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(54) Benævnelse: **FREMGANGSMÅDE TIL FREMSTILLING, TRANSPORT OG MONTERING AF ISOLERENDE LAMELLER AF MINERALULD**

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[0001] The object of the present invention is a method for producing, transporting and installing insulating lamellae of mineral wool, in accordance with the preamble of the independent claim 1.

[0002] Insulating lamellae made of mineral wool are used, among others, in the thermal insulation structures of roofs, where the lamellae are typically installed as a single-layer insulation layer in which the mineral wool fibres of the lamellae are directed essentially perpendicularly to the two main surfaces of the insulation layer. The insulation layer is fixed by one of its main surfaces to the load-bearing roof structure through the vapour barrier installed to it without mechanical fasteners passing through the vapour barrier. The load-bearing roof structure may be, for example, a concrete base or profiled sheet with plywood installed on top of it, to which plywood installed on the concrete base or profiled sheet is fixed the vapour barrier. The vapour barrier comprises, for example, an adherable bitumen membrane, which is fixed to the load-bearing roof construction by adhering with hot bitumen. On the upper main surface of the laminated thermal insulation layer may, in addition, be fixed a thin mineral wool board with mechanical fasteners in such a way that the mechanical fasteners of the board pass through it and extend, by anchoring to a certain depth in the layer consisting of mineral wool lamellae, in such a way that they will not pass through the vapour barrier on the other main surface of the lamellae layer. A lamella insulation roof can also be implemented with fasteners passing through the vapour barrier. A board possibly placed over the lamella insulation layer may also be fixed through the vapour barrier. When the board is fixed through the vapour barrier, separate lamella fixing is not normally used. Lamella insulations can be used also elsewhere than in roof constructions.

[0003] One problem with current lamella production processes is that the lamellae have to be cut to a certain minimum width in order to be able to convey them forward reliably on the processing line after cutting. If the lamellae are too narrow, they may fall in the slots between the conveyors. In addition, handling and moving individual lamellae, for example at the packing stage and installation site, is slower than with sheet-like products.

[0004] US 2003/183055 discloses a compression-cutting method for forming one or more longitudinally extending series of cuts and separable connectors in a fibrous insulation blanket. The series of cuts and connectors define blanket sections which are attached to one another by the connectors.

Pre-cut blankets are transported to the site of use in full width. These pre-cut blanket sections are, however, not used as insulation lamellae turned by 90° with respect to the plane determined by the blanket but only for diminishing the width of the blanket, when necessary, by tearing one or more blanket sections from the full width blanket.

[0005] The aim of the present invention is to provide a solution by means of which reliable handling of also narrower insulation lamellae than before is made possible in the production process. To achieve this aim, the method according to the invention is characterised by the features of the characterising part of the independent claim 1.

[0006] The invention is described in greater detail in the following, with reference to the accompanying drawing, in which:

Figure 1 shows a diagrammatic cross-section of a mineral wool insulation sheet cut according to a method implementing the invention,

Figure 2 shows a diagrammatic top view of a section of the production line following the cutting stage, and

Figure 3 shows a side view of the section of line show in Figure 2.

[0007] Figure 1 shows a cross-section of a mineral wool sheet 1 after the cutting forming the lamella parts 2. In this embodiment, there are nine lamella parts 2 divided into groups of three lamella parts, at the point 5 between which groups, the cutting is performed through the entire thickness of the sheet 1, whereas within the groups, the cuts 3 between adjacent lamellae are left incomplete in such a way that adjacent lamellae 2 are attached to one another by a thin neck 4. The lamella 2' on the right-hand side of the Figure is shown slightly opened at the cut 3 to show the neck 4 more clearly. Such groups of three lamellae, the width of which is indicated by reference marking W1, form a sheet-like entity, the overall width of which exceeds the minimum width required on the line even if the width of a single lamella W2 is considerably less than the minimum requirement. The overall width of the sheet is marked with reference marking W.

[0008] Figure 2 shows nine lamellae L1–L9, which are taken, after longitudinal cutting, to conveyors C1–C5 and C6–C10 extending in the longitudinal direction of the line which are at a transverse distance from one another. Figure 3 illustrates the mutual position of the conveyor groups C1–C5 and C6–C10 of Figure 2 as a side view. The transverse distance between two adjacent conveyors in each conveyor group C1–C5 and C6–C10 is dimensioned for a certain minimum width of the lamellae. If it is desirable to make lamellae narrower than this minimum width, the risk of the lamellae falling between the conveyors will become a problem. Figure 2 illustrates the positioning of such narrow lamellae on the conveyors after cutting. Should the lamellae L1-L9 be cut in the usual manner, detaching completely from one another already at the longitudinal cutting stage, lamella L2, for example, might be able to fall between conveyors C6 and C7, and lamella L3 in turn between conveyors C1 and C2. Similarly, lamella L4 might fall between conveyors C2 and C3, lamella L5 between conveyors C8 and C9, etc. By applying the partial cutting according to the invention in such a way that at least two of the lamellae are at each time attached to one another in such a way that their joint width is greater than the distance between the conveyors, falling between the conveyors and the interruptions in production caused by it are avoided in a relatively simple and reliable manner. The method according to the invention makes possible a flexible changeover to manufacturing lamellae of different sizes by changing on the line only the position of the cutting means in the transverse direction of the mineral wool sheets and their cutting depth in the mineral wool sheet. As cutting means may be used, for example, circular saw blades on a drive shaft extending transversely to the mineral wool sheet, the blades being placeable to different points in the longitudinal direction of the shaft, whereby depth adjustment is easily carried out by reducing the diameter of the blade at desired points. The rest of the line may thus remain essentially unchanged.

[0009] According to the invention, a sheet on the line may also be cut in such a way that all lamellae remain attached to one another and only trimming of the edges is carried out as a cut extending through the thickness of the entire sheet.

[0010] The lamella groups W1 are preferably conveyed all the way to the packing station by keeping the lamella parts attached to one another and are also packed in sheet-like form, in which case the lamella parts are not detached

from one another until the package is unpacked. At the installation site, the lamella parts are turned 90° about their longitudinal axis, whereby their fibres settle in an essentially perpendicular position to their installation base. The lamellae can be detached from one another, for example, by cutting with a knife or simply by tearing them off one another. The tearing may leave uneven marks on the tearing point, but this is not harmful to the insulating capacity of the lamellae nor does it have an unfavourable effect on the final appearance of the insulation site.

PATENTKRAV

1. Fremgangsmåde til fremstilling, produktion, transport og montering af lameller af mineraluld, i hvilken fremgangsmåde der først fremstilles en mineraluldsplade (1) eller -måtte, og pladen eller måtten føres til en produktionslinje, hvor, på et skæretrin, smalle lameldele (2) afskæres på langs, hvor skæringen mellem mindst to tilstødende lameldele udføres delvist, således at de mindst to tilstødende lameldele forbliver forbundet med hinanden ved en smal hals, hvilke fastgjorte lameldele derefter transporteres til et pakketrin ved hjælp af en transportdel, hvor transportdelen omfatter et transportørmiddel, og på skæringstrinnet den delvise skæring mellem mindst to tilstødende lameldele udføres, således at de fastgjorte lameldele danner en lamelenhed, og de emballerede lameller transporteres efterfølgende til anvendelsesstedet, kendetegnet ved, at

måttens eller pladens fibre hovedsageligt er parallelle med pladens hovedflader;

lameldelene i bredde svarer til den ønskede isoleringstykkelse;

lamellerne monteres på anvendelsesstedet drejet 90° i forhold til planen bestemt af pladen eller måtten (1) på en sådan måde, at tilstødende monterede lameller danner et isoleringslag, hvori fibrene i alt væsentligt ligger vinkelret på planet dannet af isoleringslagets hovedoverflader;
transportørmidlet (C1-C10) strækker sig i den langsgående retning af produktionslinjen i en tværgående afstand fra hinanden; bredden af lamelenhederne er større end den tværgående afstand

mellem to tilstødende transportørmidler (C1-C10), og de fastgjorte lameldele frigøres helt fra hinanden før emballering heraf, eller ikke før tæt på anvendelsesstedet, og monteres individuelt på anvendelsesstedet.

2. Fremgangsmåde ifølge krav 1, kendetegnet ved, at skæringen udføres ved hjælp af et rundsavblad på en drivaksel, der strækker sig på tværs af mineraluldspladen, hvor bladene kan placeres på forskellige steder i akslens langsgående retning.

3. Fremgangsmåde ifølge krav 2, kendetegnet ved, at dybdejusteringen for hver skæring udføres ved at ændre diameteren på det tilsvarende blad.

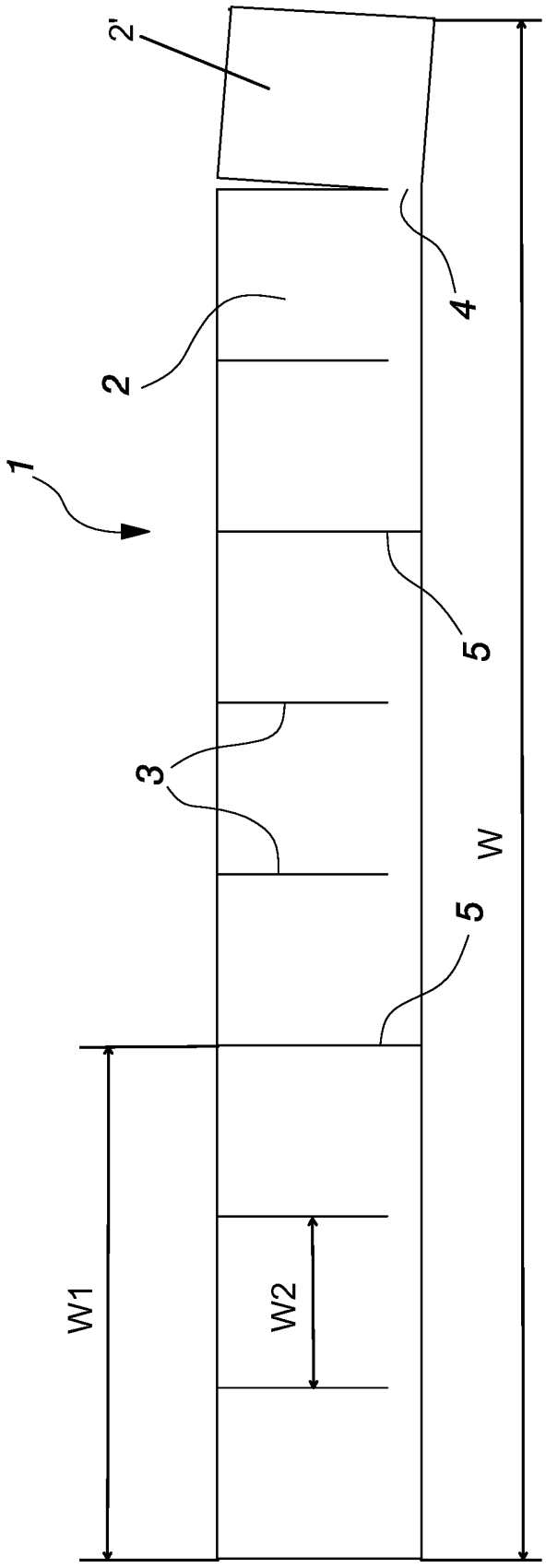

Fig. 1

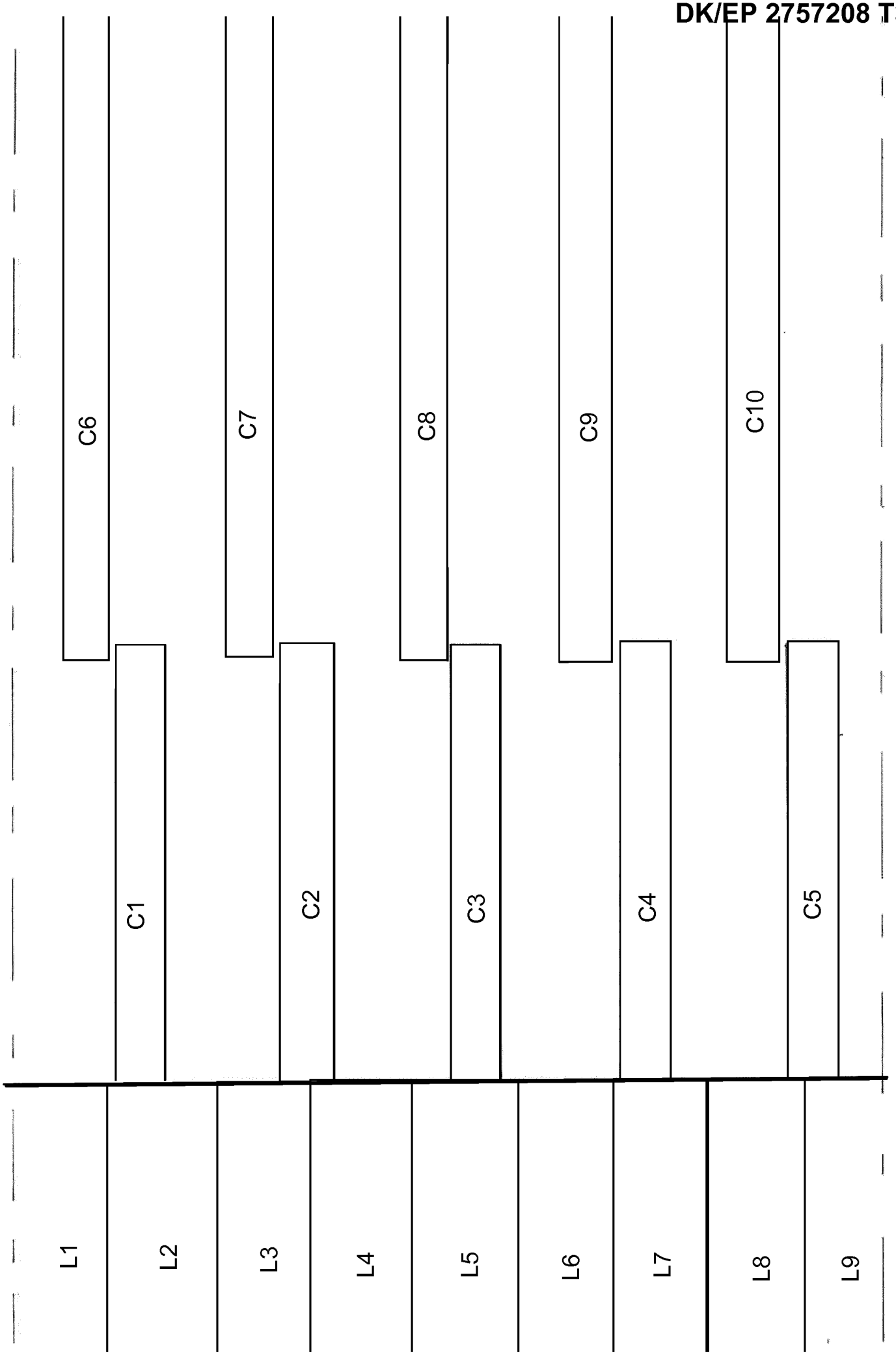

Fig. 2

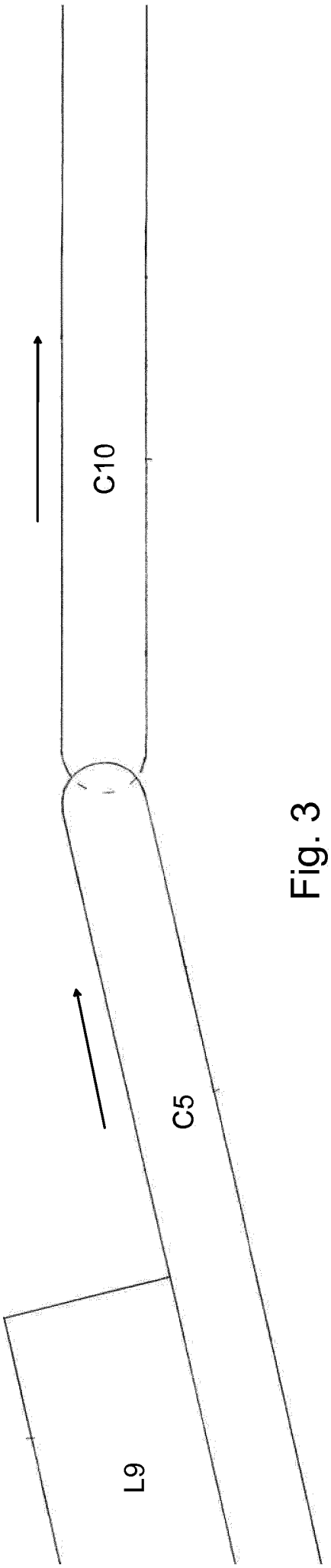

Fig. 3