

Nov. 16, 1971

R. E. OMHOLT

3,619,963

FLOORING SYSTEM

Filed July 31, 1969

FIG. 1

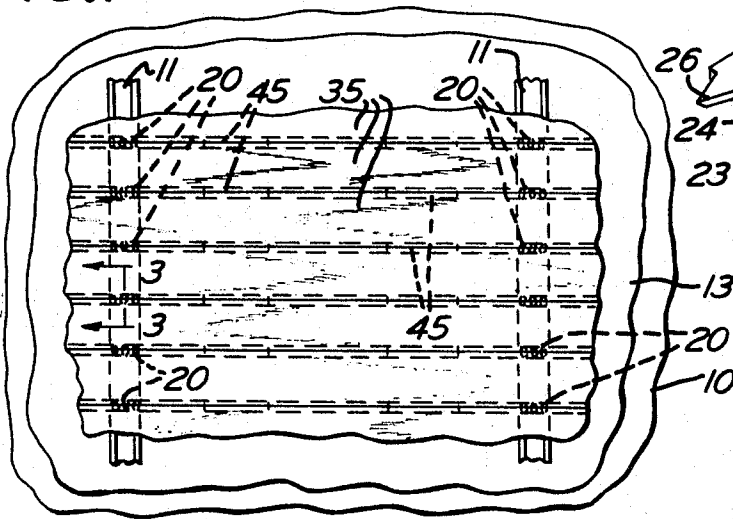


FIG. 5

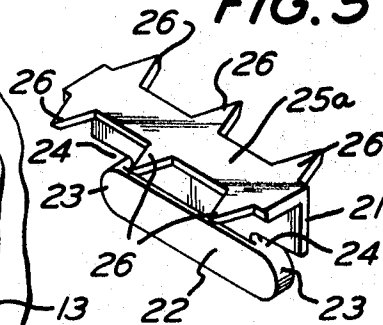


FIG.2

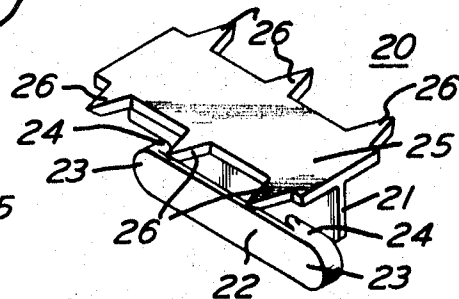


FIG. 3

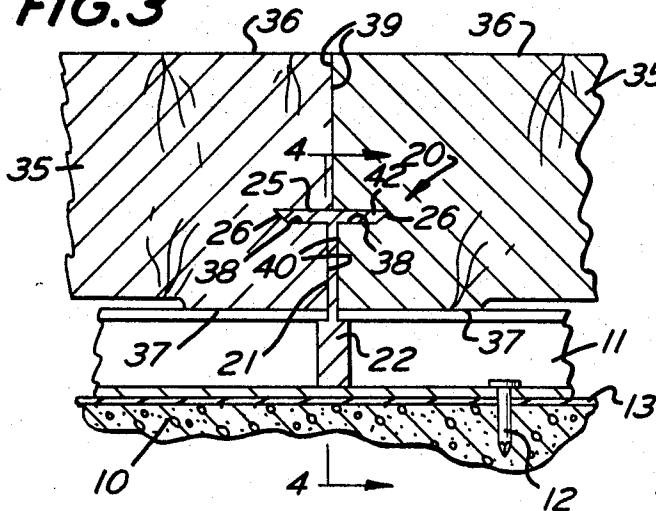


FIG. 4

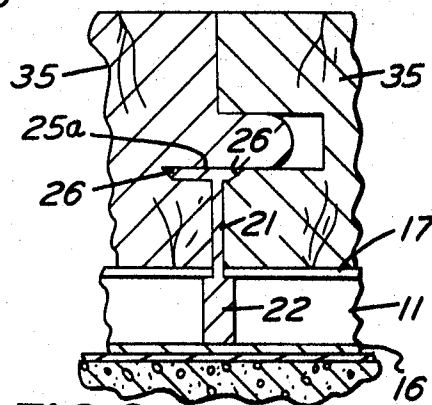
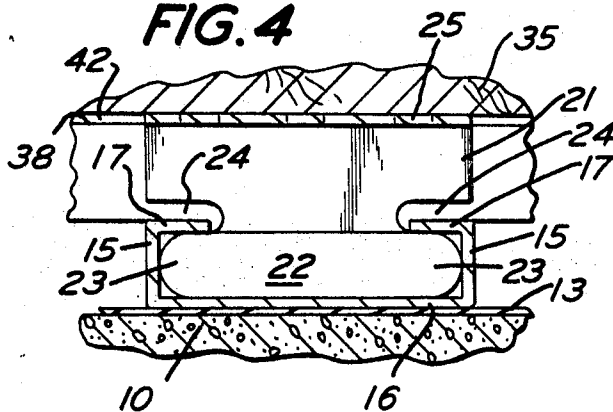


FIG. 6

INVENTOR

RAY E. OMMOLT

BY

BY B. J. Wobensmith

ATTORNEY

1

3,619,963

FLOORING SYSTEM

Ray E. Omholt, Berwyn, Pa., assignor to Powerlock Floors, Inc., Philadelphia, Pa.

Filed July 31, 1969, Ser. No. 846,323

Int. Cl. E04b 5/00; E04f 15/02

U.S. Cl. 52—483

2 Claims

ABSTRACT OF THE DISCLOSURE

A flooring system utilizing wood floor boards, the boards being supported on transversely disposed spaced channels, metallic holding clips securing the boards in bearing engagement with the channels, the boards having side edge slots for clip engagement, the clips engaging the channels each having a web portion vertically disposed between the boards and having, at the upper margin of the body portion a horizontally extending plate portion with opposing parts on each side extending into one or more edge grooves, the horizontally extending plate portion being highly resistant to bending and distortion under stress with respect to the web. The opposing parts of the horizontal plate are in fiber penetrating relation on opposite sides, so that the bending forces in the plate portion substantially or totally balance each other to limit bending distortion which would otherwise occur in the web if the forces were not so balanced, the strength being determined by the wood in shear without appreciable reduction in holding power caused by deformation of the clip itself.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to flooring systems and more particularly to wood flooring systems having wooden floor boards secured to channels by metal clips.

DESCRIPTION OF THE PRIOR ART

Various systems for applying, mounting and securing floor boards upon a subflooring of concrete or the like have been proposed but these have had limitations based upon their construction and many of these did not adequately secure the boards in place.

It has heretofore been proposed to utilize, in a flooring system, conventional tongued and grooved floor boards with hold-down clips. Typical examples are those of Cherry, U.S. Pat. No. 2,057,135, Urbain, U.S. Pat. No. 2,046,593, Tonn, U.S. Pat. No. 1,986,030 and Wiegert, et al., U.S. Pat. No. 2,469,252, which employ clips which engage between the tongue and groove of floor boards or panels. None of the systems heretofore referred to has proven wholly satisfactory because of the necessity of oversize grooves to avoid splitting, as well as other shortcomings. There are serious limitations on the total holding power available with the hold down clips heretofore available engaging in slots, grooves and the like, and also in slots below tongues which seriously limit their ability to sustain vertical loads.

The structures in the U.S. patents to Tonn, No. 1,986,030 and to Wiegert et al., No. 2,469,252, employ clips which engage between the tongue and groove of floor boards or panels. These constructions require either a very loose and sloppy fit between the tongue and groove, or if there is a tight fit between the tongue and groove with a special clip groove beneath the tongue, then a weakened cantilever portion of the wood extends below the clip groove which tends to break during installation or in the use of the floor.

2

In my application for Letters Patent for Flooring Systems, filed Jan. 31, 1968, Ser. No. 702,005, there is shown a flooring system employing clips but these clips grip the boards above the level of the lower margins of the tongues of the tongued and grooved edges of the boards, portions of the tongues being removed to accommodate the upper parts of the clips. The structure of the present invention does not require such removal.

In my prior Pat. No. 3,031,725, a flooring system is shown which is satisfactory but with which there are inherent limitations of the holding power of the clips.

In my prior application Ser. No. 724,799, filed Apr. 29, 1968, a flooring system is shown in which an improved clip is provided but this requires a tightly engaging edge tongue and groove on the boards to transfer the load to the clip. This construction also has inherent limitations on the holding power of the clips.

In the flooring systems heretofore referred to the maximum vertical holding force capable of being attained per clip was of the order of six hundred pounds, even using a very heavy steel clip of intricate design.

The flooring system of the present invention by reason of the construction of the clip in its relation to the boards permits of increasing the holding force of the clips a plurality of times without requiring a thick bending resistant steel web.

SUMMARY OF THE INVENTION

In accordance with the present invention a wood flooring system is provided in which boards are secured to channels carried by the foundation, the securing being effected by clips having horizontal plate portions extending into the boards on each side, the horizontal plate portions resisting bending and penetrating the wood in opposing relation at both sides so that the maximum strength or holding power of the clips is the strength of the wood in shear at the clips since little or no distortion occurs in the clips where the horizontal plate is joined to the web.

It is the principal object of the present invention to provide a flooring system utilizing floor boards with one or more side edge grooves in which the boards are most effectively held in place by clips which have a greatly enhanced anti-buckling and anti-cupping restraining action, the restraining action being aided by opposed resistance to bending of horizontal board penetrating portions of the clips.

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 most effectively retained in place in contrast to flooring systems heretofore available.

It is a further object of the present invention to provide a flooring system in which buckling of the boards is prevented, permanent cupping or warping of the boards is limited or eliminated, the manner of holding of the boards is such as to prevent loosening of the boards upon repeated flexure, and in which splitting of the boards under heavy load is prevented.

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

BRIEF DESCRIPTION OF THE DRAWINGS

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

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

FIG. 2 is a view in perspective of a hold down clip employed in one preferred embodiment of the invention;

3

FIG. 3 is a vertical sectional view, enlarged, taken approximately on the line 3—3 of FIG. 1;

FIG. 4 is a vertical sectional view taken approximately on the line 4—4 of FIG. 3;

FIG. 5 is a view in perspective of another preferred embodiment of a hold down clip in accordance with the invention; and

FIG. 6 is a view similar to FIG. 3 showing the clip of FIG. 5 in hold down position.

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.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawings, it will be noted that a supporting base 10, which may consist of wood, concrete or other subfloor, is provided upon which a plurality of channels 11 are secured in parallel relation and in level condition, preferably by the use of explosively applied fasteners 12, and with a waterproofing membrane 13 covering the top face of the base 10 and with the channels 11 thereon.

Each of the channels 11 has side marginal portions 15 extending upwardly from the web 16 with inwardly horizontally extending rims 17 substantially parallel to the web 16.

The channels 11 are formed to close dimensional tolerances for enhancing their clip holding action, as herein-after explained. The channels 11 can be made of any desired material of adequate strength and preferably of steel, a thickness of sixteen gage being employed in a preferred embodiment with a heavy galvanizing or other resistant coating to resist rusting.

A plurality of hold down clips 20 are provided, preferably of metal, each having a vertical web portion 21, and a lower base 22 preferably of greater thickness than that of the web 21 and with rounded ends 23.

The web 21, immediately above the base 22, has notches 24 extending inwardly at each end.

At the upper end of web 21, a horizontal plate portion 25 is provided of a strength to resist bending transversely, as hereinafter explained, and which accordingly for a given metal may be of greater thickness than that of the vertical web 21. The same effect of greater resistance to bending can be obtained by the use of alloys and the like.

The horizontal plate portion 25, as shown in FIG. 2, is symmetrical with respect to the web 21, and includes a plurality of opposed horizontally extending wood penetrating prongs 26 on each side.

In the form of clip shown in FIGS. 5 and 6, the horizontal plate portion 25a is asymmetrical with respect to the web 21, and includes opposed prongs 26 as in the form of clip shown in FIG. 2.

In particular embodiments of the invention, the clips 20 can be of aluminum, the horizontal plate portions 25, 25a, can be of 10-gage thickness and the web 21 can be of 13-gage thickness. Similar results, in so far as resistance to bending is concerned, can be obtained by the use of steel alloys.

The floor boards 35 employed with the flooring system are of wood which can be milled or shaped to close dimensional tolerances, hard maple being particularly suitable.

Each of the floor boards 35 used in connection with the system of the present invention preferably has flat longitudinal top and bottom faces 36 and 37 and at a predetermined distance from the bottom face 37, has a longitudinal slot or groove 38 formed therealong on one or both sides thereof.

4

The grooves 38 in accordance with the present invention can be about one-third of the distance between the top face 36 and the bottom face 37, and closer to the bottom face 37 than to the top face 36, so that an increased wearing part is provided on each board 35 while still providing adequate holding and avoiding splitting.

Each floor board 35 has in the embodiment of FIG. 3, an upper vertical side wall face 39 extending upwardly from the groove 38 and a lower vertical side wall face 40 extending downwardly from the groove 38 offset from the upper face 39 so that the offsets of a pair of boards 35 provides a space to accommodate the web 21.

The vertical dimension of the grooves 38 is preferably slightly greater than or equal to the thickness of the horizontal plate portion 25 of the clips 20 and the depth to the root surface 42 thereof is preferably such as to accommodate the horizontal plate portions 25 with the prongs 26 when the clips 20 are seated, penetrating the wood beyond the root surface 42.

The grooves 38 also serve for the reception of holding inserts or splines 45 which are positioned intermediate the clips 20 and channels 11 and inserted under pressure for retaining the boards 35 against independent deflection between the clips and prevent midchannel board cupping, squeaks and dead spots.

The construction in FIGS. 5 and 6 is similar to that of FIGS. 2 and 3 except for the use of tongued and grooved boards and a groove 38, on the left side only for the plate portion 25a on that side.

A function of the groove 38 is to provide an engaging position for the clips 20 upon assembly which in no way interferes with the desired tight tongue and groove or tight spline and groove relationship.

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

The channels 11 are mounted in spaced parallel relation, as heretofore pointed out.

While any preferred spacing of the channels 11 can be employed, a spacing of the order of 12 inches between centers has been found satisfactory for many types of use.

With the channels 11 secured in place, clips 20 are inserted in the channels 11 and turned so that the web portions 21 and base portions 22 thereof are transversely disposed with respect to the channels 11. Upon turning the clips 20 they will be moved to a position with the bases 22 in firm gripping engagement with the rims 17 and the vertical portions 15.

The floor boards 35 are now brought successively to positions with their lower faces 37 supported by the upper faces of the rims 17 and are moved to positions to engage with the plate portions 25, or 25a in the grooves 38 and with the prongs 26 penetrating the boards beyond the root surfaces 42. The upper side edge faces 39 are brought into engagement with the lower side faces 40 spaced to accommodate the webs 21 of the clips 20.

At predetermined locations between the clips 20 for FIG. 3 the holding inserts or spline 45 are provided and prevent mid-span independent movement or deflection of one floor board 35 with respect to the next at the locations at which the inserts 45 are provided.

The clips 20 with their horizontal plate portions 25 or 25a engaged against the lower faces of the grooves 38 exert a hold down force much greater than achieved heretofore because of their great resistance to bending resulting from substantial balancing of internal bending forces in the horizontal plate portions 25 and 25a. There is accordingly little or no cantilever bending action of the wood under groove 38 as in prior flooring systems, the webs 21 primarily acting as tension members to hold the plate portions 25 or 25a with respect to the channels 11. The clips 20 are anchored in the wood so that the

5

strength of the wood in shear rather than in bending under the groove 38 is the limiting factor.

Further, by essentially balancing the shearing action of the clip 20 with one shear point opposed to the other, as with the clips of FIG. 2 distortion of the web 21 by unequal bending force application thereto is eliminated. For this reason the clip 20 of FIG. 2 is more effective than that of FIG. 5 which, although somewhat out of force balance, still gives greatly improved hold down action over prior clips.

The flooring system of the present invention has, by reason of the clips 20 a holding power of the order of more than twice that of clips heretofore available. Attendant on the increased hold down action of the clips 20 is the elimination of the necessity for using channels 15 more closely spaced or of using more clips via the medium of narrow face width boards.

From the foregoing it will be seen that structure has been provided by which the objects of the invention are attained.

I claim:

1. A flooring system employing floor boards having side edge faces comprising

a plurality of spaced parallel channels each with a pair of rims having upper and lower faces,

a plurality of parallel floor boards with at least one board of a contiguous pair having a longitudinal side edge clip receiving groove extending therealong in spaced relation to the bottom of the boards,

said boards being transversely disposed above said channels and having lower faces engaging the upper faces of said rims,

said boards having above said groove upper vertical edge faces for disposition in meeting relation and immediately below said groove lower spaced vertical faces, and

6

a plurality of spaced holding clips engageable with said channels,

each of said clips having a vertically disposed web portion disposed below said groove and between said lower spaced edge faces,

each of said clips having at the upper part of said web portion at least one horizontally extending plate portion disposed along the web and extending into said clip receiving groove with at least one fiber penetrating projection extending from said plate portion into said board beyond said groove,

said plate portion extending continuously along at least one side of said web portion,

each of said clips having extending from the opposite side of said plate portion at least one fiber penetrating projection extending into the next board of the contiguous pair,

said plate portion and said fiber penetrating portion balancing the bending forces generated by the opposed penetrating projections upon vertical loading and resisting bending and vertical load transfer to the bottom of the side edge groove.

2. A flooring system as defined in claim 1 in which said plate portion extends on both sides of said web.

References Cited

UNITED STATES PATENTS

184,589	11/1876	Childs	52—492
2,200,649	5/1940	Wardle	52—512
3,031,725	5/1962	Omholt	52—489
3,267,630	8/1966	Omholt	52—489
3,439,464	4/1969	Omholt	52—489

JOHN E. MURTAGH, Primary Examiner

U.S. Cl. X.R.

52—480, 489, 506