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(54) Ground sill construction

Bodenschwellestruktur

Structure de seuil de sol

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Description

[0001] The invention relates to a casing for a door or a window, which may or may not be provided with a moveable part, such as a door leaf or a sliding door. In particular the invention relates to such casings which are situated at or below ground surface.

[0002] Such casings are known in many designs. In a known embodiment the posts and both sills are made of wood. Such casings are usually prefabricated in a joinery's works and are set as a unity in the construction at the building site, the ground sill attached to the concrete floor parts.

[0003] In another known embodiment casings of wood are used but then provided with a ground sill of nature stone or so-called artificial stone, such as for instance Holonite (registered trademark). Nature stone is durable but has the drawback of being difficult to work and expensive. Artificial stone is a reasonable substitute for nature stone, but is also difficult to work so that it has to be brought in the exact shape beforehand. Because of the moulding process the bottom side has a slightly broader width than the upper side -suited to the post cross-section-, as a result of which placing this ground sill can be problematic. Furthermore both kinds of "stone" have in common that the sill made from them may form a cold bridge. Moreover, special provisions have to be made for the connection to the posts of the casing. The ground sills made of nature stone or artificial stone are fragile, heavy and are placed and transported to the building site separately. The casings consisting of wooden posts -kept together by a coupling slat- and upper sill are then already fitted. Insofar as the artificial stone ground sills would be mounted to the casing beforehand the aforementioned unparallel location of the vertical planes of the ground sill -as a result of the tapered shape- would be a problem when placing and holding the casing and sill during the mounting operations.

[0004] The use of casings with one or several aluminium parts is also known. Aluminium has the advantage of being easily extruded, but the disadvantage of being expensive. Aluminium, moreover, is prone to attacks by cement and to damage.

[0005] In connection with the improvement of the accessibility of buildings it is strived for to create as few barriers as possible to humans who have difficulties walking and in particular people who move about with the help of rolling aids, such as a rollator or a wheelchair. It is desirable here that the threshold formed by the ground sill of a casing is so low that the wheels of the rollator or the wheelchair can easily roll past it. To that end the top surface of the ground sill has to be situated lower than has been usual up until now, namely -according to present standards- 2 cm higher at a maximum than the connecting surface of the ground surface (on the one hand) and the floor (on the other hand).

[0006] This can be achieved by having the posts extend further downwards and placing the ground sill lower.

With wooden ground sills however, this has the drawback that the material is located closer to or deeper into the moist ground, and will also contact stagnant water over a larger part. Reducing the profile height is no solution because of the wanted strength.

[0007] Use of ground sills of nature stone or artificial stone located recessed could be a possibility, but that would entail the above-mentioned drawbacks. The formation of a cold bridge will also increase with a recessed location. Furthermore the mounting will be more difficult.

[0008] FR-2.259.220 discloses a ground sill construction for a door or window comprising posts, a ground sill and plinth blocks for connecting the post to the ground sill. The ground sill is made of metal, the plinth blocks can be made of flexible material, of semi-flexible material such as a kind of plastic material or of ridged material covered in flexible material.

[0009] The invention has the objective to improve on the known ground sill constructions and to improve the prevention of water ingress into the posts of such a construction.

[0010] The invention relates to a ground sill construction of claim 1.

[0011] Preferably the ground sill and possibly the plinth blocks of the ground sill construction are made of a plastic, for instance poly olefin or pvc. Pvc is very suitable. Regarding pvc a construction of full core pvc should be thought of, for instance solid, or provided with a foamed core. In this way the ground sill and possibly the plinth blocks can be made by means of extrusion.

[0012] Poly olefin is preferred however, because of the above-mentioned advantages. In the following text the ground sill relates to the former ground sill as described with respect to the casing, and to the ground sill as described with respect to the ground sill construction.

[0013] Preferably the ground sill is made of a poly olefin having a molecular weight of between $150 \cdot 10^3$ and $4 \cdot 10^6$, preferably $0.5 \cdot 10^6$. Said material appeared to be very suitable and resistant to intensive use.

[0014] Preferably the poly olefin is a poly ethylene, preferably a material from the group formed by LDPE, LLDPE, HMWPE and UHMWPE. Such polyethenes can be recycled very well, so that preferably such recycled material is included in the ground sill. The material is very suitable for use in the "Durable building" program in the Netherlands. The recycled material can in an advantageous manner -at least partly- consist of visible particles, which particles preferably have a different colour. Most of the material of the ground sill may for instance be black, with in it lighter pieces of recycled material, which gives it a natural appearance, when a stone-like appearance is wanted. Alternatively of course a wood pattern could also be realised in a similar manner. The material has a higher ignition temperature than wood: in order to ignite permanent contact with a flame is necessary.

[0015] By ground sill is meant here the actual ground sill of an entrance opening, but also the ground sill of a fixed window, such as a side-light near a door. The ground

sill of the door opening is then in an advantageous manner extended in order to form the ground sill of an opening for fixed glazing situated adjacent to the casing. As a result the manufacturing of such an assembled casing is simple and wood is saved on.

[0016] At the location of the connection to the posts, the ground sill can be provided with plinth blocks, which preferably are made of the same material as the ground sill.

[0017] In construction work joints, in particular joints between casings and the surrounding construction, are usually sealed with a sealant. However this is not durable and not simple to apply. In the ground sill construction and the casing according to the invention a sealing is moreover necessary to stop rising dampness in the usually wooden posts. In the ground sill construction according to the invention it is preferred that the flashings of sealing material are arranged between the plinth blocks and the posts. To that end the invention also relates to a flashing for sealing joints and chinks in constructions, specifically for sealing connection joints between one casing part and the other and the remaining construction, the flashing being made of a flexible plastic having a closed cell structure, and an elongation strength to rupture which is higher than 120%.

[0018] Such a flashing serves for instance to stop vertically rising dampness in a ground sill construction and casing as described above. It appears to be important that the material of the flashing follows the wood grain well, and after pressing in returns slowly into the original position. In this way the wood appears to be sufficiently protected against rising dampness.

[0019] Preferably the water absorption of the flashing is lower than 10%.

[0020] Preferably the flashing has a pressure force at 40% of 8-12 N/cm², the flashing particularly has a tensile strength which is higher than 350 kPa, and more specifically has a pressure deviation 50% 22 hours at 23°C of 6-10%. An even better sealing appears to be achieved as a result.

[0021] A flashing having an elongation strength to rupture higher than 140%, a water absorption lower or equal to 8%, a pressure force at 40% of 9-11 N/cm² and a pressure deviation 50% 22 hours at 23°C of 7-9% is even better. Optimized results are obtained with a flashing made of EPDM, of approximately 2-10 mm. In order to easily arrange the flashing it may be provided with an acrylate gluing.

[0022] The various characteristics are indicated according to the following standards:

Pressure force at 40%: DIN 53577

Pressure deviation 50 % 22 hour/23 degrees Celsius: ASTM D1056

Elongation strength to rupture and tensile strength: ISO 371977H.

[0023] By using the specific flashing it is possible to

build the ground sill construction and the casing in a very durable manner. For instance this appeared during tests, such as fast wearing tests BRL0801 facade elements, as for instance carried out by SHR, Stichting Hout Research (Wood Research Foundation).

[0024] Here the construction including wooden posts is exposed to a test of 6 weeks. During this time cycles of two days of raining and subsequently two days of drying, after which exposure to -10 degrees Celsius, are repeated over and over again. The ground sill construction was not damaged then.

[0025] The harmful influence of moisture on the wooden posts is further counteracted, when the ground sill, the plinth blocks and the posts are connected to each other by means of screws, which screws are surrounded in the posts by plastic covers or plugs.

[0026] Rising dampness is further counteracted when for attachment of the screws in the posts use is made of so-called screw plugs or plugs that can be inserted otherwise. Also in the used situation said plugs shield screw itself from the wood, so that along the screw rising dampness cannot or hardly reach the wood. Preferably the plugs continue until through the ground sill, and more preferably a plastic or rubber ring is arranged between the screws and the plugs. As a result no water passes in the construction along the plugs or screws.

[0027] The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings, in which:

Figure 1 shows a connection of a ground sill according to the invention to a post, in disassembled situation:

Figure 2 shows the connection of figure 1 in assembled situation, with an extended ground sill according to the invention;

Figure 3 shows a schematic view of the way in which the parts of figure 1 are attached to each other; and

[0028] The ground sill 1 shown in figure 1 is made of poly olefin, in particular a polyethylene, in particular of the material "Hollodeen", available from Kreunen Kunststoffen B.V. of Lochem, the Netherlands. Said material is easy to work, in view of a machining treatment and in view of making attachment holes. The material having a molecular weight of 150.10³ and 4.10⁶, preferably 0.5.10⁶, furthermore is very hardwearing and weather resistant. "Hollodeen" has a wearing value tested according to the "Sandslurry" testing method of 63% of the one of Steel ST 37.

[0029] The material of the ground sill may be entirely or partially recycled. For the sight particles of recycled, regenerated material may be included in the material. The material is easy to recycle, because no toxic substances are released when burned, at least not to a more disadvantageous degree in relation to what is released

when burning wood. When burned mainly CO and H₂O arise.

[0030] The material of the ground sill is furthermore easy to make UV proof.

[0031] As already mentioned pvc could also possibly be used.

[0032] At the top side the ground sill 1 can in the usual manner be provided with a plane 5 which inclines downward to the outside and a threshold 6. The threshold 6 is provided with a recesses step 7, in which a draught profile 8 of plastic is attached. For the connection to the lower side of the posts 2 a plinth block 3 is used, made of the same material as the ground sill 1, and a sealing flashing 4 made of flexible material, which can be cut to size with a stanley knife and -if necessary- can be finished after it has been placed. As shown in figure 3, the posts 2 is provided with two bore holes 13a, 13b made from the lower plane, the sealing flashing 4 placed against it is provided with holes 10a, 10b corresponding to it, the plinth block 3 which is in turn placed against that is provided with two bore holes 9a, 9b corresponding to that and finally ground sill 1 is provided with bore holes 18a, 18b which downwardly end into widened bore holes 19a, 19b. In the bore holes 13a, 13b plastic tubes 14a, 14b are inserted that are almost closed at their top ends, which may have the shape of so called gas concrete anchors, which are made of a hard plastic and at their outer side are provided with a screw thread of a crude pitch. Preferably, however, the plugs can be driven into the construction. The plastic tubes 14a, 14b can be screwed into the bore holes 13a, 13b with the help of a screw driver, the aforementioned screw thread cutting into the wood. Plugs that have to be pressed or hammered into the wood may also be used. Fixing the plugs here therefore does not take place through axial contraction, as with normal plugs, in which the plugs are, as it were, pressed open. The plugs continue down to the ground sill, as can be seen in the figure.

[0033] Subsequently the screw bolts 15a, 15b are inserted from the lower side of the sill 1 into the holes 19a, 19b, 18a, 18b, through the bore holes 9a, 9b in the plinth block 3, through the holes 10a, 10b into the sealing flashing 4 and with the tip in the tubes 14a, 14b. After that the screw bolts 15a, 15b are screwed into the tubes 14a, 14b with a suitable tool, which is facilitated by the relatively large holes 19a, 19b. In a manner which is known per se, the screw bolts 15a, 15b are then fixed to the tubes or plugs 14a, 14b which are fixed in the wood of the posts 2 also in manner known per se. The screw bolts 15a, 15b are shielded from the wood by the plugs.

[0034] It can be seen that the bore holes 9a, 9b substantially have the same diameter as the screw bolts 15a, 15b but that the bore holes 18a, 18b are somewhat wider than the shank of the screw bolts 15a, 15b. The difference may be 2 mm, and makes it possible that the sill can slide a little in transverse direction with respect to the plinth block and thus with respect to the post 2. Influence of settings and temperature may be set off in this manner.

It is advantageous here when resilient rings 17a, 17b are placed between the heads 16a, 16b of the bolts 15a, 15b, preferably plastic or possibly rubber rings. In this way the action of the screw bolts is set off and the construction can be made waterproof.

[0035] However the plinth block 3 is clamped to the post in a sliding fixed manner.

[0036] The sealing flashing 4 and the plastic tubes 14a, 14b prevent rising dampness from penetrating the inside of the wooden post 2. The use of sealing flashing 4 renders the application of a sealing joint with the help of putty superfluous, so that fitting the casing according to the invention is simplified at that point.

[0037] As shown in figure 2, the ground sill 1 need not be limited to the one of a door opening, but may further extend to adjacent the actual door casing, to form a ground sill of a casing for fixed glazing, which is a unity with the door casing. In figure 2 this is shown with the help of the double glazing pane 11, which at the lower side is kept in its place by means of a glazing bead 12 which may be made of the same material as the ground sill 1.

[0038] The entire casing assembly, with ground sill and plinth blocks, may be assembled at a joinery's works in a simple manner, so that the entire casing can be placed in the construction in one go. The ground sills 1 here are made into the wanted dimensions and shape beforehand, which may take place by means of a machining treatment and after that delivered to the joinery's works.

[0039] The recessed location of the ground sill 1 with respect to the state of the art is also shown in figure 2. The inclined plane 5 ends at the front side at ground surface 20 level, and at the rear side the floor 21 is shown. The difference in level between the inclined plane 5 and the top surface of the ground sill 6 on the one hand and the difference in level between the floor 21 and the top surface 6 of the ground sill is 20 mm or less, so that the ground sill 1 with respect to what is usual extends further into the ground. However this is no objection because the material is moisture proof.

Claims

1. Ground sill construction for a door or a window, which construction may or may not be provided with a movable part, comprising posts (2), a ground sill (1) and plinth blocks (3) for connecting the posts to the ground sill, **characterized in that** the ground sill and plinth blocks are made of plastic, and at their upper side the plinth blocks are provided with a flexible sealing flashing (4) for waterproof sealing of the lower side of the posts.
2. Ground sill construction according to claim 1, in which the plinth blocks (3) are made of polyolefine, preferably with a molecular weight between 150,000 and 4,000,000, preferably 0.5.10⁶. wherein the ma-

terial preferably is a polyethene, preferably from the group consisting of LDPE, LLDPE, HMWPE and UHMWPE, wherein the plinth blocks are preferably made of recycled material, wherein preferably at least a part of the recycled material consists of visible particles, which particles preferably have a different colour.

3. Ground sill construction according to claim 1, wherein the posts (2) are made of wood.
4. Ground sill construction according to claim 2, wherein the plinth blocks (3) are formed in a machining treatment.
5. Ground sill construction according to any of the preceding claims, in which the sealing flashing (4) is made of a flexible synthetic material with a closed cell structure, and an elongation strength to rupture of more than 120%, wherein the water absorption is preferably less than 10%, preferably the sealing flashing has a compressive force of 8-12 N/cm² at 40%, preferably a tensile strength of more than 350 kPa, preferably a pressure variation 50% 22 hours at 23 degrees C of 6-10%, preferably an elongation strength to rupture of more than 140%, preferably a water absorption of less than or equal to 8%, preferably a pressure force at 40% of 9-11 N/cm² and a pressure deviation 50% 22 hours at 23 degrees C of 7-9%, preferably the sealing flashing is made of EPDM-rubber.
6. Ground sill construction according to one of the preceding claims, in which the plinth blocks (3) are provided with means for slide-proof connection with the ground sill (1) and with the posts (2) of a casing, wherein in particular the ground sill (1) is provided with a continuous hole through the ground sill (1) and the plinth blocks (3).
7. Ground sill construction according to any of the preceding claims, in which the ground sill (1), the plinth blocks (3) and the posts (2) are interconnected by means of screws (15a, 15b), which screws in the posts are surrounded by synthetic cap cases (14a, 14b), such as screw plugs or cellular concrete plugs, wherein preferably screws are used which are screwed into screw plugs or cellular concrete plugs, optionally with an external thread, which are themselves screwed into the wood of the posts, wherein in particular the screw plugs or cellular concrete plugs extend through the ground sill, and between the plugs and the screws flexible plastic or rubber rings (17a, 17b) are arranged.
8. Ground sill construction according to any one of the preceding claims, in which the ground sill (1) is made of another material than the posts of the casing,

wherein the ground sill (1) is made of polyolefine.

Patentansprüche

1. Grundswellenkonstruktion für eine Tür oder ein Fenster, in welcher die Konstruktion mit einem beweglichen Teil bereitgestellt sein kann oder nicht sein kann, umfassend Pfosten (2), eine Grundschwelle (1) und Plinthenblöcke (3) zum Verbinden der Pfosten mit der Grundschwelle, **dadurch gekennzeichnet, dass** die Grundschwelle und die Plinthenblöcke aus Plastik hergestellt sind und dass die Plinthenblöcke an ihrer oberen Seite mit einer flexiblen Dichtungsverwahrung (4) für das wasserdichte Abdichten der unteren Seite der Pfosten bereitgestellt sind.
2. Grundswellenkonstruktion gemäß Anspruch 1, in welcher die Plinthenblöcke (3) aus Polyolefinen hergestellt sind, vorzugsweise mit einem Molekulargewicht zwischen 150.000 und 4.000.000, vorzugsweise 0,5x10⁶, wobei das Material vorzugsweise ein Polyethylen ist, vorzugsweise aus der Gruppe bestehend aus LDPE, LLDPE, HMWPE und UHMWPE, wobei die Plinthenblöcke vorzugsweise aus einem recycelten Material hergestellt sind, wobei vorzugsweise wenigstens ein Teil des recycelten Materials aus sichtbaren Partikeln besteht, wobei die Partikel vorzugsweise eine unterschiedliche Farbe haben.
3. Grundswellenkonstruktion gemäß Anspruch 1, wobei die Pfosten (2) aus Holz hergestellt sind.
4. Grundswellenkonstruktion gemäß Anspruch 2, wobei die Plinthenblöcke (3) durch eine maschinelle Verarbeitung geformt werden.
5. Grundswellenkonstruktion gemäß einem beliebigen der vorstehenden Ansprüche, in welcher die Dichtungsverwahrung (4) aus einem flexiblen synthetischen Material mit einer geschlossenen zellartigen Struktur und einer Dehnungsstärke bis zum Abriss von mehr als 120% hergestellt ist, wobei die Wasserabsorption vorzugsweise weniger als 10% beträgt, vorzugsweise die Dichtungsverwahrung eine Druckkraft von 8-12 N/cm² bei 40% hat, vorzugsweise eine Zugkraft von mehr als 350 kPa, vorzugsweise eine Druckvariation 50% 22 Stunden bei 23 Grad C von 6-10%, vorzugsweise eine Dehnungsstärke bis zum Abriss von mehr als 140%, vorzugsweise eine Wasserabsorption von weniger als oder gleich 8%, vorzugsweise eine Druckkraft bei 40% von 9-11 N/cm² und eine Druckvariation von 50% 22 Stunden bei 23 Grad C von 7-9% hat, vorzugsweise ist die Dichtungsverwahrung aus EPDM-Gummi hergestellt.

6. Grundswellenkonstruktion gemäß einem beliebigen der vorhergehenden Ansprüche, in welcher die Plinthenblöcke (3) mit einem Mittel für die rutschfeste Verbindung der Grundschwelle (1) und der Pfosten (2) eines Tahmens bereitgestellt sind, wobei insbesondere die Grundschwelle (1) mit einem durchgängigen Loch durch die Grundschwelle (1) und die Plinthenblöcke (3) bereitgestellt ist.
7. Grundswellenkonstruktion gemäß eines beliebigen der vorhergehenden Ansprüche, in welcher die Grundschwelle (1), die Plinthenblöcke (3) und die Pfosten (2) mittels Schrauben (15a, 15b) miteinander verbunden sind, wobei die Schrauben in den Pfosten mit synthetischen Kappengehäusen (14a, 14b) wie Schraubstopfen oder Zellenbetonstopfen ummantelt sind, wobei vorzugsweise Schrauben verwendet werden, die in Schraubstopfen oder Zellenbetonstopfen geschraubt werden, gegebenenfalls mit einem Außengewinde, welche selbst in das Holz der Pfosten geschraubt werden, wobei sich insbesondere die Schraubstopfen oder die Zellenbetonstopfen durch die Grundschwelle erstrecken, und zwischen den Stopfen und den Schrauben flexible Plastik- oder Gummiringe (17a, 17b) angeordnet sind.
8. Grundswellenkonstruktion gemäß einem beliebigen der vorhergehenden Ansprüche, in welcher die Grundschwelle (1) aus einem anderen Material hergestellt ist als die Pfosten des Gehäuses, wobei die Grundschwelle (1) aus Polyolefin hergestellt ist.

Revendications

1. Structure de seuil de fond pour une porte ou une fenêtre, laquelle structure peut ou peut ne pas être munie d'une partie mobile, comprenant des montants (2), un seuil de fond (1) et des socles (3) pour relier les montants au seuil de fond, **caractérisé en ce que** le seuil de fond et les socles sont réalisés en plastique et que les socles sur leur côté supérieur sont pourvus d'un noquet d'étanchéité flexible (4) pour étancher imperméable à l'eau du côté inférieur des montants.
2. Structure de seuil de fond selon la revendication 1, dans laquelle les socles (3) sont constitués de polyoléfine, de préférence avec un poids moléculaire entre 150 000 et 4 000 000, de préférence $0,5 \cdot 10^6$, dans laquelle le matériau est de préférence un polyéthylène, de préférence appartenant au groupe composé de LDPE, LLDPE, HMWPE et UHMWPE, dans laquelle les socles sont de préférence constitués d'un matériau recyclé, dans laquelle de préférence au moins une partie du matériau recyclé consiste en particules visibles, lesquelles particules ont

de préférence une couleur différente.

3. Structure de seuil de fond selon la revendication 1, dans laquelle les montants (2) sont réalisés en bois.
4. Structure de seuil de fond selon la revendication 2, dans laquelle les socles (3) sont formés par un processus d'usinage.
5. Structure de seuil de fond selon l'une quelconque des revendications précédentes, dans laquelle le noquet d'étanchéité flexible (4) est constituée d'un matériau synthétique flexible avec une structure à cellules fermées et une limite de rupture à l'allongement de plus de 120 %, dans laquelle l'absorption d'eau est de préférence inférieure à 10 %, le noquet d'étanchéité a de préférence une force de compression de 8-12 N/cm² à 40 %, de préférence une résistance à la traction supérieure à 350 kPa, de préférence une variation de pression à 50 % en 22 heures à 23 degrés C de 6-10 %, de préférence une limite de rupture à l'allongement supérieure à 140 %, de préférence une absorption d'eau inférieure ou égale à 8 %, de préférence une force de compression de 9-11 N/cm² à 40 % et une variation de pression à 50 % en 22 heures à 23 degrés C de 7-9 %, de préférence le noquet d'étanchéité est constituée de caoutchouc EPDM.
6. Structure de seuil de fond selon l'une des revendications précédentes, dans laquelle les socles (3) sont pourvus de moyens pour relier le seuil de fond (1) et les montants (2) d'un châssis d'une manière non-glissant, dans laquelle en particulier le seuil de fond (1) est pourvu d'un trou continu à travers le seuil de fond (1) et les socles (3).
7. Structure de seuil de fond selon l'une quelconque des revendications précédentes, dans laquelle le seuil de fond (1), les socles (3) et les montants (2) sont interconnectés au moyen de vis (15a, 15b), les vis dans les montants étant entourées par des enveloppes de couverture synthétiques (14a, 14b), telles que des bouchons filetés ou des bouchons de béton cellulaire, dans laquelle sont utilisées de préférence des vis qui sont vissées dans des bouchons filetés ou des bouchons en béton cellulaire, optionnellement avec un filetage externe, qui sont eux-mêmes vissés dans le bois des montants, dans laquelle en particulier les bouchons filetés ou les bouchons en béton cellulaire s'étendent à travers le seuil de fond, et entre les bouchons et les vis sont disposés des anneaux en caoutchouc ou plastique flexibles (17a, 17b).
8. Structure de seuil de fond selon l'une quelconque des revendications précédentes, dans laquelle le seuil de fond (1) est constitué d'un matériau différent

de celui des montants du châssis, dans laquelle le seuil de fond (1) est constitué de polyoléfine.

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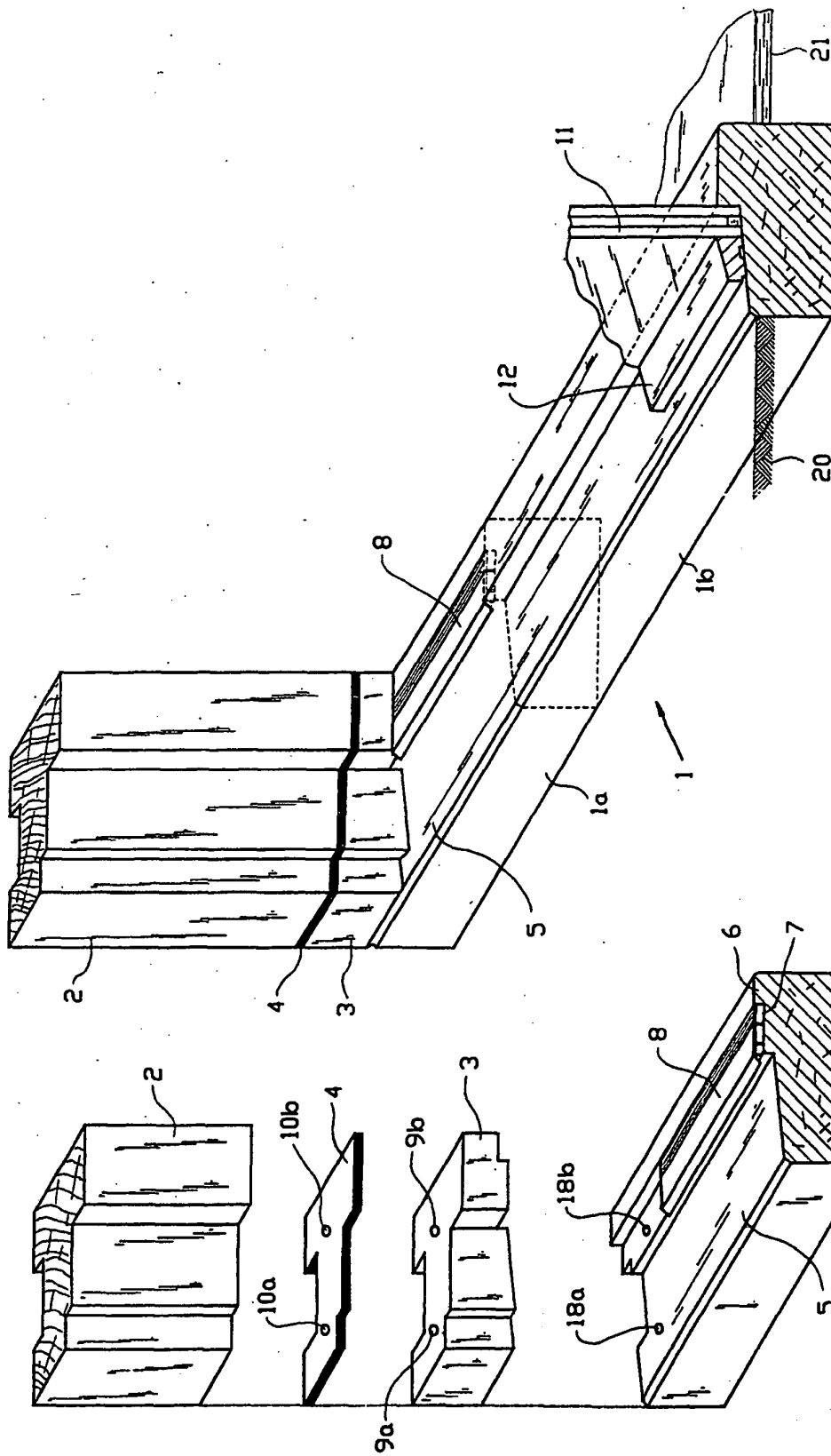


FIG. 1

FIG. 2

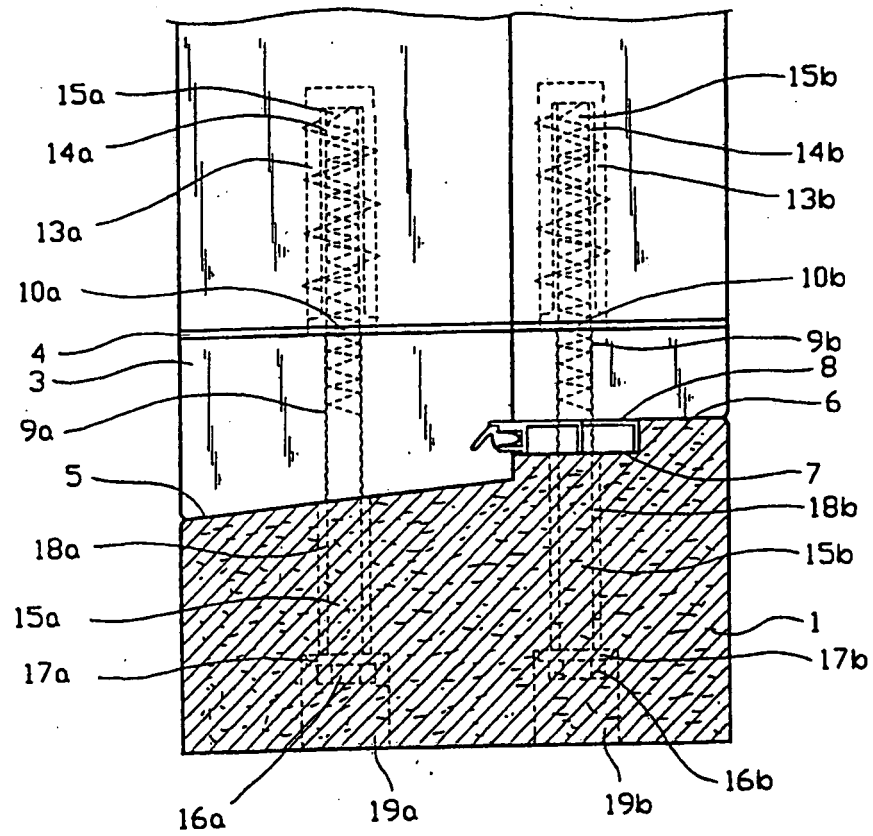


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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