

Oct. 21, 1969

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3,473,281

FLOORING SYSTEMS

Filed Sept. 19, 1966

FIG. 1

FIG. 6

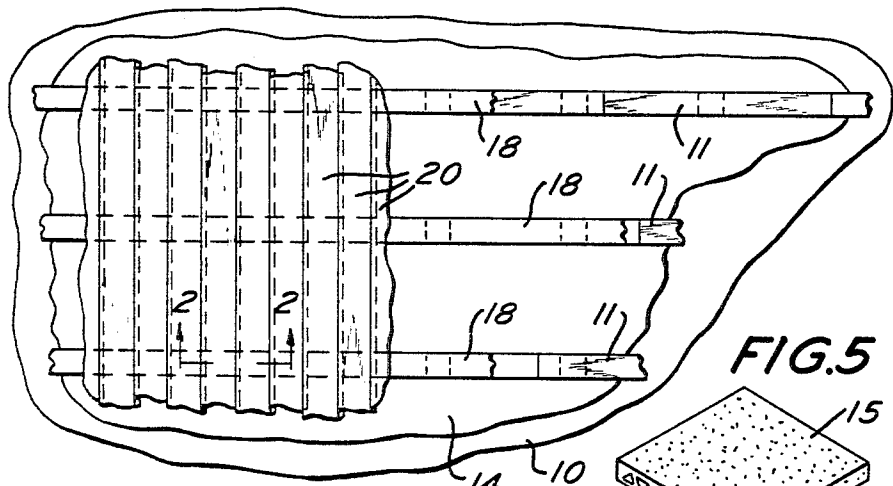


FIG. 5

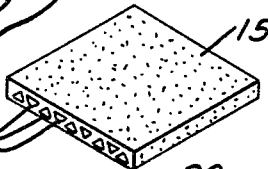


FIG. 2

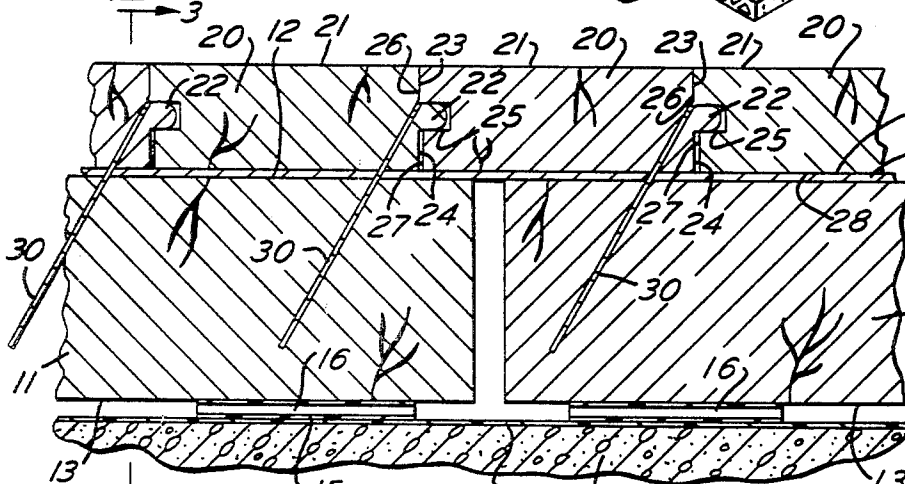


FIG. 7

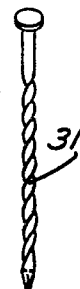


FIG. 3

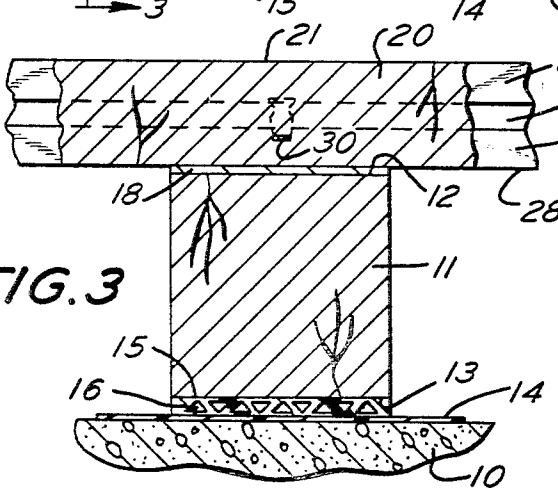
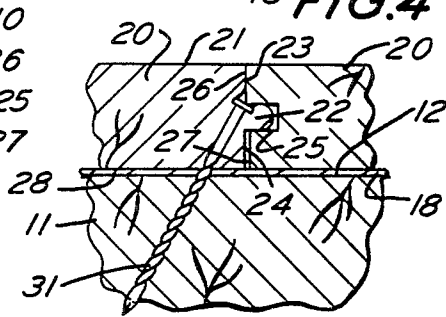


FIG. 4



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2

3,473,281

FLOORING SYSTEMS

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Filed Sept. 19, 1966, Ser. No. 580,386
Int. Cl. E04b 5/02; E04f 15/22
U.S. Cl. 52—480

6 Claims

ABSTRACT OF THE DISCLOSURE

A flooring system having wooden floor boards, preferably edge tongued and grooved disposed on and secured to wooden supports on a foundation, the wooden supports having elements carried thereon and of desired tensile and shear strength for preventing wooden support growth transverse to the floor boards, the restraint on the wooden supports such that little or no growth of the wooden supports occurs in a direction transverse to the floor boards in the presence of moisture may also be held against a plurality of wooden support movement with respect to each other in a direction transverse to the floor boards.

This invention relates to flooring systems.

Various systems for applying, mounting and securing floor boards have been proposed but these have had limitations based upon their construction.

It has heretofore been proposed to secure floor boards to sleepers, mechanically attached to the supporting base or floating as desired, and with or without a sub-floor. The floating sleepers have been superposed, as desired, directly on the supporting base, in mastic on the supporting base or on resilient cushions.

In floating systems employing wooden sleepers, the ability of the sleepers to restrain the growth of flooring attached thereto is severally limited by two frames. The first of these is that the sleeper itself has a decided tendency to grow longitudinally in humid damp weather, thereby automatically increasing the space between nails securing flooring to the sleepers and permitting the flooring boards to expand without restraint. Secondly, floating floors employ short sleepers in the range of four feet long since longer sleepers warp and spiral. The butt ends of these sleepers are spaced normally about one-half inch apart to help prevent buckling. The unrestricted separation which occurs between these butt ends further limits the ability of the sleepers to restrict growth of the flooring. This inability of the floating sleepers to limit the growth of the flooring results in the loosening of nails, buckling in humid periods, and objectionable shrinkage under dry conditions such as those encountered during winter months.

In flooring systems, therefore, in which the floor boards are secured to floating sleepers the boards expand almost at will as a result of which the floor buckles at the wall and also pulls the nails loose from the sleepers.

In such systems, where expansion has been permitted to occur, upon reduction of moisture content shrinkage occurs leaving cracks between the boards. Proper maintenance of such floors is almost impossible, the tightness and holding action of the tongues and grooves is lost, dirt can work its way between the boards so that it prevents subsequent closing of the cracks, and this causes further destruction and pulling out of the nails.

In flooring systems where fixed sleepers were employed this necessitated the use of anchors applied through the sleepers and through the slab but these were expensive to apply, punctured the membranes and prevented possible cushioning action of the floor.

It is the principal object of the present invention to provide a flooring system preferably utilizing edge tongued

and grooved floor boards in which the boards are mounted on support members and in which the support members are restrained along their longitudinal axes.

It is a further object of the present invention to provide a flooring system utilizing floor boards mounted on support members with nails retaining the floor boards firmly gripped with respect to the support members, a ribbon like band or bands or other formed section of metal or the like being interposed between the floor boards and the top face of the support members.

It is a further object of the present invention to provide a flooring system utilizing floor boards mounted on support members in which the support members are individually held against growth along their longitudinal axes and against movement with respect to each other.

It is a further object of the present invention to provide a flooring system utilizing floor boards mounted on support members with interposed stabilizing and strengthening elements of the desired cross section to provide the desired tensile and shear strength.

It is a further object of the present invention to provide a flooring system of the character aforesaid which will be easy to install and in which the floor boards will be effectively retained in place in use.

It is a further object of the present invention to provide a flooring system of the character aforesaid which may have the support members cushioned, if desired.

Other objects and advantageous features of the invention will be apparent from the description and claims.

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawing forming part thereof; in which:

FIGURE 1 is a plan view of a portion of a flooring system in accordance with the invention;

FIG. 2 is a vertical sectional view, enlarged, taken approximately on the line 2—2 of FIG. 1;

FIG. 3 is a vertical sectional view taken approximately on the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary sectional view, similar to FIG. 2 showing a different type of nail for holding the floor boards to the support members;

FIG. 5 is a view in perspective of one of the cushioning elements which can be employed beneath the support members;

FIG. 6 is a view in perspective of a machine applied nail which can be used for holding the floor boards in place; and

FIG. 7 is a view in perspective of a hand driven nail which can be used for holding the floor boards in place.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

In accordance with the present invention floor boards are mounted on support members, such as sleepers, with strips or formed sections of metal or other suitable material extending continuously along the upper or other faces of the support members and with the floor boards resting thereon. The floor boards are held in place by fasteners which extend through the floor boards, and into the support members, the strips or formed sections also being secured to the support members in any desired manner, and those members as thus held being stabilized as to their length individually and in series. The support members can advantageously be carried on spaced resilient cushions, and a film or membrane therebelow prevents access of moisture from the foundation which can be of concrete or of any other material.

Referring now more particularly to the drawings it will be noted that a supporting foundation or base 10, which may consist of wood, concrete, or other material is provided upon which a plurality of parallel support members 11 such as sleepers are carried. The support members 11 are preferably of wood, of relatively short lengths, and in a particular embodiment can be nominal 2 inches by 2 inches or actual 1½ inches by 1½ inches and on 8 inch centers. The support members 11 have upper horizontal faces 12 and lower horizontal faces 13.

It is preferred that a waterproofing and vaporproofing coating 14 be applied on the base 10 prior to placing the support members 11.

The coating 14 can be an asphalt adhesive or mastic, or can be a vinyl film or sheet.

It is also preferred where a cushioned floor is desired to interpose cushions or resilient pads 15, such as shown in FIG. 5, which may be square in plan of a width corresponding to that in support members 11, and of a thickness of the order of one eighth of an inch along each of the lower faces 13 at desired intervals, for example on 8 inch centers.

The pads 15 are preferably of rubber, natural or synthetic, made as extrusions, and with elongated openings 16 to enhance the resiliency.

The support members 11 individually and each row are stabilized in length and against buckling by strips or formed sections secured thereto and for this purpose in a preferred embodiment each row of support members 11 has, extending along the upper horizontal faces 12, a band or ribbon 18, preferably of metal, preferably free from corrosion or rusting and capable of perforation by automatic nailing or manual nailing. The band or ribbon 18 is preferably of a width equal to the width of the support members 11, but in any event is of a width sufficient to provide the desired tensile strength to prevent change in length of individual support members 11 or of the overall length of each row or a selected part of each row of support members 11 as hereinafter pointed out. The thickness of the band or ribbon 18 is preferably such as to provide adequate shear strength to prevent tearing by the nails, as hereinafter pointed out.

The floor boards 20 employed in connection with the flooring system of the present invention are of wood, which can be hardwood such as hard maple, or oak, or can be of softer wood, such as yellow pine.

The floor boards 20 are preferably of conventional type with flat top faces 21, longitudinal edge tongues 22 of any desired configuration, with upper and lower vertical longitudinal edge faces 23 and 24 therealong. The floor boards 20 on their edges opposite to those provided with the tongues 22 have longitudinal edge grooves 25 for the reception of the tongues 22 of contiguous boards 20, and preferably with a relatively snug fit and floor boards 20 with normal manufacturing tolerances are suitable. The floor boards 20 have upper and lower vertical side edge faces 26 and 27, respectively above and below the edge grooves 25 and have bottom faces 28. In a particular embodiment the floor boards 20 can be of a thickness of 25/32 inch but are not limited to this thickness.

As is customary in this type of floor board 20, the lower faces 24 and 27 are respectively inset with respect to the upper faces 23 and 26 and the groove 25 is of greater depth than the horizontal transverse dimension of the tongue 22.

When the boards 20 are in place, with the tongues 22 extending into the grooves 25, the faces 23 and 26 are in engagement and the faces 24 and 27 are separated to provide a clearance therebetween. The floor boards 20 are held in engagement with the bands or ribbons 18 and the support members 11 by nails 30 (FIG. 6) or 31 (FIG. 7) which extend from the junction of the upper face 23 and the tongue 22 at an angle with respect to the bottom faces 28 through the band or ribbon 18 and angularly into the support members 11.

The nails 30 shown in FIG. 6 are suitable for machine nailing while the nails 31 shown in FIG. 7 are suitable for manual nailing.

The mode of installation and of use will now be pointed out.

The base 10 with the film or coating 14 thereon has the support members 11 placed in spaced parallel relation with resilient pads 15 interposed therebelow at the desired intervals if desired. The bands or ribbons 18 are mounted on the upper faces 12 of the support members 11, preferably in a continuous relation along each row of support members 11. A floor board 20 is placed in position, and a nail 30 or 31 is driven diagonally from the intersection of the upper edge face 23 and tongue 22 so as to puncture the band or ribbon 18 and enter the support member 11. The nails 30 or 31 are applied at each intersection of a floor board 20 and support member 11. The next board 20 has its edge groove 25 brought into meeting relation with the tongue of the previously mounted board 20, with the upper edge face 26 engaging the upper edge face 23, and is secured in place by nails 30 or 31.

The plurality of nails 30 or 31 in engagement through each band or ribbon 18 holds the support member 11 against change in length within each support member 11 and also holds each row of support members 11 against change in length.

Any system of support members 11 can be employed with the support members 11 fixed or floating with respect to the base 10.

The use of the band or ribbon 18 at the location indicated provides a dynamic center of action with the load transferred to the band or ribbon 18. The thrust of the flooring above the stabilizing strip neutralizes the thrust of the sleeper under conditions of expansion so that no unbalanced thrust which would produce buckling can become effective in this embodiment.

The construction heretofore described can be quickly installed by preventing the support members 11 from falling during installation.

A stable floor is provided which permits of the use of a low cost molding around the perimeter because of the elimination of expansion and contraction.

It will accordingly be clear that the flooring system of the present invention can be easily installed and is effective for carrying out the objects of the invention.

I claim:

1. A flooring system comprising a foundation,

wooden support members on said foundation, said wooden support members being free from mechanical attachment to said foundation,

a plurality of parallel floor boards superposed on said wooden support members,

board fastening members holding said floor boards to said wooden support members, and

strip like restraining members extending along said wooden support members below said floor boards and spaced above said foundation,

said strip like restraining members being attached to said wooden support members so as to cause said wooden support members to resist the upward lifting thrust of said floor boards under conditions of expansion,

said attached restraining members being essentially free from dimensional changes in the presence of moisture and retaining said wooden support members against growth parallel to the longitudinal axis of said wooden support members.

2. A flooring system as defined in claim 1 in which said support members have upper faces, and said strip like restraining members are disposed between said floor boards and said upper faces.

3. A flooring system as defined in claim 2 in which said floor boards have said board fastening members

5

extending therethrough and into said support members.

4. A flooring system as defined in claim 3 in which said fastening members extend through said restraining members.

5. A flooring system as defined in claim 1 in which said floor boards have tongues and grooves, and said floor boards have said board fastening members extending therethrough, and said board fastening members extend downwardly and inwardly of said boards from immediately above the tongues.

6. A flooring system as defined in claim 2 in which said floor boards have edge tongues and grooves with the tongues extending into the grooves, and said board fastening members extend from upper side edge faces of said boards immediately above the tongues diagonally downwardly and inwardly and extend downwardly from the upper faces of the support members and into said support members at an angle with respect to said upper faces.

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U.S. Cl. X.R.

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