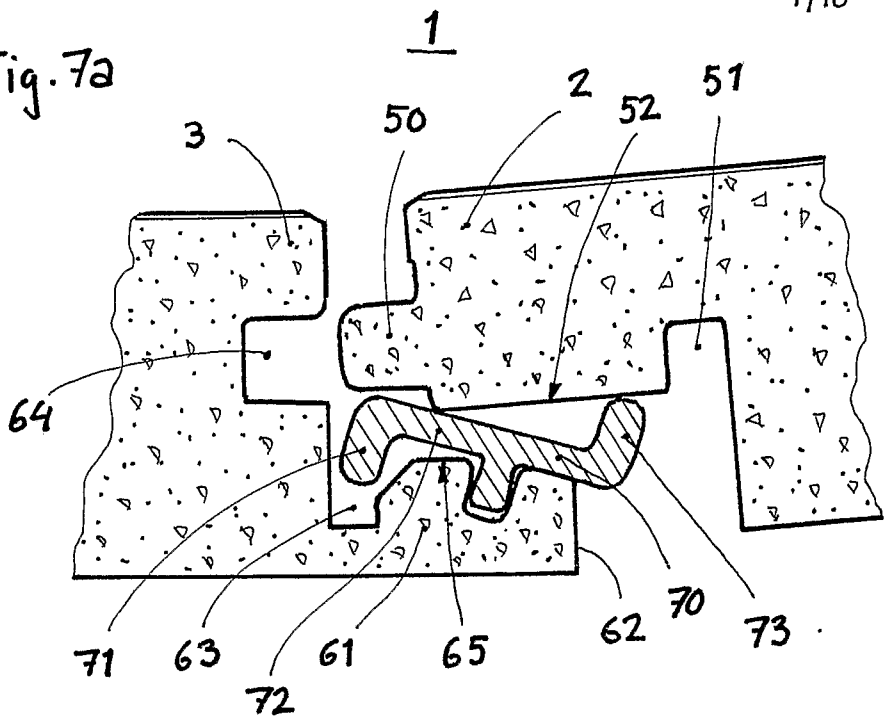


Fig. 7b

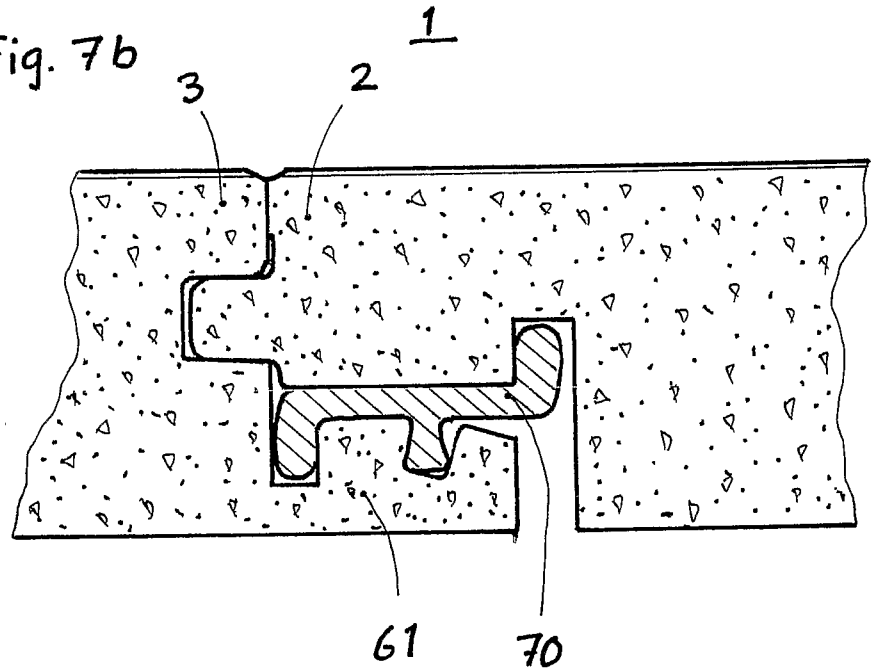


Fig.8a

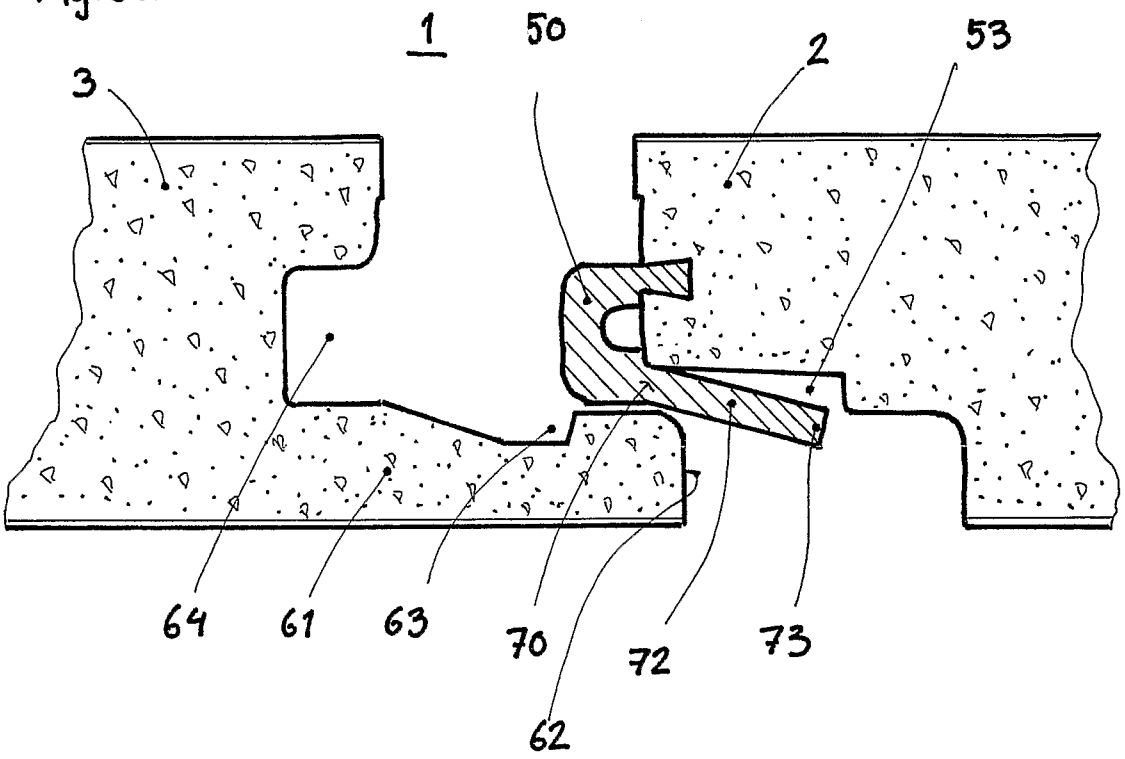


Fig. 8b

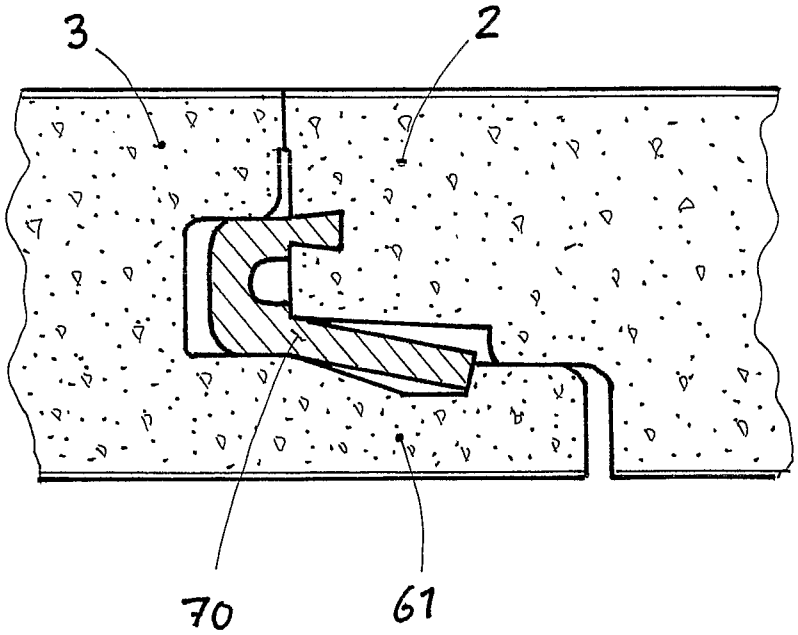


Fig 9

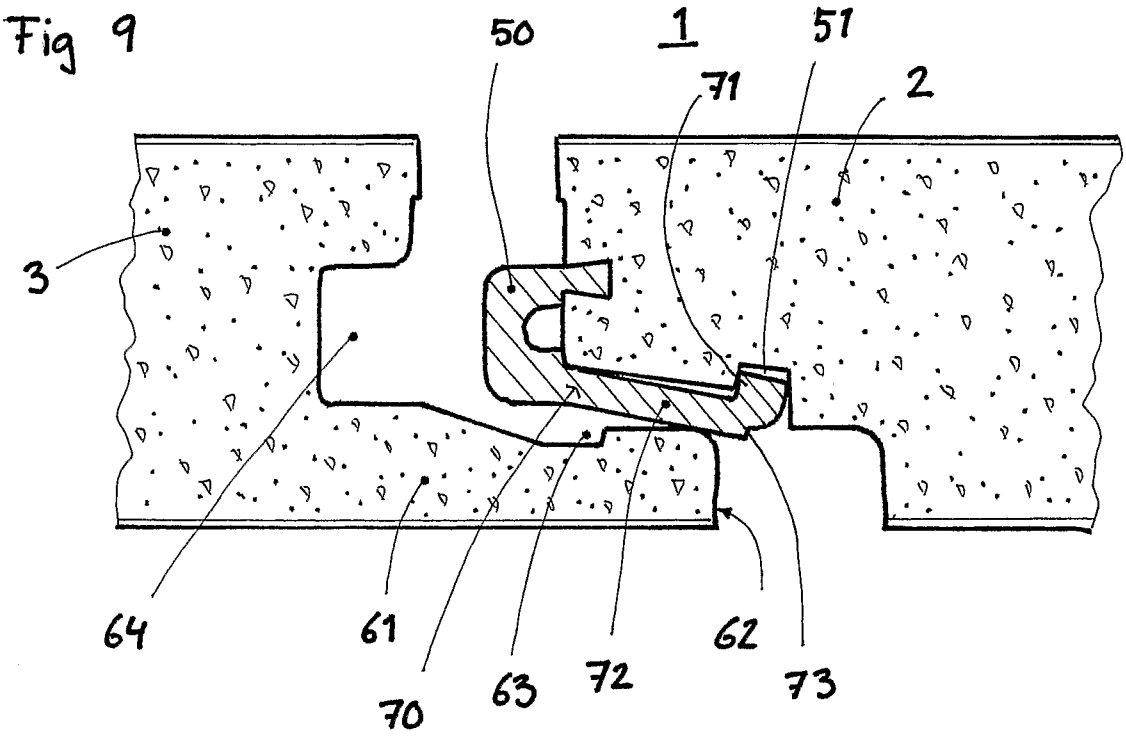


Fig. 10a

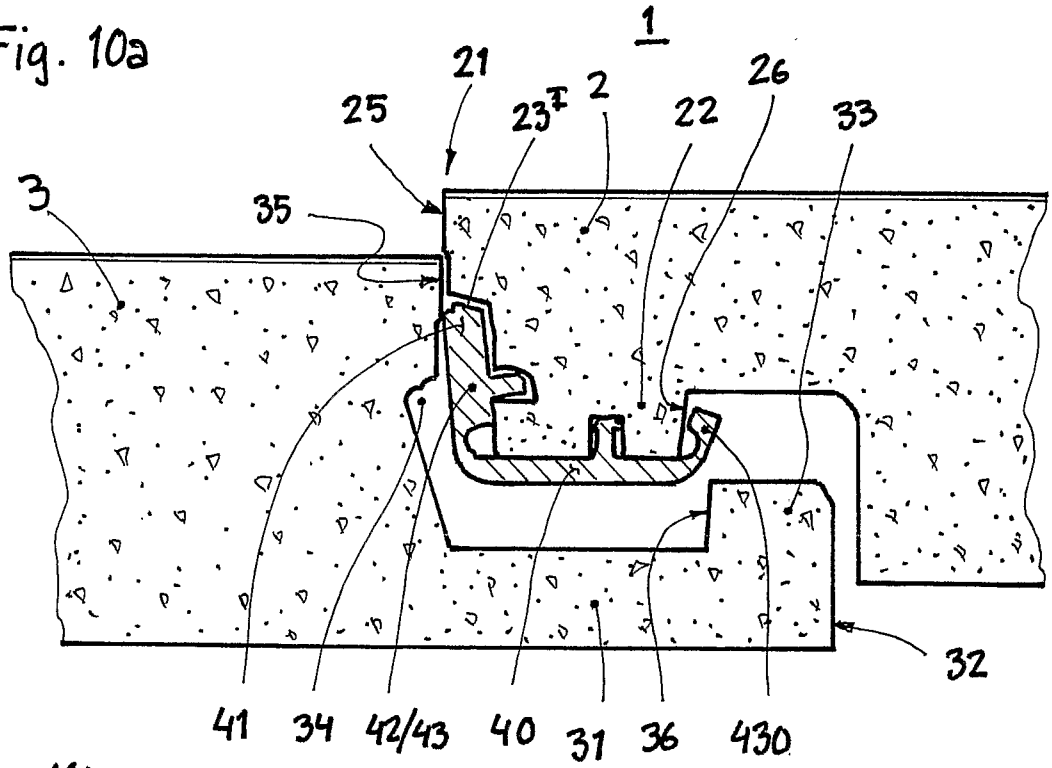
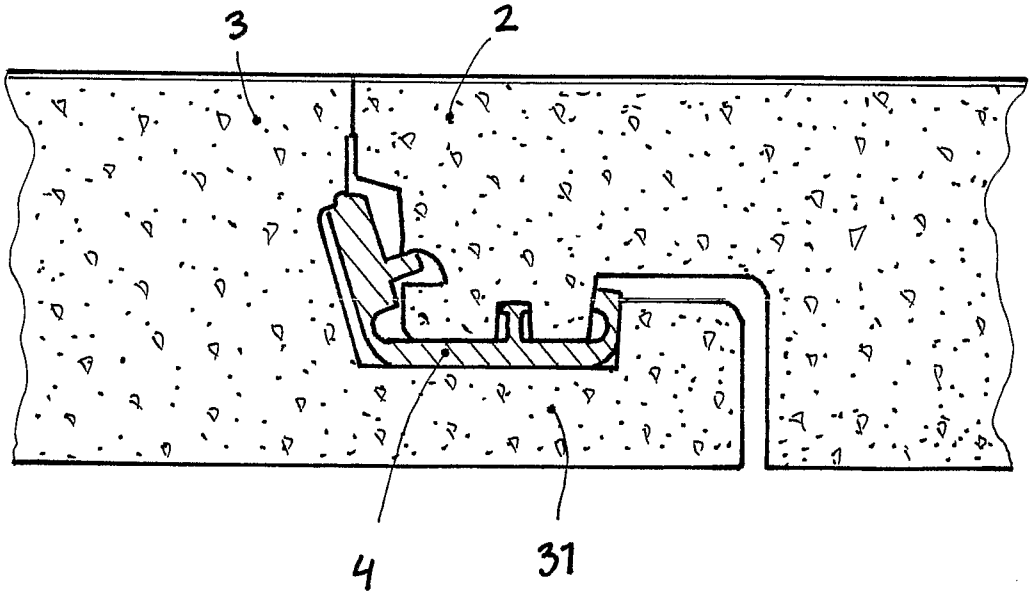


Fig. 10b



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2006/000812

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
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)

IPC: E04F

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20040211143 A1 (H.-J. HANNING), 28 October 2004 (28.10.2004), paragraph (0060)-(0065), paragraph (0068)-(0070)	1-19
A	WO 2004085765 A1 (KRONOTEC AG), 7 October 2004 (07.10.2004), page 8, last paragraph - page 9, second paragraph	1-19
A	US 20030180091 A1 (P.-E. STRIDSMAN), 25 Sept 2003 (25.09.2003), figures 3-6, abstract	1-19

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
10 October 2006	11 -10- 2006
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Tommy Blomberg / MRo Telephone No. +46 8 782 25 00

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International patent classification (IPC)

E04F 15/02 (2006.01)

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Cited literature, if any, will be enclosed in paper form.

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