United States Patent

[11] **3,579,941**

[72] Inventor **Howard C. Tibbals**
P.O. Drawer A, Oneida, Tenn. 37841

[21] Appl. No. **777,070**
[22] Filed **Nov. 19, 1968**
[45] Patented **May 25, 1971**

[54] **WOOD PARQUET BLOCK FLOORING UNIT**
6 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **52/384,** 52/390, 52/436, 52/593
[51] **Int. Cl.** **E04b 5/00,** E04f 15/04, E04f 15/16
[50] **Field of Search** 52/384, 388, 390, 391, 595, 593, 436

[56] **References Cited**

UNITED STATES PATENTS

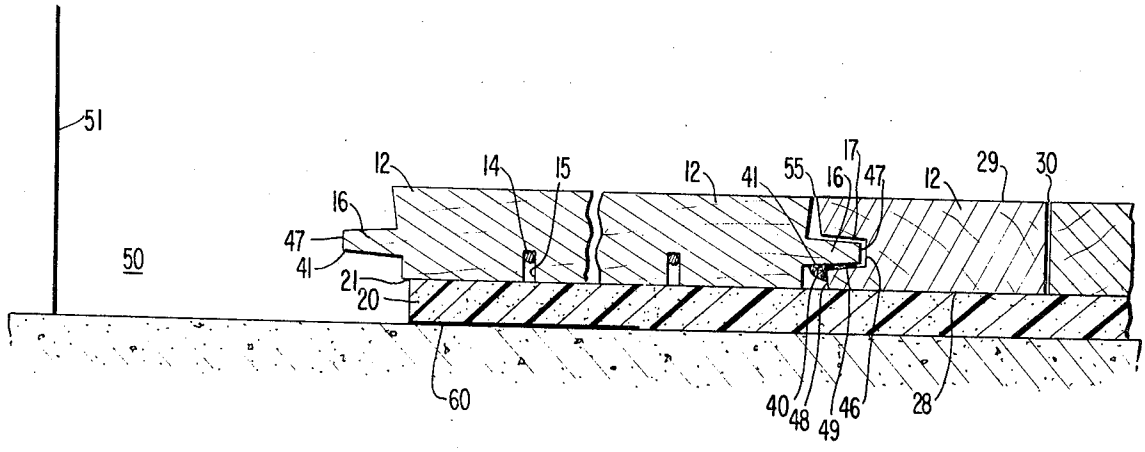
2,027,292	1/1936	Rockwell	52/595
2,091,476	8/1937	Elmerdorf	52/313
3,014,829	12/1961	Cartin	52/309
3,082,488	3/1963	Nasbaum	52/309
3,121,977	2/1964	Bersudsky	52/388
3,200,553	8/1969	Frashour	52/595

FOREIGN PATENTS

63,687	1955	France	52/586
305,801	1929	Great Britain	52/586
670,646	1952	Great Britain	52/309
812,671	1959	Great Britain	52/392

Primary Examiner—Henry C. Sutherland
Attorney—Beveridge & De Grandi

ABSTRACT: Wooden parquet block flooring incorporating cellular foam in multiple parquet block units having rubber-like flexible adhesive joining tongue and groove formations within the multiple block unit.



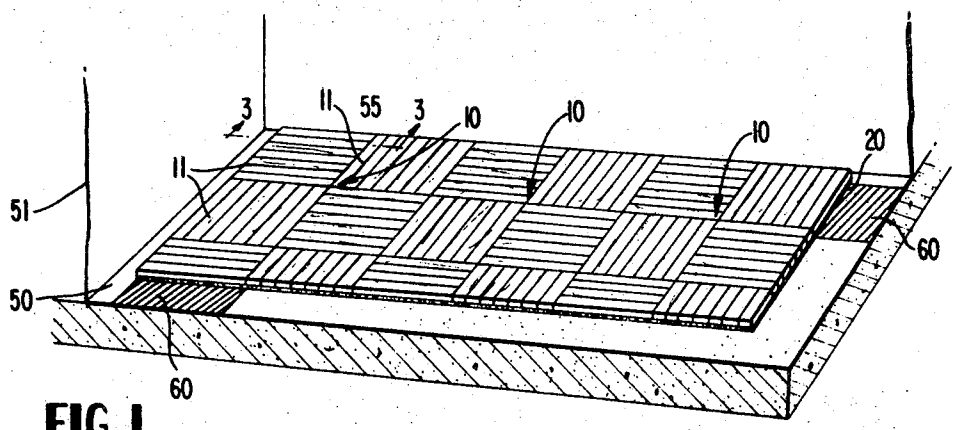


FIG. 1

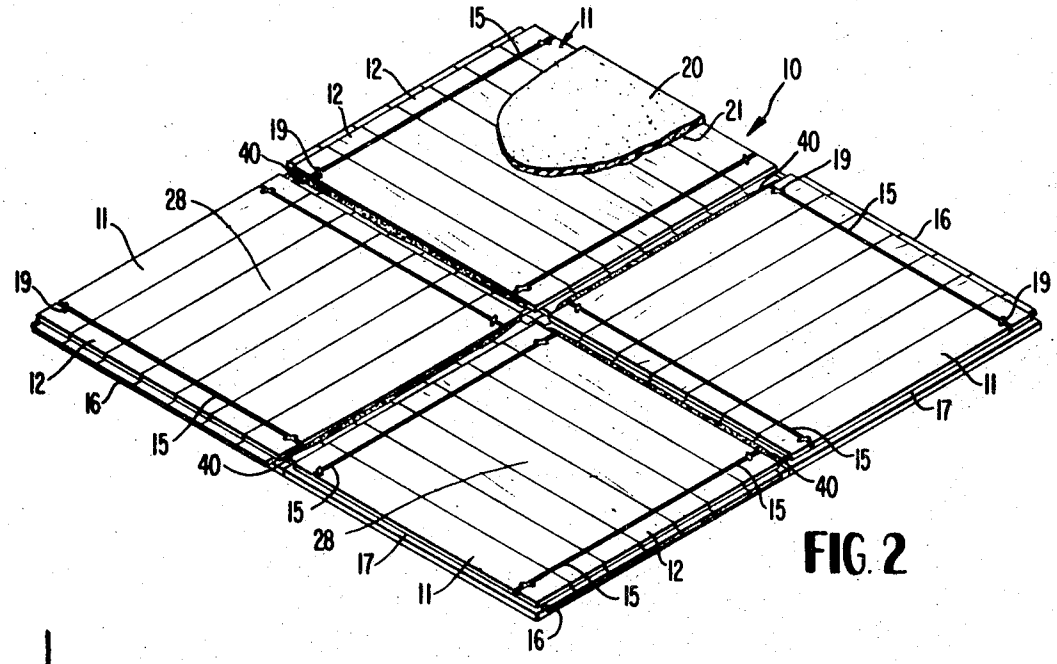


FIG. 2

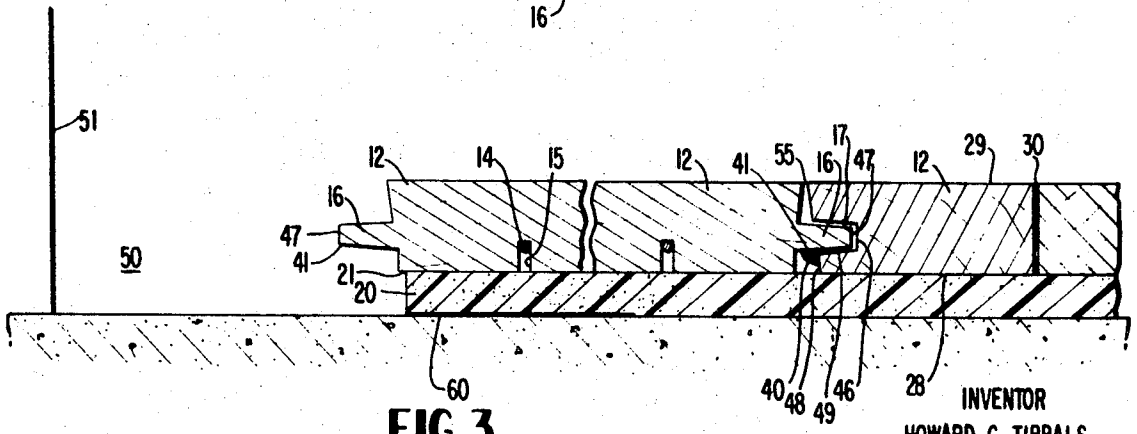


FIG. 3

INVENTOR
HOWARD C. TIBBALS
BY
Browne, Schuyler & Beveridge
ATTORNEYS

WOOD PARQUET BLOCK FLOORING UNIT

The present invention relates to parquet flooring and more particularly to multiple parquet floor block units.

Prefinished relatively thin, slatted parquet flooring block units as disclosed in Tibbals U.S. Pat. No. 3,128,511 have been successfully used for many years in various types of structures. In the past, such individual block units have been layed in mastic directly on wood or concrete slab subfloors. Such individual blocks as disclosed in U.S. Pat. No. 3,128,511 have usually been in 6×6 inch squares whereby in the laying of a floor, each individual block is handled and fitted into place separately by the workmen. A similar block is disclosed in Tibbals U.S. Pat. No. 3,118,804 in which the slats making up the block are held in assembly by a paper-felt strip adhesively secured to the nonwear surfaces of the slats.

It is known to secure such blocks in parquet fashion by staples having legs driven into the adjacent block edges to form multiple block units for accelerated installation of a floor. It is also known to secure such blocks in parquet pattern by adhering the blocks to some form of semirigid underlayment such as Celotex for sound deadening and like purposes. Use of a flexible material to join square edged individual slats into subblock units and subblocks into larger assembly is likewise known. Furthermore, in the installation of conventional strip floors it is a known practice to cover the subfloor with felt, building paper, cork, etc. to act as a dust, sound, air moisture barrier. There is also known vinyl tile and carpet floor covering materials incorporating foam cushioning. It is also known to provide foam as insulation in wood structures including flooring.

Objects of the present invention include the provision of an improved wood parquet block floor system, multiple wood parquet flooring block units for accelerated laying of a floor, a foam cushioned wooden parquet floor block assembly having a built-in dust, sound, air and moisture barrier and an improved cushioned parquet block floor which is relatively inexpensive.

The invention features a plurality of individual parquet block units, each individual block having tongue and groove formations on the perimetrical edges thereof which cooperate with tongue and groove formations, respectively, on adjacent blocks within a multiblock unit. A flexible, nonbrittle adhesive bead, applied to the tongue and groove of the block, holds the block units in assembly at least prior to laying. The flexible, rubbery, adhesive bead maintains the edges between adjacent blocks spaced apart a short distance to permit thermal and moisture expansion and flexibility of the multiple block structure so as to conform to uneven subfloor system. A compressible foam cushioning material, preferably a closed cell foam, as for example a closed cell polyethylene foam, is adhesively secured to the under or nonwear surfaces of all blocks in a unit which foam cooperates with the adhesive joint at the tongue and groove connections to maintain the blocks in assembly and afford a built-in dust, sound, air and moisture barrier. After installation the adhesive joint between tongue and grooves tends to fail in shear because of relative movement between tongue and groove surfaces caused by walking on the floor. However, since the adhesive is nonbrittle and flexible, noise, as for example squeaking, is diminished or absent. While in locations where moisture or extremely heavy traffic conditions are likely to develop or in unusually long run areas of floor, such units usually will be laid in a mastic or other adhesive, the blocks may also be laid dry with only the perimeter blocks of a floor being secured to the subfloor. For "piecing out" at walls, transitions to other flooring, etc. the units may be sawed or otherwise dimensioned in the usual manner.

The above and other objects, advantages and features of the invention will become more apparent taken in conjunction with the attached drawings in which:

FIG. 1 is an isometric perspective cutaway view of a floor consisting of multiunit parquet blocks constructed in accordance with the invention,

FIG. 2 is a bottom perspective view of a multiple parquet block unit constructed in accordance with the invention with the foam cushioning partially removed to expose the under surface of the individual blocks, and

FIG. 3 is an enlarged cross-sectional view taken on lines 3–3 of FIG. 1.

Multiple unit parquet flooring blocks **10** illustrated in FIG. 2 are composed of a plurality of individual parquet flooring blocks **11** as manufactured by the process and apparatus disclosed in U.S. Pat. No. 2,983,295, for example. The individual slats **12** of a group of slats forming a parquet block may be formed from otherwise scrap material left over from the manufacturer of conventional hardwood flooring strips. Typically, such slats have a wear surface length of about 6 inches, a width of about twenty-eight thirty-seconds inch (the end or terminal slats being somewhat less) and a thickness of about five-sixteenths inch. The slats **12** in each individual block **11** are held in assembly by a pair of small gauge ductile wires which have a low inherent resiliency. Typically, such wires may be aluminum or soft steel with a diameter of about 0.050 inch. However, other forms of slat binding elements or means may be used, as for example adhesive, paper, metal foil, plastic or cloth strips, webs, etc. and the binding elements may be located in grooves in the edge of the block. As shown in FIG. 2, the wires terminate short of the outside edges of the block where deformed or deflected ends **19** of the wire binding elements form an elongated staple and effectively maintain a group of slats in assembly while maintaining a desired spacing **30** between adjacent slats in the assembly sufficient to accommodate normal expansion and contraction of the slats (for slats having a wear surface dimension of about twenty-eight thirty-seconds inch a spacing of about 0.008 inch is generally sufficient.) The finishing material (not shown) applied to the upper block surfaces bridges the interstices formed by spacing 30 so as to conceal the same while still accommodating slat expansion. The individual slats **12** of each individual block **11** is, in a preferred embodiment, approximately 6 inches long (wear surface) twenty-eight thirty-seconds inch wide and approximately five-sixteenths of an inch thick. As shown, seven (more or less, larger or smaller, slats may be used) slats in assembly form a block having a wear surface **12** which is approximately 6 inches by 6 inches (after the tongue and grooves have been cut) so that four such blocks form a multiple block unit having a 12 inch by 12 inch wear surface. This size is easily handled by workmen for accelerated installation of a floor. As disclosed in Tibbals U.S. Pat. No. 2,983,295, individual slats **12** of parquet blocks **11** are assembled on an arcuate surface or drum (not shown) with the nonwear surfaces **28** being outward and wires **14** are urged into grooves **15** so that when the blocks having the wires in groove **15** are removed from the drum, the expansion space **30** between adjacent slats is formed to accommodate thermal and moisture expansion and contraction in the individual slats.

Each block **11** has tongue and groove formations on the edges thereof. Thus, transverse to the longitudinal dimension of the individual slats is tongue element **16** and longitudinal to the length of the terminal slats is groove **17** , cooperating, respectively, with tongue and groove formations on an adjacent similar block.

As shown in FIG. 3, the tongue and groove connection between adjacent blocks is of the taper lock type in that the tongue and groove have complementary sloping surfaces. Furthermore, the wear surface edge extends slightly beyond the lower or nonwear surface edges. A flexible, rubbery, nonbrittle adhesive or glue bead **40**, preferably a hot melt adhesive, is applied to the lower (FIG. 3) surface **41** of tongue **16** which, preferably has been preheated to permit hot melt adhesive to better penetrate the grain of the wood. In application of flexible adhesive bead **40**, it is preferred that no adhesive be permitted to reach edge **47** of tongue **16**. For this reason, in the assembly process, two adjacent blocks may be moved along the assembly line (not shown), nonwear surfaces **28** up, tongue and groove in interfitting relation and at a first glue station they are tented upwardly to partially withdraw the tongues **16** from grooves **17** along one pair of aligned tongue and

groove joints. At that time, the joint is preheated and a line or bead of adhesive is layed along the tongue surface **41**, the edge **48** serving as a dam or stop to the adhesive during application thereof. After the adhesive bead **40** is applied, the blocks are urged to approximately a common plane to cause the tongue **16** to assume interfitting relation in groove **17** in the adjacent block. The adhesive is cooled or caused to set when the adjacent blocks are in approximately a common plane to produce the space **55** as described more fully hereafter. In this way, a line of flexible adhesive is formed between the edge **48** and the upper surface **49** of the grooved slot and the lower surface **41** of tongue **16**. A similar flexible adhesive bead is formed along each tongue and groove connection between blocks within the multiple block assembly. Adhesive bead **40** is a high grade hot melt adhesive which after cooling or curing is relatively soft, flexible and pliant and its purpose is to maintain the blocks in assembly prior to installation in a floor. These four adhesive beads **40** are sufficient to hold the four blocks in assembly, even in the absence of foam layer **20**, to permit workmen to lay four blocks at a time. Advantageously, the glue bead **40** is cooled in the manner described so that when the multiblock unit is flat, small space **55** is produced between the edges of adjacent blocks comprising a multiblock unit. In addition to accommodating the cushioning effect, this crack or space permits the unit to have the necessary flexibility so that the multiblock unit will conform to uneven subfloors and also accommodate additional expansion in the plane of the floor. However, space **55** is about 0.015 inch and is not large enough to be unsightly.

Foam layer or sheet **20** is adhesively secured to all blocks by a layer of adhesive **21** which may be a hot melt adhesive. However, this adhesive may be of lower quality adhesive or glue and is much less expensive than that used to form flexible adhesive bead **40** and need not be flexible. Adhesive layer **21** may be a low grade byproduct-type hot melt adhesive which is relatively inexpensive. Foam layer **20** has a thickness of about one-third of the thickness of the blocks. This thickness is sufficient to provide the cushioning and sound deadening properties desired and, at the same time, it is not thick enough in relation to thin blocks to permit wood failure or disengagement of the tongue and groove connection between adjacent blocks as when the foam is compressed at the joint between blocks by a heavy concentrated load. Nevertheless, foam layer **20** is thick enough and of sufficient density to provide insulation, reduce air infiltration from below, retard moisture from rising through the floor to the wood slats, and a quieter, "softer" walking floor. In the case of concrete subfloors the foam spaces the wood members from the subfloor so that moisture forming on or coming through the concrete does not directly reach the wood members.

Preferably, the slats are predominately quarter grain to take advantage of the lower expansion factor thereof and the aesthetic appearance of such slats. Prior to being assembled into multiple parquet block units, the individual blocks are finished by application of penetrating sealers, tinting coats and a top coat such as wax, all of which are preferably infrared baked on. Although preferable, the individual slats need not be of the same kind of wood, for example, mixed slats of red and white oak may be used as well as hard maple, white ash, black walnut, etc. all of which may be finished to reveal individual grain patterns and grain variety. Preferably, the number of individual prefinished blocks **12** is four although smaller or larger units may be formed in accordance with the invention. As disclosed in U.S. Pat. No. 3,128,511 slats **12** are held in assembly by knurled wires clinched into the terminal slats of the blocks. However, as indicated above any other slat securement means may be utilized for purposes of this invention.

It is preferred that the individual blocks **12** be prefinished prior to having the foam layer **20** applied thereto. The reason for this is the difficulty in sanding and finishing blocks where grains run in different directions as when the blocks are assembled in parquet fashion. Further, because of the vigorous finishing steps such as sanding, tongue and grooving etc. required as well as the buffing and polishing and infrared baking of the surface finishing, these steps can best be done prior to assembling the individual blocks into a multiple block unit and prior to application of the flexible foam layer **20**.

While in the preferred form of the invention the individual blocks **11** are constituted by a plurality of slats held in assembly by slat binding or connecting elements, the invention is not limited thereto. For example, in place of multislat blocks **11**, laminated or plywood blocks as well as other wood block materials may be used.

The addition of a layer of foam **20** makes the blocks more expensive. However, in the case of the dry-type installation described herein this increase in cost is offset by a decrease in the amount of time to lay a floor and elimination of mastic or other such adhesive so that in general the cost of a dry installed floor may be about the same as without the foam.

In contrast to thick blocks, there is an important relationship between the thickness of thin blocks and the thickness of the foam and foam density. Since it is important that the blocks have tongue and groove connections in order to minimize or eliminate "over wood" between blocks, if the foam layer is too thick or too easily compressed, wood failure tends to occur in thin blocks. For example, with a 5/16-inch thick block having conventional tongue and groove formations on the edges thereof a 3/16-inch thick foam layer would present too much compression or "give" under such concentrated loading tending to wood over stress or failure. In the preferred practice of the invention there is provided a ⅛-inch thick layer of closed cell foam (having relatively small cells and a relative density of about moderate density) for blocks having a 5/16-inch thickness.

Although the blocks may be laid directly in a mastic or other adhesive it may be desirable in some situations (as for example suspended slabs in high rise apartment buildings) to lay the blocks dry, e.g., directly on the subfloor for relatively small floor areas. A dry installation does have an advantage in that foam cells near the surface fill with mastic and the foam may lose a small amount of its softness or cushioning effect. If desired, the foam may be provided with a well-known pressure sensitive adhesive layer on the exterior surface. In a dry installation the only place adhesive or other block securement is used is at the lateral edges of a floor constructed with block units of this invention. The reason for this is that even though the blocks are compensated for slat expansion by built-in expansion joints **30** and interblock spaces **55**, there may be an overall expansion of a floor in the plane thereof. Accordingly, it is conventional practice to leave a 1-inch expansion joint **50** at walls (such as wall **51**) and like structures or abutments which are subsequently covered by a baseboard and/or molding, finish wood work, etc. (not shown). Hence, in dry installation it is preferred to secure the block units laid at the perimeter of a floor to the subfloor so as to prevent block migration. Accordingly, a securement means **60** which may be a tape having pressure sensitive adhesive on both sides, or conventional mastic, is applied to the perimeter of the floor next to the walls and like structures where an expansion joint **50** may be provided. This securement is soft and permanently pliant to accommodate expansion into the expansion joint **50**.

While a preferred embodiment of the invention has been described in detail, it will be understood that modifications might be made without departing from the scope of the invention as defined in the following claims.

I claim:

1. In a multiple block parquet flooring block assembly composed of a plurality of individual parquet blocks, each block having tongue and groove formations on the perimetrical edges thereof interfitted with and cooperating, respectively, with groove and tongue formations on an adjacent parquet flooring block of said unit, the improvements which comprise, in combination,

a cured adhesive bead between the under horizontal surface portions of each cooperating tongue and lower horizontal

groove surface only of individual blocks in said multiple block parquet flooring block assembly,

said adhesive bead being a hot melt applied adhesive having a permanently relatively soft, permanently flexible character and maintaining the edges between and adjacent blocks in said unit spaced a short distance apart to permit expansion or contraction and flexibility of the said multiple block structure so as to conform to an uneven subfloor system in the plane of the block, and

a single thin sheet of closed cell flexible foam commonly secured to the nonwear surfaces of all of said individual blocks,

whereby individual parquet flooring blocks in said multiple block parquet flooring block structure prior to being laid on a subfloor surface are held in a semirigid parquet block oriented pattern by said adhesive and said flexible foam sheet and said sheet of flexible foam providing an air, moisture, heat and sound barrier and cushioning for said blocks and permitting use of said block assembly on an uneven subfloor surface.

2. A multiple block parquet flooring block assembly consisting of a plurality of individual parquet blocks, each individual block having tongue and groove formations on the perimetrical edges thereof interfitted with and cooperating, respectively, with groove and tongue formations on an adjacent parquet flooring block of said multiple block assembly

a cured adhesive bead between the under horizontal surface portions of each interfitted cooperating tongue and lower horizontal groove surfaces only of individual blocks in said multiple block structure,

said cured adhesive bead being a hot melt applied adhesive which is permanently flexible and soft and maintaining the edges between adjacent blocks in said unit spaced a short distance apart to permit contraction or expansion and flexibility of the said multiple block assembly so as to conform to an uneven subfloor surface in the plane of the block, and

whereby individual parquet flooring blocks in said multiblock parquet flooring block assembly are held in a semirigid, parquet oriented pattern by said flexible adhesive beads.

3. The invention defined in claim **2**, including a layer of foam secured to the nonwear surfaces of said blocks and forming a built-in dust, sound, air and moisture barrier for said blocks and cooperating with said flexible adhesive bead to maintain said blocks in said parquet oriented pattern prior to installation of same on a subfloor and permitting use of said multiple block unit on an uneven subfloor said foam being of the closed cell type having relatively small cells.

4. The invention defined in claim **3** wherein said blocks are about 5/16-inch thick and said foam layer is about ⅛-inch thick.

5. The invention defined in claim **3**, wherein said foam layer is secured to the nonwear surfaces of said blocks by a cured, low grade, hot melt adhesive film between the nonwear surfaces of all of the blocks in said multiple block parquet flooring block unit and the opposing surfaces of said foam layer.

6. A floor system comprising, in combination,

a plurality of thin wooden floor blocks, each block having tongue and groove formations on the perimetrical edges thereof, said blocks being arranged in parquet block formation with tongues and grooves of adjacent blocks in interfitting relation and said individual blocks forming the wear surface of said floor system, said thin wooden floor blocks being about 5/16 inch thick,

a cured adhesive bead between the under horizontal surface portions and lower horizontal surface portion only of a groove into which it is interfitted,

a layer of cellular foam adhesively secured by a hot melt adhesive to said blocks, said layer of cellular foam being thinner than said blocks and resting on the surface of the subfloor of said floor system, said foam being a closed cell foam and having a thickness of about one-third the thickness of said blocks, said foam layer forming an air, moisture, heat and sound barrier and cushioning for said blocks,

said blocks terminating short of the perimeter of said subfloor to accommodate overall expansion of said floor in the plane thereof, and

pliant means for impeding substantial lateral movement of at least the perimetrical blocks forming said floor wear surface which comprises means yieldingly securing said perimetrical blocks to said subfloor.