Nov. 10, 1970 P. GOHNER 3,538,665

PARQUET FLOORING

Filed April 15, 1968

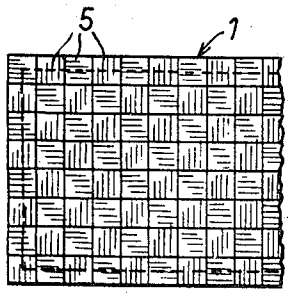

Fig. 1

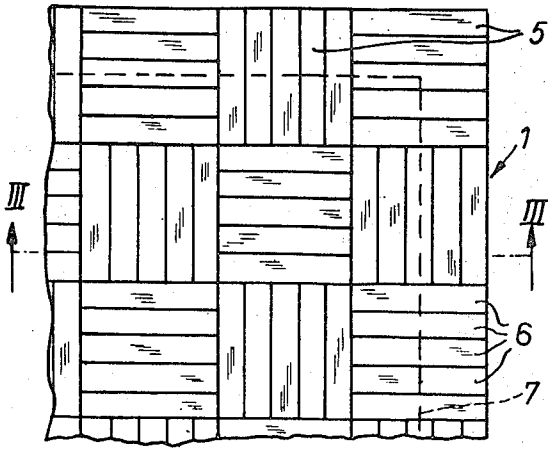

Fig. 2

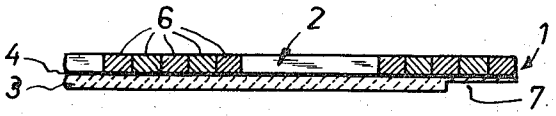

Fig. 3

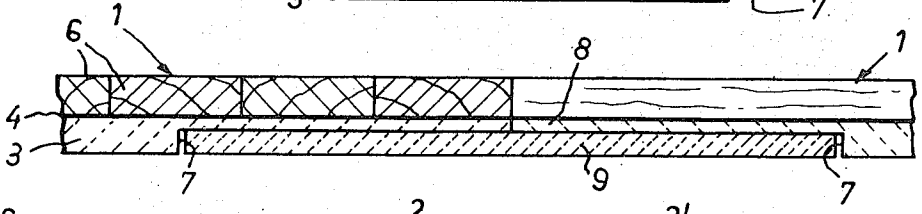

Fig. 4

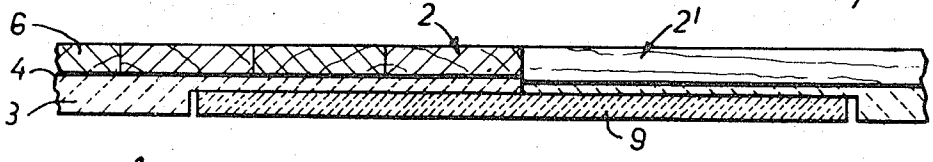

Fig. 5

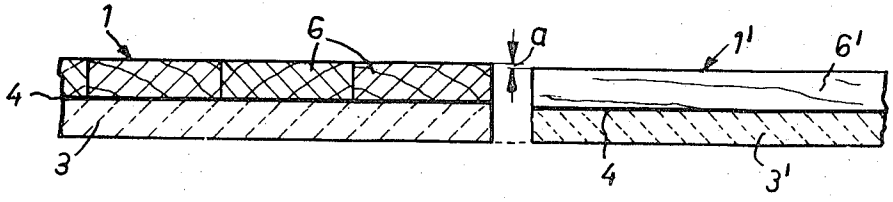

Fig. 6

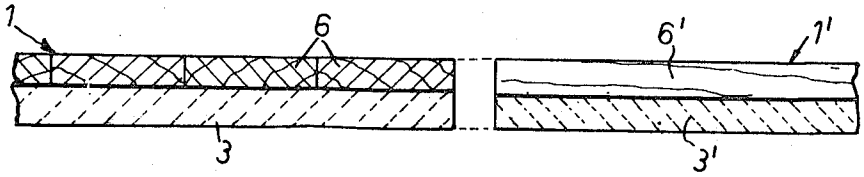

Fig. 7

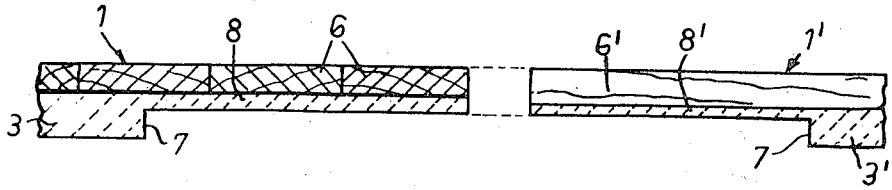

Fig. 8

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PARQUET FLOORING

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Int. Cl. E04c 2/26, 2/40

U.S. Cl. 52—391 1 Claim

ABSTRACT OF THE DISCLOSURE

A floating parquet flooring comprising rectangular-shaped two-layer flooring units composed of a parquet layer and a backing layer, the bottom face of the backing layer being provided with marginal recesses along the four sides of the unit and a strip of backing layer material being inserted in the space formed by said marginal recesses for bridging the joint between adjacent units, the backing layer material having a modulus of elasticity in tension not exceeding 5000 kg./cm.^{2}.

This application is a continuation-in-part of my application Ser. No. 426,232, filed Jan. 18, 1965, now abandoned entitled Parquet Flooring.

This invention relates to parquet flooring composed of rectangular flooring units having a parquet layer and a carrier or backing layer, and to a method of laying a floating parquet floor.

The flooring units according to this invention are prefabricated elements ready for laying on the floor-bed and offer various advantages with respect to the usual flooring in which the units are nailed or screwed to the bed or fixed thereto by adhesive. The prefabricated parquet units can be used for producing room floors in an economical manner and supply a want in actual building practice.

An object of the present invention is to provide a parquet flooring which avoids the usual inconveniences due to swelling or shrinkage of the wood, and which is composed of flooring units having a parquet layer and a softer, sound and heat insulating backing layer bonded by adhesive to the parquet layer.

The flooring units according to the invention are not required to be fixed to the floor-bed, but conveniently they are loosely laid on the floor bed in the manner of a rug. For this reason, no thrust forces are transmitted to the floor-bed as this is the case with flooring panels which are fixed to the bed, when the parquet layer, owing to changing air moisture conditions, swells and shrinks.

The construction of the parquet flooring according to the invention and the method of laying the floor are based on the following considerations:

The parquet floorings, in the course of a year, are exposed to natural climatic changes. The moisture content of the wood in a parquet flooring can be 5% in winter and 15% in summer. The parquet wood shrinks in winter and swells in summer. When the moisture content of the air increases and the parquet layer swells, a parquet unit has the tendency to become convex. Compression stresses build up in the upper or parquet layer, and tension stresses in the lower or backing layer.

It is a further object of the invention to provide a floating parquet flooring having two-layer flooring units in which the stresses tending to build up when the wood swells are rendered ineffective. I have discovered that this can be obtained by opposing as little resistance as possible to the swelling tendency of the wood. For this reason, the backing layer to which the parquet layer is bonded by adhesive, must be elastic to a certain degree and able to yield.

I have also discovered that, when the wood has the tendency to swell, the tensile stresses building up in the backing layer must not be interrupted at the joints between adjacent flooring units. When such interruption is avoided, the connection between adjacent units is bending resistant. When this is not the case, the units of the floor will individually warp by the action of swelling of the wood. When, however, a bending resistant connection of the backing layer is ensured, the totality of flooring units of a floor will have the tendency of arching as a whole in a single curve, but this tendency can be opposed by selecting an appropriate material for the backing layer and providing a bending resistant connection of the backing layers of adjacent flooring units. When these requirements are met, it will be possible to compensate the stresses tending to arch the flooring, or to render them ineffective by the opposing action of the own weight of the flooring.

The present invention relates to a method of laying a floating parquet floor of composite rectangular-shaped two-layer flooring units composed of a parquet layer and a backing layer, the parquet layer being composed of groups of parallel wooden strips fixed by a layer of adhesive to the backing layer. According to the invention this method comprises the steps of grinding the top surface of the parquet layer of said flooring units used for laying the floating parquet floor, to obtain flooring units of equal thickness, providing marginal recesses of continuous width along the four sides of the bottom face of the backing layer of said units, said marginal recesses being formed by a machining operation removing material from the bottom side of the backing layer and using the ground top surface of the parquet layer as reference surface to obtain recesses of equal depth, laying the flooring units on a supporting floor in floating side to side arrangement, inserting strips of backing material into the space formed by said marginal recesses in the bottom face of adjacent flooring units for bridging the joint between adjacent units, and fixing said strips by adhesive to said bottom faces to form a levelling lap joint between adjacent units.

According to a further feature of the invention said backing layer and said strips for bridging the joints between adjacent flooring units consist of a relatively soft material having a modulus of elasticity in tension not exceeding 5000 kg./cm.^{2}, whereby the stresses caused in the parquet layer by swelling of the wood are rendered ineffective or are compensated by superposition of oppositely acting stresses resulting from the own weight of the flooring, and in which an interruption of tensile stresses in the backing layer at the joints between adjacent flooring units is avoided by providing a relatively large lap connection for bridging said joints by strips of backing layer material having a width substantially corresponding to the length of said wooden strips of the parquet layer.

The invention will now be described more fully by reference to the accompanying drawing, in which:

FIG. 1 is a fragmentary plan view of a rectangular flooring unit;

FIG. 2 is a fragmentary plan view of the flooring unit drawn to a larger scale;

FIG. 3 is a vertical sectional view taken along the line III—III of FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view of two adjacent joined flooring units in the condition when they are placed on a supporting floor and connected together by a strip overlapping the joint between adjacent units;

FIG. 5 is a sectional view similar to FIG. 4 showing two adjacent joined flooring units the backing layers of which, due to manufacturing tolerances, are of different thickness;

FIGS. 6, 7 and 8 each represents a section through two

flooring units to be joined, these figures serving to explain the manner of preparing the flooring units prior to laying them on a supporting floor.

Referring to the drawings, a rectangular parquet flooring unit **1** comprises an upper parquet layer **2** and a lower backing layer **3** bonded together by a layer of adhesive **4**. The parquet layer is composed of a plurality of square elementary blocks **5** which are joined together to form a rectangular flooring unit which, for example, may have a length of 2 meters and a width of 1 meter. Each elementary, square block **5** is made up of five wooden strips **6**, and the strips **6** of one square block **5** are directed at right angles to the strips **6** of the adjacent block. The manner of assembling the wooden strips **6** to the square blocks **5** and of assembling the blocks **5** to form a rectangular parquet layer is known in the art and is not described in detail. The strips **6** are not glued to each other but they may be held together provisionally by paper tapes or the like, which also hold the elementary square blocks in assembled relation, or the strips or the blocks may be individually glued to the backing layer. The adhesive layer **4**, by which the parquet layer **2** is bonded to the backing layer **3** forms a continuous film between the two layers which assists in strengthening and improving the elastic properties of the backing layer.

When preparing the flooring units and bonding the parquet layer to the backing layer, the two layers are coextensive, as shown for example in FIG. 6. For providing the bending resistant lap connection between two adjacent flooring units **1** when laying a floor, a portion of the thickness of the backing layer is cut away by a milling operation along all four sides of the unit to provide a marginal recess **7** along the four sides of the unit. The width of this recess, in the example shown, is equal to one half of the length of a side of the square elementary blocks **5** or one half of the length of a wooden strip **6**. Obviously, the width of the marginal recess **7** can be smaller or greater than one half of this length, but it should amount to a substantial portion of the side length of a square block **5** in order to form a bending resistant connection between adjacent units. The recess **7** is cut to such a depth that a thin layer of backing material **8** will remain underneath the marginal portions of the parquet layer. When the units **1** provided with the marginal recesses **7** are laid on the floor, a strip **9** of backing material will be inserted into the hollow space formed by the two marginal recesses **7** between adjacent units. This strip **9** will be fixed by adhesive to the bottom side of the thin layers **8**, of backing material remaining bonded to the bottom side of the marginal portions of the parquet layer.

In the section as shown in FIG. 4 of the drawings, it is assumed, that the thickness of the two adjacent flooring units **1** is identical. In this example, the thickness of the parquet layer, i.e. of the wood strips **6**, is about 6 to 8 millimeters and the thickness of the backing layer may be from 5 to 10 millimeters. Obviously, the thickness of the backing layer must substantially be the same for all flooring units used for laying a floor.

The backing layer **3** and the overlapping strip **9** preferably consist of a relatively soft material, such as bituminated wood fibers having a bitumen content of about 15% by weight in dry condition. The plates made from such material and used as backing layer **3**, due to manufacturing tolerances, are not of rigorously identical thickness such as it is required for their use as backing layer, in order that the top surface of the parquet layer of adjacent flooring units will always be situated in the same plane absolutely flush with each other. In order to avoid any differences in level, the so-called lippings, between adjacent flooring units, and to obtain a rigorously plane floor, the finishing treatment, to which the flooring units will be subjected after the parquet layer **2** and the backing layer **3** have been bonded together by the adhesive layer **4**, will now be described with reference to FIGS. 5 to 8.

FIG. 6 is a fragmentary sectional view of two parquet units **1** and **1'** in which a parquet layer made up of wooden strips **6** or **6'** is bonded by an adhesive layer **4** to a coextensive backing layer **3** or **3'**. While in both units **1** and **1'** the thickness of the wooden strips **6** or **6'**, i.e. of the parquet layer, is the same, the backing layer **3'**, owing to manufacturing tolerances, is thinner than the backing layer **3** of the unit **1**, the difference in thickness being exaggerated in the figure for the sake of clearness. When the two units are placed on the same plane, there is a difference in level between the two units corresponding to the difference in the height of the backing layers **3** and **3'**, this difference being designated by *a*. In order to make this difference in level disappear, all flooring units first are subjected to a grinding operation effected on the top face of the parquet layer with the bottom face of each unit as reference surface for exactly calibrating the height of all units destined to be laid on a floor. FIG. 7 shows the two units **1** and **1'** after the grinding operation has been effected on them. The wooden strips **6** of the unit **1** have become thinner, while the wooden strips **6'** of the unit **1'** substantially remained at their original thickness and have been ground superficially only for obtaining the required surface finish. After grinding the two units **1** and **1'** have exactly the same thickness. Now the marginal recesses **7** can be cut into the backing layer **3** or **3'** and this will be effected by means of a milling operation, using the ground top face of the units as reference surface. This stage in the preparation of the flooring units is represented in FIG. 8. The milling operation using the ground top surface of the units as reference surface ensures that in all units the depth of the recesses **7** is exactly the same, while the thickness of the remaining layers **8** or **8'** of the backing material along the recesses **7** may vary according to the original thickness of the backing layers **3** or **3'**.

When the units **1** and **1'** now are assembled on a supporting floor, as shown in FIG. 5, the top surface of the parquet layers will be rigorously flush over the whole floor, and since the overlapping strip **9** also will be calibrated to the exact thickness of the marginal recesses **7**, it is ensured that all units laid on a floor have their top surfaces situated in the same plane; no lippings will appear along the joints of adjacent flooring units, but these units will be absolutely flush with each other.

I have discovered that in a floating parquet floor made of flooring units as described above and which are not fixed to the supporting floor, the objects of this invention, i.e. the absence of warping of the floor due to swelling of the wood can then be obtained when a backing layer material is used having a modulus of elasticity in tension of approximately 5000 kg./cm.^{2} or slightly less but not substantially exceeding this value. A bituminated wood fibre material having a bitumen content of about 15% by weight in dry condition will meet this requirement. This material has just the desired and necessary yielding properties to be hard enough for correctly supporting the individual wooden strips **6** and elementary square blocks **5** and maintaining their cohesion, but at the same time to be soft enough for compensating the stresses tending to warp the floor, by the own weight of the flooring units. Extended tests were made with floorings as described, using flooring units in which the thickness of the parquet layer, measured from 6 to 10 millimeters and the thickness of the backing layer of bituminated wood fiber material measured from 5 to 10 millimeters, and the single rectangular units had a size of approximately 1 meter by 2 meters or more. These tests have shown that even under severe changing climatic conditions the parquet floors made and laid in accordance with this invention did not show any warping or arching but remained absolutely flat on the sub-floor. This behaviour of the flooring according to the invention is due to the fact that the stresses resulting from different swelling of the parquet layer and the backing layer are rendered ineffective or

are compensated by the superposition of sufficiently great oppositely acting stresses resulting from the own weight of the flooring units which remain in flat condition.

The stresses resulting from the own weight of the flooring units and which prevent an arching of the floor, will become effective particularly with a great span of the floor. Since, however, the size of the single flooring units is limited, these units must be joined to each other by a bending resistant connection. If the parquet layer has the tendency to swell, tensile stress will build up in the lower or backing layer of the floor. This tensile stress must not be interrupted at the joints of adjacent flooring units, as this would lead to individual warping of the single units. When such interruption is avoided, the single units cannot warp individually but the entire flooring will have the tendency of arching, and this tendency will be opposed by the weight of the flooring which is in floating condition and not fixed to the supporting floor. This bending resistant connection between adjacent flooring units is obtained according to the invention by using comparatively large overlapping strips **9** of the same material as the backing material, i.e. bituminated wood fibers; these strips have a width substantially equal to the side length of an elementary square block **5** of the parquet layer, this length being about 120 millimeters in the example shown.

The advantages obtained with the parquet flooring established according to the present invention are that due to the floating flooring units which are not to be fixed or glued to the sub-floor, no particular requirements are to be imposed on the sub-floor or supporting floor; even cheap equalizing material, such as a smoothly drawn off dry said layer, will suffice. Owing to the absence of adhesive, for fixing the units, the floating parquet layer, during laying is not subjected to any action of moisture. The laying of the floating flooring units is greatly simplified, since the units are completely finished in the factory; bonding the parquet layer to the backing layer, grinding, polishing, cutting the marginal recesses for the overlapping strips, and sealing of the parquet layer will be effected in the factory.

What is claimed is:

1. A floating parquet floor using gravity as the sole means for fastening to a generally horizontal supporting base, so as to be free to contractively and expansively move as an integral floor covering without fastening to said base, and without incurring adverse warping and cracking throughout seasonal environmental temperature and humidity variations, said floor comprising rectangular, modular flooring units each composed of a parquet layer and a combined sound-and-heat insulating backing

layer of bituminated wood fiber material; a lap joint member for integrally connecting adjacent units; said parquet layer comprising a plurality of elementary elongate strip blocks secured to the topside of said backing layer by a continuous film of adhesive, the bottom side of said backing layer being provided with a marginal recess of substantial width corresponding generally to about one-half the length of the strip blocks comprising the parquet layer, said recess being provided in the backing layer material along all four sides of the flooring unit to receive said lap joint member to integrally unite adjacent units, and without interruption of said continuous adhesive film between parquet layer and backing layer; said lap joint material comprising strips of the same general backing layer material, and which strips are inserted into and fill the cavity areas formed by said marginal recesses between adjacently disposed flooring units; said strips being glued to the backing layer to bridge the joint between said adjacent flooring units so that uneven interruption by potential tensional stress building up in the backing layer of the flooring due to seasonal swelling of the parquet layer is avoided at the joints between adjacent flooring units; said backing layer material having a modulus of elasticity in tension not exceeding 5000 kgs./cm.^{2} whereby said stresses tending to build up in the parquet layer due to swelling of the parquet layer are rendered ineffective and are compensated or counteracted by opposing stresses resulting from the overall integrated weight of said floating parquet floor.

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HENRY C. SUTHERLAND, Primary Examiner

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