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CEILING PANEL AND METHOD OF MANUFACTURE.

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Description

The present invention relates to a method of manufacturing a ceiling panel capable of bending into the shape of a curve.

For purposes of noise damping and interior features, glasswool panels installed with the help of support moulding are generally used in ceilings. A flat ceiling is not difficult to make, but construction of a curved ceiling is complicated. Until now, curved ceilings have been made of pressed-to-shape pieces, the manufacture of which calls for expensive moulds and the transport of which is difficult. Furthermore, fitting the pieces together in the assembly stage sets great demands on the dimensional accuracy of the pieces.

An object of the invention is to provide a method of manufacturing a panel capable of bending into the shape of a curve, by means of which method the drawbacks described above can be avoided.

The method according to the invention for manufacturing ceiling panels is characterized in that a mineral wool mat which is coated on both sides thereof with an underlayer fabric and the fibers of which mat have been caused to rise in the manufacturing stage between the top and bottom conveyor belts from a horizontal position extending generally in the plane of the panel mainly to a perpendicular position, is cut along its centerline into two layers and that the layers cut apart from each other are cut into panels of a suitable size.

In the mineral wool panels produced by conventional manufacturing processes, the fiber structure is, for technical reasons, primarily parallel to the surface of the panel, which is why the compression strength of the panel is low in the direction perpendicular to the plane of the panel.

Many methods are known in which a mineral wool mat is divided into lamellas, which are turned 90° and re-combined with each other in order to achieve a vertical fiber structure i.e. perpendicular to the plane of the panel, and consequently, a higher compression strength. Said methods are exemplified by a method of manufacturing an insulation panel of mineral wool in accordance with Swedish patent 390997. According to said method the mineral wool panel is coated with an appropriate insulation material, operating as an intermediate layer, whereafter it is cut into lamellas and turned 90°, whereby said intermediate layer operates as a jointing compound between the adjacent lamellas. By turning the lamellas 90° and by joining the lamellas thus produced to one another, a new mineral wool panel is formed of the fibers originally oriented parallel to the mineral wool panel. In said mineral wool panel the orientation of the fibers is perpendicular to the flat surface of said new mineral wool panel. At least one of the flat surfaces is provided with an appropriate surface layer, which may be paper, paper board, fiber mat, etc. which covers and protects at least one of the open cut surfaces of the lamella plate. The method of manufacturing insulation panels in accordance with the above mentioned Swedish patent SE 390997, in which the core of the panel is formed by parallel fibers perpendicular to the surface, naturally operates, but it includes numerous process stages, such as cutting the lamellas, turning them, adding additional material operating as intermediate layers and glueing the surface materials to the panel.

According to the method of invention the panel is manufactured from a mineral wool sheet, the main portions of the fibers of which are, in the manufacturing stage with the panel regarded lying in a horizontal position, forced to rise from the hitherto normal, horizontal disposition to a substantially vertical disposition in such a manner that the fibers proceed steeply wavelike in the base sheet when viewing the profile of the base sheet. This is brought about by decreasing the speed of the mineral wool mat between the top and the bottom conveyor belts used in the manufacturing prior to conveying the mat into the heat treatment oven for hardening of the bonding agents.

This "shrink" panel is already coated on both sides thereof in the processing stage with an underlayer fabric (25 - 50 g/m² glass tissue) which provides an even base for final coating of the panel. The underlayer fabric is attached to the base sheet by means of the resin contained in the base sheet. The base sheet is made twice as thick as that required for the final product plus working allowance.

This base sheet which is coated on both sides thereof with an underlayer fabric and which naturally is stiff in this stage, is sawn along its centerline into two layers. In that way, one surface of both layers is coated with an underlayer fabric, which provides an even base for the final coating. In the middle of the base sheet, the fibers are mainly in the vertical position.

After sawing, the final product has, due to the presence of vertical fibers, sufficient compression strength and solidity so that the panel can be installed to rest freely on mouldings. On the other hand, since the sawing of the base sheet in two is effected mainly perpendicularly to the fibers, the fibers are not subjected to the tensile and compression forces in the direction of the fibers when the sheet is being bent, but perpendicularly to the fibers. Thus, the sheet, produced by the method in accordance with the invention, bends well because of lack of horizontal bonds in the back thereof. The base sheet layers sawn apart are laminated with a final coating fabric on that side which is coated with an underlayer fabric.

The method in accordance with the invention is further described in more detail below, by way of example, with reference to the accompanying drawings, in which

Fig. 1 is a cross-sectional illustration of a stage of manufacture of a ceiling panel in accordance with the method of the invention,

Fig. 2 is a cross section of a panel produced by the method according to the invention.

A glasswool mat 2 illustrated in Fig. 1 is manufactured by a method known per se from fibers and bonding agents suspended in a gas flow by collecting the fibers onto a conveying belt, below which a suction box is disposed. By decreasing the speed of the glasswool mat formed thereby between the upper and the lower conveyors in two stages, the main length of the fibers are forced to rise from their normal, horizontal position to a vertical position so that the fibers will mainly extend in the vertical position in the middle of the mat. Thereafter, the fiber mat is coated on both sides thereof with an underlayer fabric 3, which is attached to the mat by means of the resin contained in the mat.

After the heat treatment, the coated mat 1 is sawn or otherwise separated along its centerline 4 into two layers 2' and the sides of the layers sawn apart from each other which are coated with the underlayer fabric 3 are laminated with a coating fabric 6, whereafter they will be cut into ceiling panels 5 (Fig. 2) of a suitable size.

The underlayer fabric 3 is preferably formed of nonwoven fabric made from glasswool, the basis weight of such fabric being 25-50 g/m².

The coating fabric 6 is preferably formed of nonwoven fabric made from glasswool, the basis weight of such fabric being 50-200 g/m².

The thickness of the mineral wool layer is preferably 30-70 mm and the density 30-40 kg/m³.

Example

A mineral wool mat, the density of which was about 30 kg/m³ and thickness 65 mm and which was on both sides thereof coated with glass fabric having a basis weight of 25 gm/m², was sawn into two 30 mm thick layers. The surfaces coated with glass fabric of the layers sawn apart from each other were then laminated with another glass fabric, the basis weight of which was 60 g/m². Thereafter, the layers were cut into ceiling panels of 600 mm x 1200 mm. The end product was a flexible panel, the stiffness of which was adequate for installing the panel to rest at its edges on T-moulding.

Besides freedom of design the ceiling panel produced by the method of the invention provides ceilings which are easy to install. Transport of the panels causes no problems because the panels are flat and not bent into the shape of an arc or curve until the installation stage.

The invention is not limited to the embodiment described above, but it can be modified within the scope defined in the accompanying claims. Thus, plastic laminates can be used as the coating fabric of the panel.

Claims

1. A method of manufacturing a ceiling or other panel (1), which panel comprises a mineral wool mat, which is coated on both sides thereof with an underlayer fabric (3), the fibers (2) of which mineral wool mat have been caused to rise in the manufacturing stage between top and bottom conveyor belts from a horizontal position extending generally in the plane of the panel mainly to a perpendicular position in the manufacturing stage, **characterized** in that it is cut along its centerline (4) into two layers and that the layers cut apart from each other are cut into panels of a suitable size.

2. The method as claimed in claim 1, **characterized** in that the underlayer fabrics (3) are attached to the mineral wool mat by means of its own bonding agent in the manufacturing process of the mineral wool mat.

3. The method as claimed in claim 2, **characterized** in that the sides coated with an underlayer fabric of the layers cut apart from each other are laminated with a coating fabric (6).

Patentansprüche

1. Verfahren zur Herstellung eines Decken- oder anderen Paneels (1), welches Paneel eine Mineralwolle-matte umfaßt, die auf beiden Seiten mit einer Untervlies (3) beschichtet ist, wobei die Fasern (2) der Mineralwolle-matte in der Herstellungsphase veranlaßt wurden, zwischen dem oberen und unteren Förder-band sich aus einer horizontalen, im allgemeinen in der Ebene des Paneels verlaufenden Lage in eine

hauptsächliche senkrechte Lage aufzurichten, dadurch **gekennzeichnet**, daß sie an der Mittellinie (4) in zwei Schichten geschnitten wird und daß die voneinander getrennten Schichten in Paneele passender Größe geschnitten werden.

- 5 **2.** Verfahren gemäß Anspruch 1, dadurch **gekennzeichnet**, daß die Untervliese (3) in der Herstellungsphase der Mineralwollematte mit ihrem eigenen Bindemittel an der Mineralwollematte befestigt werden.
- 3.** Verfahren gemäß Anspruch 2, dadurch **gekennzeichnet**, daß die mit einem Untervlies beschichteten Seiten der auseinander geschnittenen Schichten mit einer Beschichtungsvlies (6) überzogen werden.

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Revendications

- 15 **1.** Procédé de fabrication d'un plafond ou autre panneau (1), lequel panneau comprend un mat de laine minérale qui est recouvert sur ses deux côtes d'un tissu de sous-couche (3), les fibres du mat de laine minérale ayant été amenées à se dresser lors du stade de la fabrication entre des bandes transporteuses supérieure et inférieure, à partir d'une position horizontale s'étendant généralement dans le plan du panneau, principalement jusqu'à une position perpendiculaire lors du stade de la fabrication, caractérisé en ce qu'il est découpé selon un axe de symétrie (4) en deux couches et en ce que les couches découpées
- 20 séparées l'une de l'autre sont découpées en panneaux à la dimension souhaitable.
- 2.** Procédé selon la revendication 1, caractérisé en ce que les tissus (3) de la sous-couche sont fixés au mat de laine minérale par l'intermédiaire de leur propre agent de liaison lors du processus de fabrication du mat de laine minérale.
- 25 **3.** Procédé selon la revendication 2, caractérisé en ce que les côtés recouverts du tissu de sous-couche des couches découpées séparées les unes des autres sont stratifiées avec un tissu de revêtement (6).

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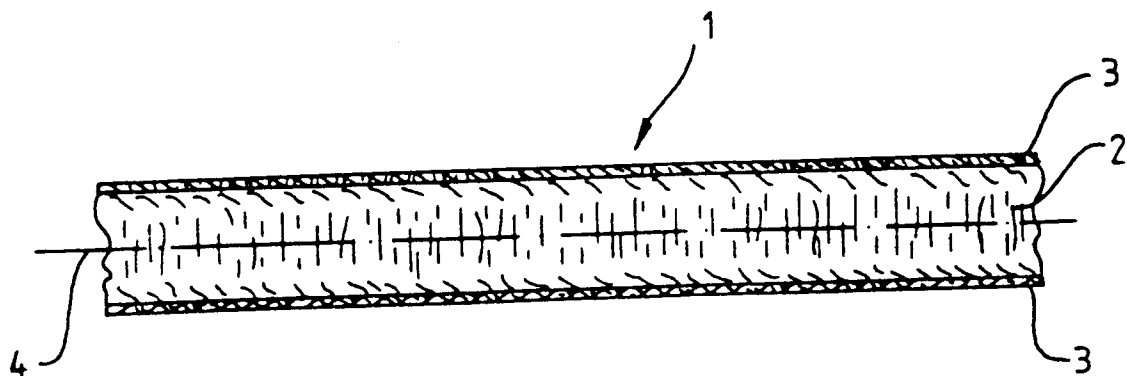


FIG. 1

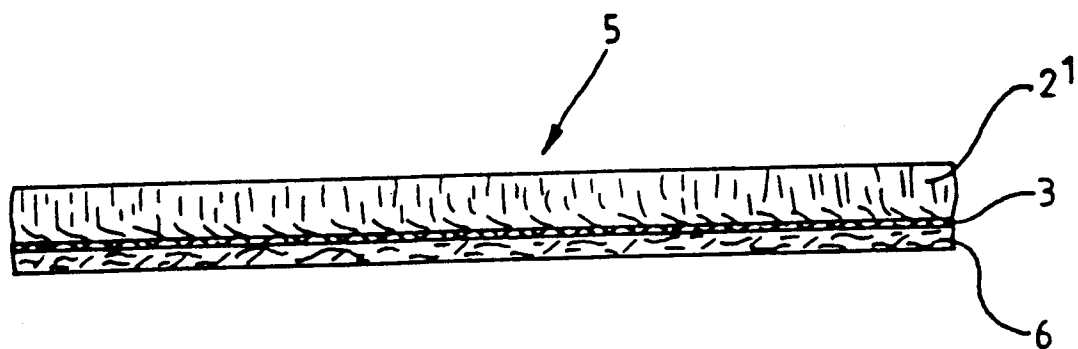


FIG. 2