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(54) **Padlóburkolat és padlólap fűtött alapra**

The invention relates to a floor covering, in particular for a heated substrate, having a multi-layered structure comprising a plurality of interconnected floor panels, wherein the floor panels have a support platesubstantially made from a derived timber material, a plastic and/or a wood-plastic mixture and a coating arranged thereon, and wherein a top layer formed by the coating of the floor panels is provided.

The production of floor coverings using floor panels has been known for some time. The panels used are so-called laminate panels, for example. Laminate panels generally have a support plate, which is provided with decoration. The decoration can consist of resin-impregnated decorative paper. This can also contain hard particles of corundum, for example, or other mineral materials, to protect the surface against wear and tear, in particular abrasion and scratching.

An additional layer, a so-called overlay, can also be provided on the decoration as protection against wear and tear. Such an overlay also contains at least one resin-impregnated paper, but this is transparent. Melamine resins or melamine/urea resins are used in particular. The overlay can also contain hard particles of the type cited to improve abrasion resistance. The decoration and the overlay are joined together permanently by means of heat and pressure.

Alternatively, the panels can also be imprinted directly with a decoration, wherein a transparent sealing varnish or an overlay of the type described above is provided on the decoration. A primer coat can be provided between the imprinted decoration and the support plate where required, and this can be considered part of the decoration.

Corresponding floor coverings can be used for miscellaneous purposes and have a long life. Floor panels can also be used in rooms with a heated substrate in the form of underfloor heating. However, this restricts the energy efficiency of the underfloor heating such that slightly higher energy consumption is to be expected.

One reason for this is that the support platesof the floor panels are generally made from derived timber materials, plastic or a mixture of wood and plastic. Fibre boards are largely used as support plates, where said boards are mostly medium-density fibreboard (MDF) or high-density fibreboard (HDF).Support plates have limited heat conductivity due to the materials used and consequently heat transfer from the underfloor heating to the room to be heated is limited. Heat transfer into the room to be heated is also restricted by the fact that the floor panels cannot be exposed to temperatures that are too high. For instance, where panels with support plates comprised of a derived timber material are exposed to temperatures that are too high, said panels can dry out excessively, which can result in undesirable warpage and/or to breaks in the plate layers.

A floor covering according to the preamble of Claim 1 is known from WO 03/035396 A1. The invention proceeds from said floor covering.

The present invention is based on the technical problem of suggesting a floor covering of the type referred to at the start and described in detail above, which provides suitable heat conduction and impact sound insulation.

This technical problem is solved in a floor covering according to Claim 1.

Compared with derived timber materials and/or plastics, mineral and/or metallic materials have higher thermalconductivity λ. Sand (λ~1,4 W/mk), crystalline metamorphic rocks (λ~3, 5 W/mk), such granite or basalt, sedimentary rocks(λ~2, 3 W/mk), such as sandstone or shell limestone, as well as ceramic materials are possible as mineral components. Pure metals such as copper (λ~380 W/mK) or aluminium (λ~200 W/mK) or alloys such as steel (λ~60 W/mk) are suitable as metallic components.

If these materials are used in a layer of the floor covering, this improves the thermal conductivity of the floor covering overall. Here an appropriate component is provided in a layer underneath the coating of the floor panel and thus underneath the top layer of the floor covering. The coating provided on the support plate is understood as the top layer of the floor covering and of the floor panels, which can consist of one layer or a plurality of separate, but comparatively thin layers, such as decoration, overlay and/or sealing varnish.

As described above, the coating may have a mineral component in the form of hard particles, which substantially serves to reduce abrasion of the floor covering. Since the coating having the mineral component is extremely thin and is provided on or close to the plateof the floor covering, the coating does not improve the heat transfer properties of the floor panels appreciably.

According to the invention, the heat-conducting layer is provided underneath the coating and thus arranged at a shorter distance from the substrate. The temperature profile of the substrate can be evened out as a result and consequently the resistance to heat transfer, whichis put up by the floor covering, can be reduced. Heating elements, for example, in the form of pipes through which water flows, are provided for heating the substrate. Said pipes can be arranged in a floating screed. Heating elements in the form of electrical conductors are also considered, which are laid on the substrate or floating screed respectively. Regardless of the type of heating elements, these are generally laid in a wavy line. Consequently, the temperature above the heating element is maximised and higher the more slowly the heat is delivered to the room to be heated. If this does not take place quickly enough, this is referred to as accumulation of heat. On the other hand, there are low temperatures between the individual sections of the heating elements. On account of this temperature profile, the heat is not uniformly delivered from the floor covering to the room, but increasingly via the regions of the floor covering arranged directly above the heating elements.

The invention has identified that the heat-conducting layer of the floor covering improves not only heat conduction perpendicular to the floor covering, but also parallel to the floor covering. This means that a more uniform temperature profile of the substrate is achieved since the heat is transferred from one region above one section of the heating element into a region between two sections of the heating element. This results in an overall increase in heat transfer through the floor covering into the room to be heated, which is increased further by the better heat transfer perpendicular to the floor covering. Finally, an improvement is made to heat transfer at a level parallel to the floor covering and in a direction at right angles thereto.

A heat-conducting layer can be formed by the support plates of the floor panels. This is advantageous because the support plate is designed as comparatively thick and consequently heat transfer can be improved significantly. Moreover, the support plate is provided relatively close to the substrate, which is advantageous in terms of evening out the temperature profile parallel to the floor covering. The mineral and/or metallic component can be distributed more or less evenly over the entire support plate. Provision can also be made for the mineral and/or metallic component to be provided preferably in the lower region of the support plateso that the temperature profile can be evened out closer to the substrate of the floor covering at a level parallel to the substrate or to the floor covering. If the support plateis formed substantially from pressed wood particles and/or wood fibres, these are scattered prior to compaction into a so-called cake with desired layer thickness, wherein the mineral and/or metallic component can also be introduced into the cake. If the mineral and/or metallic component consists of smaller particles, these can be scattered into the cake.

Alternatively or in addition, it may be advantageous if a heat-conducting layer is arranged on the side of the support platefacing away from the top layer of the floor covering or the coating ofthe floor panels. The heat-conducting layer is therefore arranged underneath the support plate and thus provided very close to the substrate in a laid state, which is conducive to evening out the temperature profile.

According to the invention, the heat-conducting layer is configured as the layer of the floor panels provided underneath the support plate. The heat-conducting layer can be integrated into the floor panels which makes laying easier. No additional components or additional method steps are required for laying the floor covering.

In order to simplify the structure of the floor panels and achieve synergistic effects, the heat-conducting layer is formed by the impact sound insulation of the floor panels. This is achieved by introducing the mineral and/or metallic component into a layer acting as impact sound insulation. A laminate coating having at least one resin-impregnated paperprovided on the underside of the support plate is understood to mean a stabilising layer here. The stabilising layer serves to equalise the tension in respect of the resin-impregnated decorative paper provided on the upper side of the floor panels and, where appropriate, in respect of the so-called overlay arranged thereon. A back coat isalso provided the case of directly varnished panels on the underside of the panels and/or underside of the support plate to equalise tension. The backing coat is generally obtained by applying varnish.

Regardless whether the heat conducting layer is part of the panel or part of other layers of the floor covering, the mineral and/or metallic component can be provided in the heat conducting layer in the form of a disperse phase. The mineral and/or metallic component is finely distributed in a so-called continuous phase, wherein the distribution can be homogenous or non-homogenous. The continuousphase can be formed by the glued wood fibres of a support plate, the adhesive of an adhesive layer or the impact sound material of impact sound insulation.

Alternatively or in addition, the mineral and/or metallic component can be configured as a large-scale element. In particular, the mineral and/or metallic component can be provided in the heat conducting layer as fabric, non-woven material, mesh or foil. A mesh structure may be preferred for example if the heat conducting layer is formed by the floor panels, i.e. the mineral and/or metallic component is part of the floor panels. In this manner, permanent cohesion of the different layers of the floor panels can be ensured. The same can also apply to fabric or non-woven material. Fabrics or non-woven materials are also suitable for introduction into an adhesive layer.

In a further embodiment of the floor covering, the heat conducting layer is configured as a vapour barrier. Both functions are then combined in one layer. The vapour barrier can be configured as metal foil for this purpose. A metal foil coated with plastic or a plastic film can also be used, into which the mineral and/or metallic component is introduced. The vapour barrier is an integral component of the floor panels in any case and consequently the heat conducting layer of the floor covering is formed when laying the floor panels without this requiring further work stages.

In order to further increase the heat conductivity of the floor covering, it is preferred if the support plate has a thickness of at least 950 kg/m^3 and/or is formed from high density fibreboard (HDF).

The heat throughput of the floor covering is improved by using flat floor panels. The floor panels therefore have a maximum thickness of 6mm, preferably a maximum of 5 mm, in particular a maximum of 4 mm.

The invention is described in more detail below with the aid of drawings illustrating just one embodiment.

Fig. 1 shows a schematic view in vertical cross section of a first floor covering not according to the invention in a laid state on a heated substrate,

Fig. 2 shows a graphic illustration of profiles of the temperature distribution of the heated substrate using a floor covering according to the invention and using a conventional floor covering,

Fig. 3 shows the details of the floor covering from Fig. 1 in vertical cross section,

Fig. 4 shows a sectional view of a second floor covering not according to the invention as per Fig. 3,

Fig. 5 shows a sectional view of a third floor covering not according to the invention as per Fig. 3 and

Fig. 6 shows a sectional view of a fourth floor covering not according to the invention as per Fig. 3.

Fig. 1 shows a floor covering 1 laid on a heated substrate U. The floor covering 1 consists of a plurality of floor panels 2, which are connected to each other by means of connecting and/or locking profiles known from the prior art. The connecting and/or locking profiles are only shown schematically since the type of connecting and/or locking profile is of secondary importance here.

The floor panels 2 shown in the embodiment are configured as rectangular and connected to other floor panels 2 of the floor covering 1 both on the long and the short narrow edges thereof. The floor panels 2 are so-called laminate panels with a corresponding layer structure (not shown in detail). An underlay 3 is provided underneath the floor panels 1.

The floor covering 1 is provided on a substrate U which can be heated, wherein said substrate has an upper floating screed E in which a pipe R is laid in a wavy line, through which a heat transfer medium, in this case hot water, can flow.

The pipe R has sections running parallel to each other which are spaced at a distance from each other.

When hot water flows through the pipe R, the substrate U heats up more above the pipe sections running parallel to each other than between said pipe sections. If a conventional floor covering is provided on the substrate, this produces a temperature profile shown as a dotted line in the graph in Fig. 2. Here, the temperature of the substrate is plotted against the distance from one of the parallel pipe sections of the underfloor heating in a direction perpendicular to said pipe section and parallel to the floor covering. At the distances a, 2a etc., the temperature reaches its maximum and in between its minimum, wherein the difference between the maximum and minimum temperature is considerable.

If a floor covering is laid on the same substrate, which has a heat-conducting layer arranged beneath the top layer and having a mineral and/or metallic component, this results in purely qualitative terms, where the boundary conditions are otherwise substantially unchanged, in a temperature profile as shown by the solid line in the graph in Fig. 2.

Also in this case, the temperature above the parallel pipe sections is at its maximum, whereas the temperature in between is at its minimum. However, the difference between the maximum and minimum temperature in said temperature profile is significantly less. In other words, the temperature of the substrate is distributed more evenly as the mineral and/or metallic component of the heat conducting layer conducts the heat from regions above the parallel pipe sections to regions in between thus contributing to an equalisation of the temperature of the substrate or the floor covering. This also results preferably in a higher average temperature of the substrate and/or floor covering and consequently the temperature difference between the substrateand/or floor covering on the one hand and the ambient air on the other hand is greater overall and therefore the heat flow delivered to the ambient air is increased.

A detailed view of the floor covering 1 from Fig. 1 is shown in Fig. 3. The floor panels 2 have a support plate 4 made from a high-density fibreboard (HDF). At the same time, the support plate 4 forms the heat conducting layer 5 of the floor covering 1. Mineral particles 6 evenly distributed in the support plate 4 are provided for this purpose. The proportion of mineral particles 6 is large enough here to significantly improve the heat conductivity of the support plate 4 overall.

A coating 7 is provided on the support plate 4, which forms the top layer of the floor covering 1 and has two different layers. A decoration layer 9 consisting of melamine resin, in which a decorative paper is provided, is directly connected to the support plate. An overlay 10 is arranged on said decoration layer 9, which also consists of paper impregnated with melamine resin, but which also contains finely distributed corundum particles (not shown in detail).

A stabilising layer 11 made of resin and at least one special paperembedded therein is arranged on the underside of the support plate 4. An insulating layer 12 of the floor covering 1 is provided underneath the floor panel 2, which, in the example embodiment shown, is not connected to the floor panel 2 but placed directly onto the substrate U.

The floor covering 21 shown in Fig. 4 comprises directly varnished floor panels 22. These also have a support plate 24 made of a high-density fibreboard (HDF). A coating 27 is provided on the upper side of the support plate 24, which forms the top layer 28 of the floor covering 21 and consists of a decoration layer 29 and a protective layer 30 containing hard particles. A back coat 33 is provided in the form of a varnish coating on the underside of the support plate 14.

The floor panels 22 of the floor covering 21 shown in Fig. 4 are bonded to the substrate U by means of an adhesive layer 34. The substrate U in turn has a screed layer E in which a pipe R through which water flows R is laid. In addition to bonding the floor panels 22 to the substrate U in an adhesive manner, the adhesive layer 34 also serves as a heat-conducting layer 25 of the floor covering 21 since the adhesive layer 34 comprises an adhesive containing a finely distributed mineral component 26, namely sand.

The floor covering 41 shown in Fig. 5 comprises floor panels 42 having a support plate on which a coating 47 is provided. Said coating is a laminate coating. The laminate coating forms the top layer of the floor covering 48 and has a decoration layer 49 consisting of resin-impregnated decorative paper as well as an overlay on top which consists of resin-impregnated transparent paper. A stabilising layer 51 is provided on the underside of the support plate 44, which is not configured as a laminate coating, but as metal foil, which constitutes the metallic component 46 in the heat-conducting layer 45. In the exemplary embodiment shown, the stabilising layer 51 and the heat conducting layer 45 respectively rest directly on the substrate U.

The floor covering 61 shown in Fig. 6 comprises floor panels 62, which have a coating 67 as the top layer 68 of the floor covering 61 comprising a decoration layer 69 attached to the support plate 64 and an overlay 70 arranged thereon. On the underside of the support plate 64, the floor panel 62 has a back coat 73 and impact sound insulation 75 integrated into the floor panel 62. The impact sound insulation 75 contains a metallic component 66 in the form of finely distributed metallic shavings such that the impact sound insulation 75 forms the heat conducting layer 65 of the floor covering 61.

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PADLÓBURKOLAT ÉS PADLÓLAP FŰTÖTT ALAPRA

SZABADALMI IGÉNYPONTOK

1. Padlóburkolat (61) különösen fűtött alapra (U), többrétegű felépítéssel,
   - amely több, egymással összeillesztett padlólapot (62) tartalmaz,
   - ahol a padlólapok (62) egy, lényegében fából, műanyagból és/vagy fa-műanyag keverékből készült hordozólemezből (64) valamint egy azon elhelyezkedő fedőrétegből (67) állnak,
   - ahol a padlólapok (62) egy, a fedőréteg (67) által képzett felső réteggel (68), valamint egy ellenhúzó vagy felfekvő réteggel (73) rendelkeznek, és
   - az ellenhúzó vagy felfekvő réteg (73) alatt hővezető réteg (65) helyezkedik el, amely lépészajcsökkentő rétegként (75) van kiképezve

   azzal jellemezve, hogy
   - a lépészajcsökkentő rétegként (75) kiképzett hővezető réteg (65) ásványi és/vagy fém alkotórészt (66) foglal magába.

2. Az 1. igénypont szerinti padlóburkolat, azzal jellemezve, hogy az ásványi és/vagy fém alkotórész (66) diszperz fázis formájában található meg a hővezető rétegben (65).

3. Az 1. vagy 2. igénypont szerinti padlóburkolat, azzal jellemezve, hogy az ásványi és/vagy fém alkotórész szövet, fliz, rács, vagy fólia formájában van kiképezve a hővezető rétegben (65).

4. A 3. igénypont szerinti padlóburkolat, azzal jellemezve, hogy a hővezető réteg párazáró rétegként van kiképezve.

A meghatalmazott:

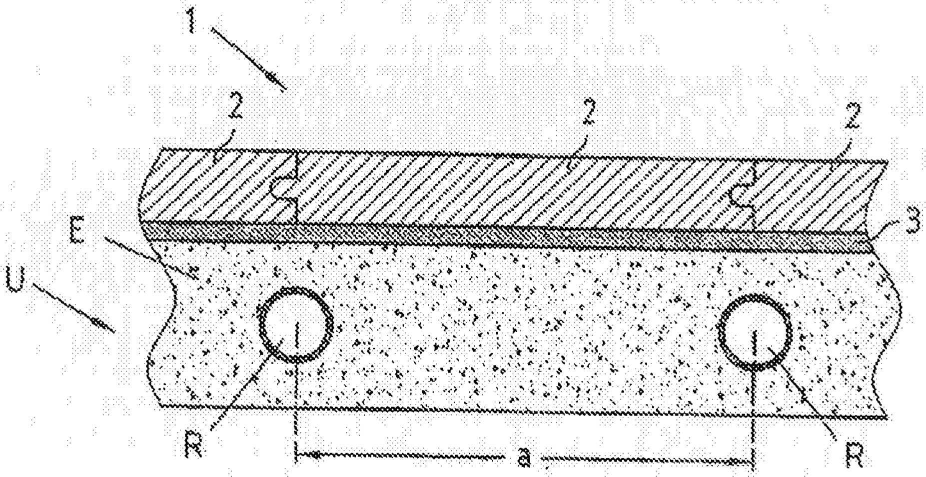

Fig. 1

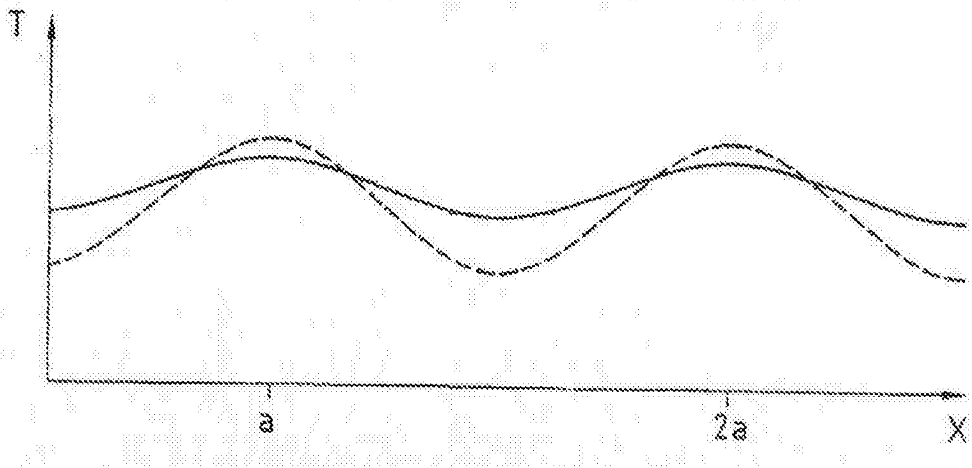

Fig. 2

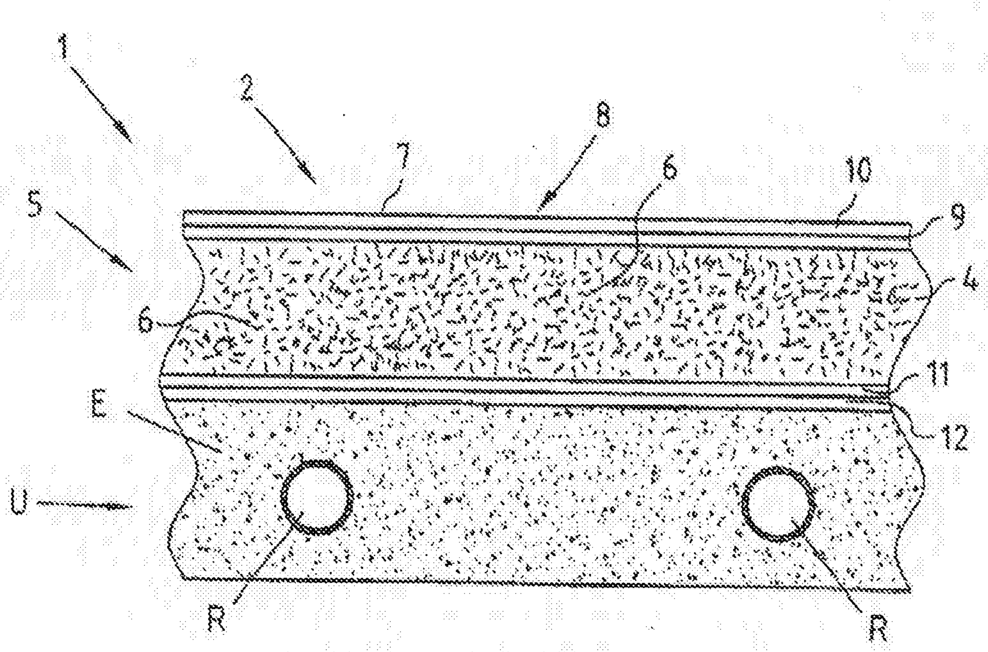

Fig. 3

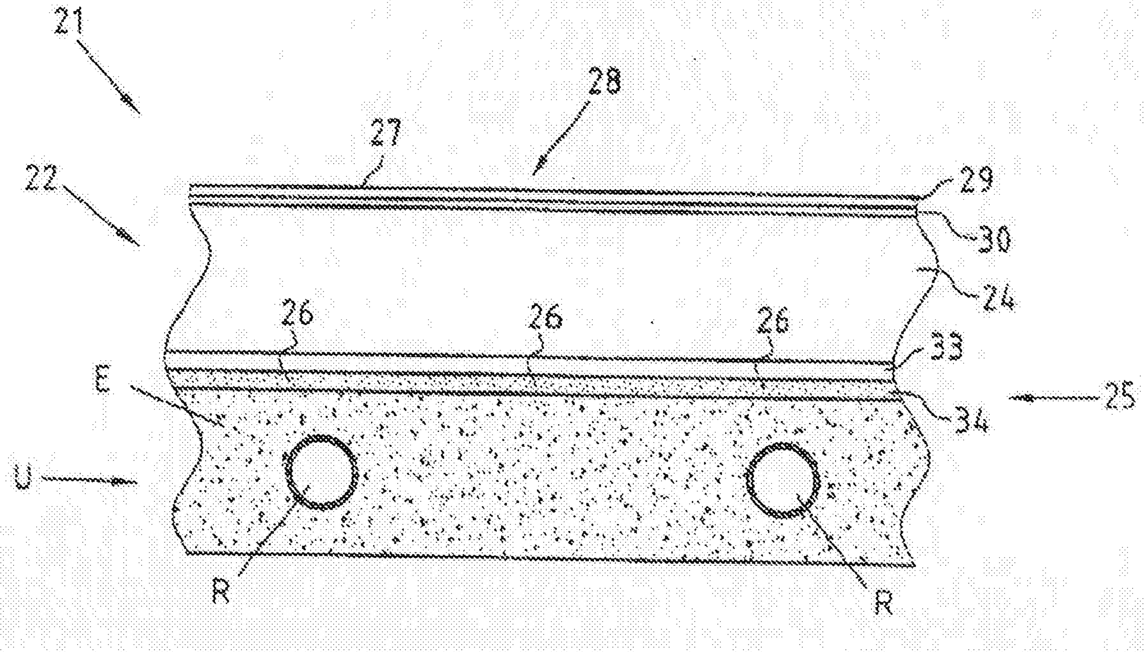

Fig. 4

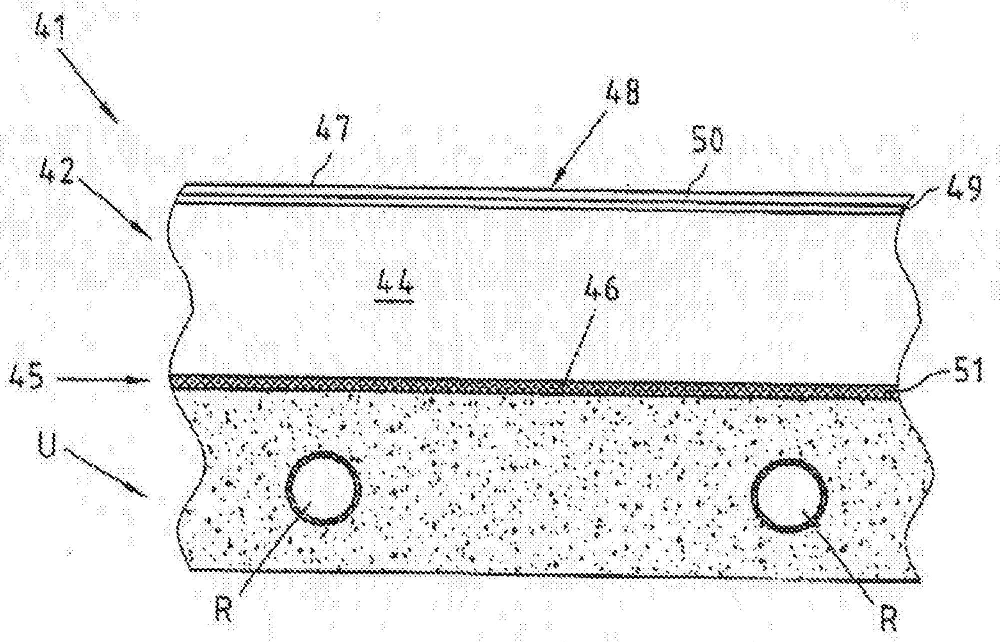
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Fig. 5

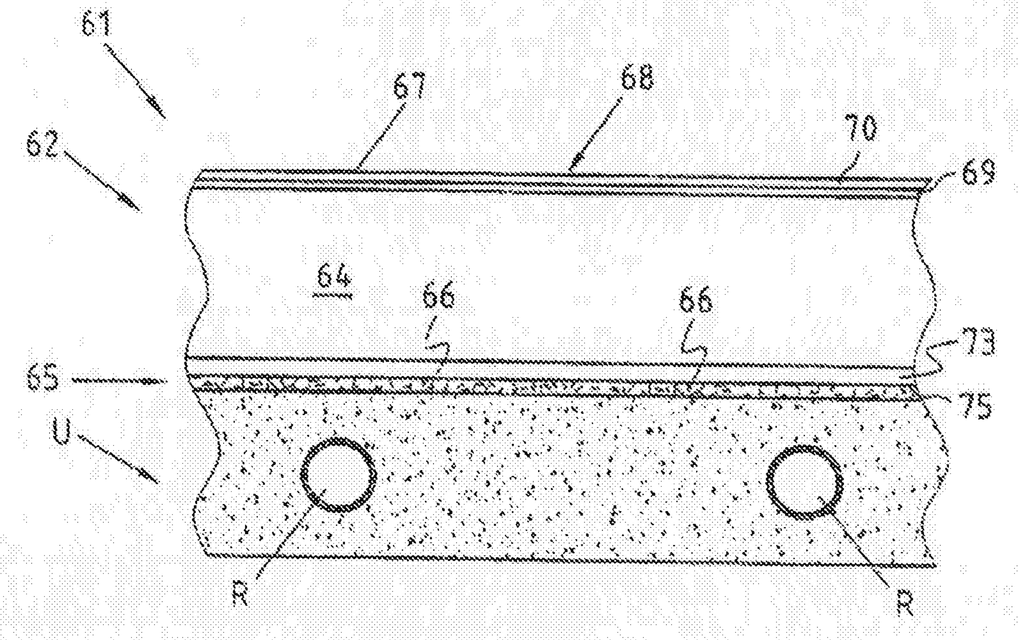
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Fig. 6