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(54) **METHOD FOR PRODUCTION OF NOISE SHIELD AND NOISE SHIELD**

VERFAHREN ZUM HERSTELLEN EINER LÄRMSCHUTZWAND UND LÄRMSCHUTZWAND

PROCEDE POUR LA FABRICATION D'UN ECRAN ANTIBRUIT ET ECRAN ANTIBRUIT AINSI
OBTENU

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EP 0 654 103 B1

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Description

The present invention relates to a method for construction of a noise screen of the type as described in the preamble of claim 1.

In urban areas it is particularly in connection with road and industrial systems often necessary to establish noise screens - and often one has forgotten during projecting to take into account space for such noise screens. Also from a financial point of view one tries to avoid noise screens, which traditionally are very expensive.

For environmental reasons it is often decided to build the noise screens afterwards along roads or along a neighbour boundary to a noisy company, which often implies huge traffic problems and/or problems of placement, because known noise screens need much space - both for the construction work - but also still because of the construction.

EP-A-393 735 discloses a wall on which vegetation can grow comprising a frame, at least one panel carried by said frame and containing a vegetation substrate, means for adding liquid at the top of said panel, means for collecting liquid at the bottom of said panel, wherein said panel is built up of at least two layers of mineral wool which are mutually separated by a capillary separating material, and to a panel therefor. A panel could be assembled from a number of layers of mineral wool which are in turn mutually separated by a layer of capillary separating material. This panel is formed into a very manageable product because it is arranged in a very coarse-mesh net stretched around it, which, if desired, need not to be removed during arranging of the panel in the wall.

The invention has for its purpose to provide a method for construction of a noise screen of the type described in the introductory part, and by means of which a very considerable relief and reduction of price of the construction work by simple provisions may be obtained, as the method according to the invention only needs very little space - during the construction work.

The method according to the invention is distinctive in that the steel netting is bound together to form a net wall along one side of the supports, that said core consisting of blocks of, for instance **GRODAN™**, is stacked up along the net wall, that the steel netting along the opposite side of the core is bound together to form a net wall, that vertical panels made from steel or wood are positioned in front of said support at the opposite side of the noise screen, and said panels together with the steel nettings and the core material are connected tightly to the supports by means of through-going bolts or threaded rods, fishplates and nuts. Hereby a noise screen is obtained, which as a consequence of its simple construction without big problems easily may be established along both new and existing roads or along neighbour boundaries to noisy companies, and which exactly in urban areas is specially advantageous, be-

cause the mounting work demands very little place and implies a minimum of traffic problems.

Expediently the method according to the invention may be performed such that the net walls at the respective sides of the noise screen are bound together around the core material by means of bindings of steel wire, which in particular may be advantageously at larger mutual distance between the vertical supports.

The method according to the invention may, in situations where a planted noise screen is wanted, in a simple manner be performed such that use is made of blocks of steady mineral wool (such as **GRODAN™**) with a height corresponding to the maximum capillary suction height of the material, that a capillary breaking layer or material is placed between the respective layers of blocks, that said blocks are surrounded by a web or a mat which possibly contains plant seed, for instance grass seed or inserted little plants, and that a watering system is established preferably along the top of the noise screen.

Furthermore the invention relates to a noise screen with a core made of sound absorbing material being surrounded by a steel netting, and said noise screen being anchored in the ground by means of vertical supports, which noise screen is distinctive in that said supports are positioned outside the core material and the steel nettings, respectively, at one side of the noise screen, and that the steel nettings are bound together around the core and connected tightly to said supports in such a manner, that the core and the steel nettings form a self-supporting, compositional construction which is able to take up and to transfer horizontal forces, for instance wind loads, to the supports.

The noise screen according to the invention may as mentioned be adapted to be planted and furthermore be distinctive in that said core consists of blocks of steady mineral wool (such as **GRODAN™**) with a height corresponding to the maximum capillary suction height of the material, and with a capillary breaking layer consisting of intermediate layer plates made from plastic foam provided with openings or cuttings being filled with drain material, for instance granulated **Leca™**.

Preferably the noise screen according to the invention consists of - mentioned in the order of mounting - said vertical supports preferably in the form of strong squared tubes of electroplated steel, bound together strong steel netting, a web or a mat with plant seed, for instance grass seed, or with little plants inserted, stacked up blocks of mineral wool with a capillary breaking layer or material between the respective layers of blocks of mineral wool, a web or a mat with plant seed, for instance grass seed, or with little plants inserted, bound together strong steel netting, which is bound together with first-mentioned steel netting by means of through-going bindings of steel wire, vertical holding panels of impregnated wood or electroplated steel, which at the opposite of the noise screen are tightly connected to the vertical support by means of through-going

bolts or threaded rods, fishplates and nuts as said web or mat preferably is stretching along first-mentioned side, along the top side and along last-mentioned side of the noise screen.

The invention is described in the following with reference to the drawing, in which:

- Fig. 1 shows a sectional view through an embodiment for a noise screen according to the invention
- Fig. 2 shows a sectional view for illustration how the noise screen according to Fig. 1 is constructed
- Fig. 3 a perspective view showing an embodiment for a capillary breaking layer between the blocks of mineral wool at the noise screens according to the invention
- Fig. 4 is a partial sectional view of another embodiment for a noise screen according to the invention, and
- Fig. 5 shows a side view of a noise screen according to the invention - as seen from the left hand side in Fig. 1.

The noise screen 2 shown in Figs. 1 and 5 is anchored in the ground by means of vertical supports 4 consisting of strong squared tubes of electroplated steel, and which are poured solidly in dugged or bored holes in the ground; and the noise screen 2 consists in order - as seen from left towards right from the supports 4 of the following parts:

Bound together strong steel netting 6 of round steel, a web or a mat 8 with plant seed, for instance grass seed, or with little plants inserted, stacked up blocks of mineral wool 10 (such as **GRODAN™**) with a capillary breaking layer 12 or material 14, 16 (Fig. 4), web or mat 8, as the web or the mat 8 at first-mentioned side continues along the top side of the noise screen and down along the opposite side, bound together strong steel netting 6, which is bound together with first-mentioned steel netting by through-going bindings of steel wire (not shown), vertical holding panels 18 of impregnated wood (or possible holding panels of electroplated steel), which at the opposite side of the noise screen 2 are placed in front of the supports 4 and tightly connected with these by means of through-going bolts or threaded rods 20, fishplates 22 and nuts 24.

In Fig. 2 is shown, how an end part of the web or the mat 8 - during stacking up of the blocks of mineral wool 10 - is fixed within the steel netting 6, that is between this and the blocks of mineral wool 10, while the remaining part of the web or the mat 8 is folded over and is hanging downwards at the outer side of the steel netting 6.

Fig. 3 shows, that the capillary breaking layer 12 between the individual layers of blocks of mineral wool 10 consists of a plastic sheet material 26 being provided with longitudinal rows of through-going openings or perforations 28. The blocks of mineral wool 10 have a height of about 250 mm, namely corresponding to the maximum capillary suction height of the mineral wool, that is that the blocks of mineral wool 10 are capable to contain so much water, that the blocks are "saturated" with water, as the capillary breaking layer 12 ensures a suctionwise partition between the respective layers of blocks. Hereby the surplus water from the individual layer is drained to the underlying layer of block via the perforations 28, so that the final result will be, that all layers of blocks are saturated with water - provided of course that via a watering system being established along the top side of the noise screen 2 (30, Fig. 1) sufficient water is supplied, whereto manure preferably is supplied.

Fig. 4 shows, that the said capillary breaking material between the individual layers of blocks of mineral wool 10 may consist of longitudinal distance panels 14, which are placed with mutual distance along the outer sides of the blocks 10, and a water distribution material 16 being placed between the distance panels 14, and which material 16 may consist of granulated **Leca™** or possibly of net-like plastic web, that is with a structure as a "wire pad", as the water distribution material 16 shall ensure, that water "falling" downunder from a layer of block safely is led directly to the underlying layer of block via the **Leca™** or the plastic web, that is to an upper longitudinal centre zone of the underlying layer of block.

Or the capillary breaking layer may consist of intermediate layer plates made from plastic foam, which for instance has a thickness of 20 mm, and being provided with a large number of minor openings or a minor number of cuttings, which for instance may be filled with a drain material, for instance granulated **Leca™**, as openings or cuttings constitute max. 30% of the area of the intermediate layer plates. Alternately the blocks of mineral wool 10 - as shown in Fig. 4 - may be provided with an upper, longitudinal drain recess 32.

Claims

1. A method for construction of a noise screen or baffle (2) with a core consisting of sound absorbing material and being surrounded by a steel netting (6), said noise screen being anchored in the ground by means of mainly vertical supports (4), said vertical supports (4) being anchored in the ground in a row and with mutual distance and said core being made by stacking layers of blocks (10) consisting of steady mineral wool, namely **GRODAN™**, characterized in that the steel netting (6) is bound together to form a net wall along one side of the supports (4), that said core consisting of blocks of, for instance

GRODAN™, is stacked up along the net wall, that the steel netting (6) along the opposite side of the core is bound together to form a net wall, that vertical panels (18) made from steel or wood are positioned in front of said support (4) at the opposite side of the noise screen (2), and said panels (18) together with the steel nettings (6) and the core material (10) are connected tightly to the supports (4) by means of through-going bolts or threaded rods (20), fishplates (22) and nuts (24).

2. A method according to claim 1, **characterized** in that the net walls at the respective sides of the noise screen (2) are bound together around the core material by means of bindings of steel wire.

3. A method according to claim 1 for construction of a planted noise screen (2), **characterized** in that use is made of blocks (10) of steady mineral wool, such as **GRODAN™**, with a height corresponding to the maximum capillary suction height of the material, that a capillary breaking layer or material (12, 14, 16) is placed between the respective layers of blocks (10), that said blocks (10) are surrounded by a web or a mat (8) which possibly contains plant seed, for instance grass seed or inserted little plants, and that a watering system (30) is established preferably along the top of the noise screen (2).

4. A noise screen or baffle (2) with a core consisting of sound absorbing material and being surrounded by a steel netting (6), said noise screen (2) being anchored in the ground by means of vertical supports (4), said core consisting of layers of blocks (10) of steady mineral wool, namely **GRODAN™**, **characterized** in that said supports (4) are positioned outside the core material and the steel nettings (6), respectively, at one side of the noise screen (2), and that the steel nettings (6) are bound together around the core and connected tightly to said supports (4) in such a manner, that the core and the steel nettings (4) form a self-supporting, compositional construction which is able to take up and to transfer horizontal forces, for instance wind loads, to the supports (4).

5. A noise screen (2) according to claim 4 and adapted to be planted, **characterized** in that said core consists of blocks (10) of steady mineral wool, such as **GRODAN™**, with a height corresponding to the maximum capillary suction height of the material, and with a capillary breaking layer (12) consisting of intermediate layer plates (14) made from plastic foam provided with openings or cuttings (16) being filled with drain material, for instance granulated **Leca™**.

6. A noise screen (2) according to claims 4 - 5, **characterized** in that - mentioned in the order of mounting - it comprises said vertical supports (4) preferably in the form of strong squared tubes of electroplated steel, bound together strong steel netting (6), a web or a mat (8) with plant seed, for instance grass seed, or with little plants inserted, stacked up blocks (10) of mineral wool with a capillary breaking layer or material (12, 14, 16) between the respective layers of blocks (10) of mineral wool, a web or a mat (8) with plant seed, for instance grass seed, or with little plants inserted, bound together strong steel netting (6), which is bound together with first-mentioned steel netting (6) by means of through-going bindings of steel wire, vertical holding panels (18) of impregnated wood or electroplated steel, which at the opposite of the noise screen (2) are tightly connected to the vertical support (4) by means of through-going bolts or threaded rods (20), fishplates (22) and nuts (24) as said web or mat (8) preferably is stretching along first-mentioned side, along the top side and along last-mentioned side of the noise screen (2).

Patentansprüche

1. Verfahren zur Herstellung einer Lärmschutzwand oder Trennwand (2) mit einem aus lärmabsorbierendem Material bestehenden Kern und einem diesen umgebenden Stahlgewebe (6), wobei die Lärmschutzwand im Boden mittels im wesentlichen vertikaler Träger (4) verankert ist, die vertikalen Träger (4) der Reihe nach und mit einem gegenseitigen Abstand zueinander im Boden verankert sind und der Kern durch Aufeinanderstapeln von schichtartigen Blöcken (19) bestehend aus gleichbleibender bzw. fester Mineralwolle, nämlich **GRODAN™** hergestellt ist, dadurch gekennzeichnet, daß das Stahlgewebe (6) zusammengebunden ist um eine netzartige Wand entlang einer Seite der Träger (4) auszubilden, daß der aus Blöcken aus beispielsweise **GRODAN™** bestehende Kern entlang der netzartigen Wand aufgestapelt ist, daß das Stahlgewebe (6) entlang der gegenüberliegenden Seite des Kerns zusammengebunden ist um eine netzartige Wand auszubilden, daß vertikale Panele (18) aus Stahl oder Holz vor dem Träger (4) an der der Lärmschutzwand (2) gegenüberliegenden Seite angeordnet sind und daß die Panele (18) zusammen mit den Stahlgeweben (6) und dem Kernmaterial (10) mittels durchgehender Bolzen oder Gewindestiften (20), Fischplatten (22) und Muttern (24) fest verbunden sind.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die netzartigen Wände an den entsprechenden Seiten der Lärmschutzwand (2) um das

Kernmaterial mittels Stahldrahtgebilde zusammengebunden sind.

3. Verfahren nach Anspruch 1 zur Herstellung einer bepflanzten Lärmschutzwand (2), dadurch gekennzeichnet, daß Blöcke (10) gleichbleibender bzw. fester Mineralwolle, wie beispielsweise GRODAN™ verwendet werden, mit einer Höhe entsprechend der maximalen kapillaren Ansaughöhe des Materials, daß eine kapillare Bremsschicht oder ein Material (12, 14, 16) zwischen den entsprechenden, schichtartigen Blöcken (10) angeordnet ist, daß die Blöcke (10) von einem Gewebe oder einer Matte (8) umgeben sind, das möglicherweise Pflanzensamen enthält, beispielsweise Grassamen oder eingesetzte kleine Pflanzen, und daß ein Bewässerungssystem (30) vorzugsweise entlang des oberen Bereichs der Lärmschutzwand (2) ausgebildet ist.
4. Lärmschutzwand oder Trennwand (2) mit einem Kern bestehend aus lärmabsorbierendem Material, der von einem Stahlgewebe (6) umgeben ist, wobei die Lärmschutzwand (2) mittels vertikaler Träger (4) in dem Boden verankert ist und der Kern aus schichtartigen Blöcken (10) aus gleichbleibender bzw. fester Mineralwolle, nämlich GRODAN™ besteht, dadurch gekennzeichnet, daß die Träger (4) außerhalb des Kernmaterials angeordnet sind bzw. die Stahlgewebe (6) an einer Seite der Lärmschutzwand (2) und daß die Stahlgewebe (6) um den Kern zusammengebunden und mit den Trägern (4) derart fest verbunden sind, daß der Kern und die Stahlgewebe (6) einen selbsttragenden Verbundaufbau bilden, der horizontal Kräfte, beispielsweise Windbelastungen, aufnehmen und den Trägern (4) übertragen kann.
5. Lärmschutzwand (2) nach Anspruch 4 und zur Bepflanzung angepaßt, dadurch gekennzeichnet, daß der Kern aus Blöcken (10) aus gleichbleibender bzw. fester Mineralwolle, wie beispielsweise GRODAN™ besteht, mit einer Höhe, welche der maximalen kapillaren Saughöhe des Materials entspricht und mit einer kapillaren Bremsschicht (12), bestehend aus zwischenliegenden Schichtplatten (14) aus Schaumstoff, die mit Öffnungen oder Einschnitten (16) versehen sind und mit Drainage-Material, beispielsweise LECA™-Granulat gefüllt sind.
6. Lärmschutzwand (2) nach Anspruch 4 bis 5, dadurch gekennzeichnet, daß sie aufweist - aufgeführt in der Reihenfolge der Montage - :
die vertikalen Träger (4) vorzugsweise in Form fester, rechteckiger Rohre aus galvanisiertem Stahl, ein festes, zusammengebundenes Stahlgewebe (6), ein Gewebe oder eine Matte (8) mit Pflanzensamen, beispielsweise Grassamen oder mit einge-

setzten kleinen Pflanzen, aufeinandergestapelte Blöcke (10) aus Mineralwolle mit einer kapillaren Bremsschicht oder einem Material (12, 14, 16) zwischen den entsprechenden, schichtartigen Blöcken (10) aus Mineralwolle, ein Gewebe oder eine Matte (8) mit Pflanzensamen, beispielsweise Grassamen oder mit eingesetzten kleinen Pflanzen, ein zusammengebundenes, festes Stahlgewebe (6), das mit dem zuerst erwähnten Stahlgewebe (6) mittels durchgehender Gebinde aus Stahldraht zusammengebunden ist, vertikale Haltepaneele (18) aus imprägniertem Holz oder galvanisiertem Stahl, die an der gegenüberliegenden Seite der Lärmschutzwand (2) angeordnet, mittels durchgehender Bolzen oder Gewindestifte (20), Fischplatten (22) und Muttern (24) mit dem vertikalen Träger (4) fest verbunden sind, wobei sich das Gewebe oder die Matte (8) vorzugsweise entlang der zuerst erwähnten Seite, entlang der oberen Seite und entlang der zuletzt erwähnten Seite der Lärmschutzwand (2), erstreckt.

Revendications

1. Procédé de construction d'un écran anti-bruit ou écran acoustique (2) comportant un noyau comprenant un matériau absorbant le son et étant entouré par un treillis métallique (6), l'écran anti-bruit étant ancré dans le sol au moyen de supports verticaux de façon générale (4), ces supports verticaux (4) étant ancrés dans le sol suivant une rangée et avec une distance mutuelle et le noyau étant fait d'un empilement de couches de blocs (10) constitués de laine minérale stabilisée, à savoir du GRODAN (marque déposée), caractérisé en ce que le treillis métallique (6) est assemblé pour former une paroi formant filet le long d'un côté des supports (4), en ce que le noyau constitué de blocs (2), par exemple en GRODAN (marque déposée), est empilé le long de la paroi formant filet, en ce que le grillage métallique (6) le long du côté opposé du noyau est assemblé pour former une paroi formant filet, en ce que des panneaux verticaux (18) en métal ou en bois sont placés en face du support (4) au côté opposé à l'écran anti-bruit (2), et les panneaux (18) ensemble avec le treillis métallique (6) et le matériau de noyau (10) sont reliés étroitement aux supports (4) au moyen de boulons traversants ou de tiges filetées (20), d'éclisses (22) et d'écrous (24).
2. Procédé selon la revendication 1, caractérisé en ce que les parois formant filets dans les côtés respectifs de l'écran anti-bruit (2) sont reliées ensemble autour du matériau de noyau au moyen d'organes de liaison de fil métallique.
3. Procédé selon la revendication 1 pour la construc-

tion d'un écran anti-bruit (2) planté, caractérisé en ce que l'on utilise les blocs (10) de laine minérale stabilisée, tels que des GRODAN (marque déposée), avec une hauteur correspondant à la hauteur de succion par capillarité maximale du matériau, en ce qu'un matériau ou couche (12) d'arrêt de capillarité est placé entre les couches respectives des blocs (10), en ce que les blocs (10) sont entourés par un réseau ou une matrice (8) qui a la possibilité de contenir une semence de plante, par exemple une semence d'herbe ou des petits plans insérés, et en ce qu'un système d'irrigation (30) est établi de préférence le long du haut de l'écran anti-bruit (2).

4. Ecran anti-bruit ou écran acoustique (2) comportant un noyau comprenant un matériau absorbant le son et étant entouré par un treillis métallique (6), l'écran anti-bruit étant ancré dans le sol au moyen de supports verticaux (4), le noyau comprenant des couches de blocs (10) de laine minérale stabilisée, à savoir du GRODAN (marque déposée), caractérisé en ce que les supports (4) sont placés à l'extérieur du matériau de noyau et du treillis métallique (6), respectivement, sur un côté de l'écran anti-bruit (2), en ce que les treillis métalliques (6) sont reliés entre eux autour du noyau et reliés étroitement aux supports (4) de telle manière que le noyau et les treillis métalliques (4) forment une construction composite auto-portée capable de supporter et de transférer des forces horizontales, par exemple des charges dues au vent, aux supports (4).
5. Ecran anti-bruit (2) selon la revendication 4 et adapté pour être planté, caractérisé en ce que le noyau comprend des blocs (10) de laine minérale stabilisée, tels que du GRODAN (marque déposée), comportant une hauteur correspondant à la hauteur de succion par capillarité maximale du matériau, et comportant une couche (12) d'arrêt de capillarité constituée de plaques (14) en couche intermédiaire en mousse de plastique munies d'ouvertures ou de découpes (16) remplies de matériau drainant, par exemple du Leca (marque déposée) en granules.
6. Ecran anti-bruit (2) selon les revendications 4-5, caractérisé en ce qu'il comprend, énoncés dans l'ordre de montage, les supports verticaux (4) de préférence en forme de tubes carrés forts en acier galvanisé, un treillis métallique (6) fort les reliant, un réseau ou une matrice (8) comportant une semence de plante, par exemple une semence d'herbe, ou bien comportant des petits plans insérés, des blocs empilés (10) en laine minérale comportant un matériau ou couche (12, 14, 16) d'arrêt de capillarité entre les couches respectives de blocs (10) en laine minérale, un réseau ou une matrice (8) comportant une semence de plante, par exemple une semence d'herbe, ou comportant des petits plans insérés, un

treillis métallique (6) fort les reliant, qui est relié avec le treillis métallique (6) mentionné en premier au moyen d'organes de liaison de fil métallique traversants, des panneaux (18) de support vertical en bois imprégné ou acier galvanisé, qui à l'opposé de l'écran anti-bruit (2) sont reliés étroitement au support vertical (4) au moyen de boulons traversants ou de tiges filetées (20), d'éclisses (22) et d'écrous (24) alors que le réseau ou matrice (8) est étendu de préférence le long du côté mentionné en premier, le long du côté du haut et le long du côté mentionné en dernier de l'écran anti-bruit (2).





