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[54] FLOORING SYSTEM

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[52] **U.S. Cl.** **52/489**, 52/480, 52/509

[51] **Int. Cl.** **E04b 5/00**

[58] **Field of Search**.....52/480, 489, 492, 483, 509, 52/512, 593, 592, 496, 508, 594, 596

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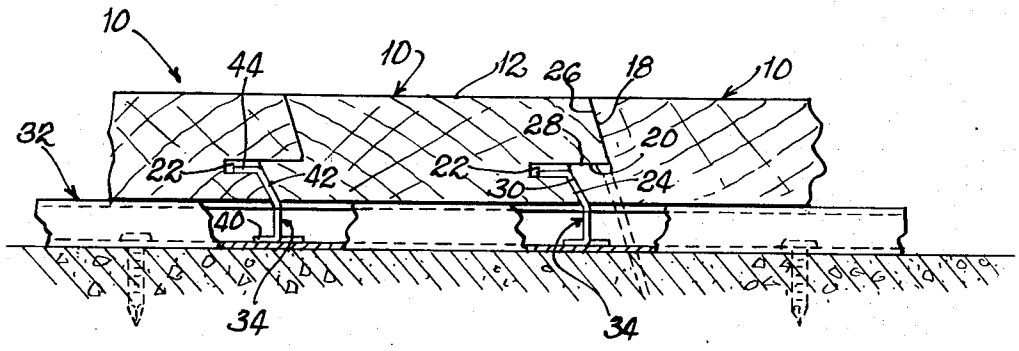
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[57] **ABSTRACT**

A flooring system including a plurality of flooring boards, each comprising an upper wearing surface, a bottom surface, and longitudinally extending sides. The boards are located in side-by-side relationship on a support with clips having engaging fingers securing the boards on the support. Each side of the boards defines a surface portion extending angularly downwardly, horizontally and then downwardly to provide a mating configuration with an adjacent board. A groove is formed in one side of the board, and this groove is adapted to receive a finger of a securing clip. The horizontally extending surfaces are located substantially below center, and the groove is located beneath the horizontal surfaces whereby a maximum wearing depth can be provided with a minimum of board thickness.

1 Claim, 4 Drawing Figures



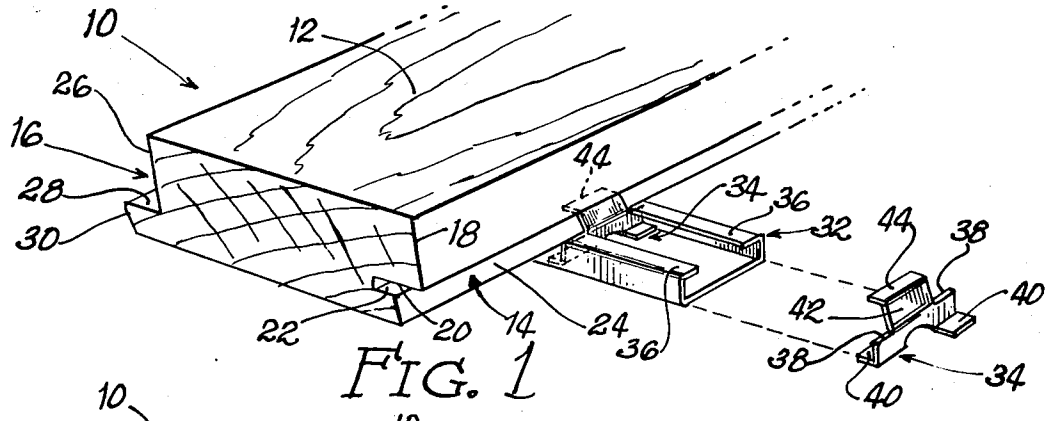


FIG. 1

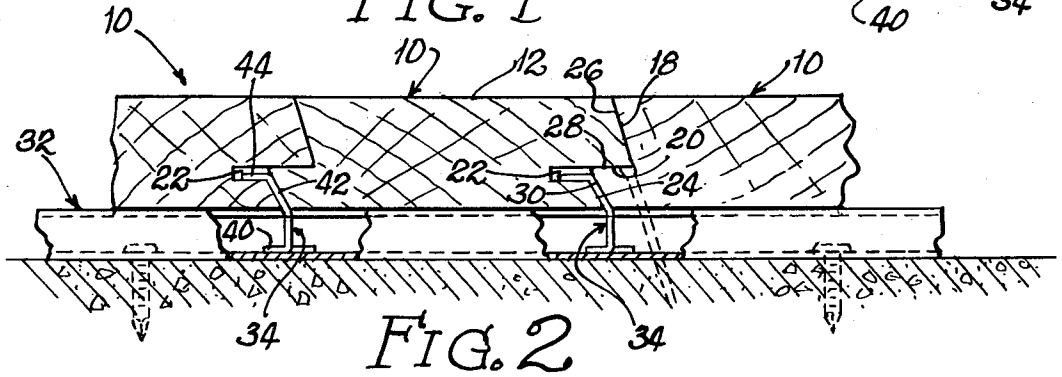


FIG. 2

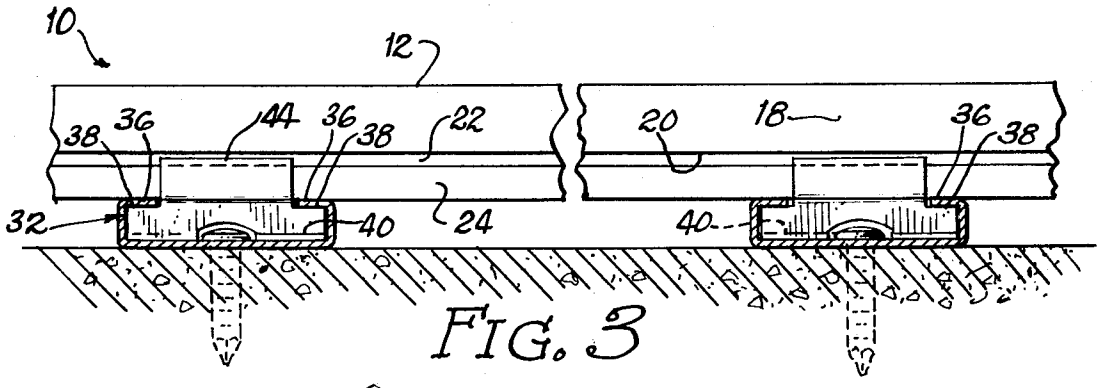


FIG. 3

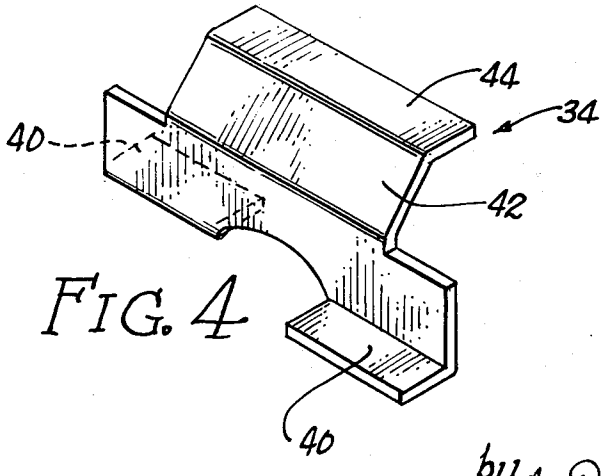


FIG. 4

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FLOORING SYSTEM

This invention relates to an improved wood flooring system. The invention is particularly concerned with flooring systems of the type employing securing clips for attaching boards to an underlying support.

Various flooring board designs have been proposed with a view toward providing flooring systems which meet certain basic requirements. Specifically, the boards must be relatively easy to produce with a minimum amount of raw material required. The boards must be such that they can be easily handled by carpenters during installation, and designs which employ clips for securing boards are considered desirable, however, it is also preferred that such boards be designed so that nails and staples can be used where necessary. The boards must be designed so that a neat appearance, primarily freedom from gaps, is presented upon installation. Finally, the boards must provide suitable wear.

Flooring board designs are particularly critical when the boards are to be used in the construction of a gymnasium floor or for any other application where extensive wear is to be expected.

For example, in the case of a gymnasium, a substantially flat and clean surface is required, and this may involve repeated sandings. Naturally, the thickness of usable board must be sufficient to allow such sandings so that the floor will be useful for a long period of time.

Flooring boards having a tongue and groove design are almost universally used. These boards are mass produced at relatively low cost; the amount of material required to produce satisfactory boards is relatively small when compared with other board designs; the boards can be handled with relative ease by carpenters even with automatic nailing equipment; and the appearance and wear characteristics of the boards is generally considered satisfactory.

Despite the wide acceptance of flooring boards with a tongue and groove design, certain limitations have been recognized. Specifically, stresses which build up in the boards as a result of changes in moisture content have been known to create undesirable compression ridges and warping or cupping or to lead to the development of cracks. The conventional designs do not have a large wearing depth ratio, and in view of the increased cost of wood, the cost of tongue and groove flooring is also becoming an increasingly difficult problem. A flooring board design which will provide additional wearing depth while requiring less raw material, particularly in applications involving high rates of wear, is becoming increasingly desirable.

It is a general object of this invention to provide an improved design for flooring boards whereby floor constructions can be more efficiently and economically produced.

It is a more specific object of this invention to provide a design for flooring boards which provides a substantially greater usable wearing depth when compared with conventional tongue and groove boards and other floor board designs of similar over-all thickness.

It is a further object of this invention to provide a new design for a flooring board which is primarily suited for installation by means of clips and associated supporting channels but which can be readily installed employing nails and staples and with or without automatic equipment.

These and other objects of this invention will appear hereinafter and for purposes of illustration, but not of limitation, specific embodiments of the invention are shown in the accompanying drawings in which:

FIG. 1 is a perspective view of a floor board and mounting means characterized by the features of this invention;

FIG. 2 is a fragmentary perspective end view in section illustrating an assembly of floor boards on a supporting structure;

FIG. 3 is a fragmentary side elevation of the assembly; and,

FIG. 4 is a perspective view illustrating a preferred mounting clip design.

The flooring board system of this invention involves the use of boards having an upper wearing surface, a bottom surface, and sides of a particular design. A first side of each board comprises an angularly, inwardly extending first surface portion, a generally horizontal second surface portion and a downwardly extending third surface portion. The second or opposite side comprises a first surface portion which extends angularly outwardly to achieve a mating relationship with the corresponding portion of an adjacent board. Similarly, the second and third surface portions on this opposite side extend inwardly and downwardly, respectively, to complete the desired mating relationship.

The first surface portion on each side extends downwardly below the center of the board. A groove for receiving an attaching clip is formed immediately beneath the lower edge of the first surface portion on one side of the board. Accordingly, these clips are located in a position such that the entire thickness of the board above the intersection of the first and second surfaces provides usable wearing depth.

The accompanying drawings illustrate boards **10** defining an upper wearing surface **12** and sides **14** and **16**. The side **14** defines a downwardly and outwardly extending first surface portion **18**, and a horizontally, inwardly extending second surface portion **20**. A groove **22** is formed inwardly relative to the second surface portion **20**. A third surface portion **24** extends downwardly and outwardly beyond this groove.

The opposite side **16** of the board defines a first downwardly and inwardly extending surface portion **26**. This surface portion intersects with a horizontally formed outwardly extending surface portion **28** which in turn intersects with a downwardly and inwardly extending surface portion **30**.

As best shown in FIG. 2, the respective surface portions of the boards **10** are adapted to assume a mating relationship in a flooring system. Thus, the first and third surface portions on one side of a board lie in the same plane as the respective surface portions lie on the other side of the board. Similarly, the second surface portions on each side of a board lie in substantially the same horizontal plane.

The boards of this invention are preferably included in a flooring system by means of supporting channels **32** and attaching clips **34**. The channels **32** comprise inwardly extending flange portions **36**. The clips **34** define shoulder portions **38** which are adapted to be received in the area defined beneath the flanges **36**. In the use of such clips, they are first located longitudinally of the channel member for insertion purposes

and then rotated 90° to position the clips for attaching purposes.

Each of the clips defines outwardly extending feet **40** to assist in holding the clips in an upright position. An angularly extending section **42** extends beyond the shoulders **38** and a finger **44** is formed as a continuation of the sections **42**.

The grooves **22** defined by the boards are dimensioned to receive the fingers **44** of clips **34**. In addition, the angle of the section **42** corresponds with the angle defined by the respective third surface portions on each side of a board. In practice, therefore, the clips **34** achieve a relationship as shown in FIGS. **2** and **3** in a flooring system.

The combination of the clips and flooring boards of this invention provides a flooring system having substantially improved characteristics from the standpoint of assembling efficiency and long life. Thus, a channel and clip system is provided without any requirement for steel splines or other additional pieces requiring additional assembly operations. The design of the clip structure which provides an angular relationship corresponding with the adjacent board surfaces greatly simplifies installation since proper seating of the clips relative to the board surfaces is automatically accomplished.

The board design also provides the advantages of a tongue and groove design without sacrificing wearing depth. Thus, the wearing depth of this invention extends substantially below the center line of each board. There is, however, an interlock provided by the mating of the respective second surfaces of adjacent boards whereby a relationship similar to tongue and groove boards is achieved. The additional interlocking achieved by the clips, of course, enhances the strength and durability of a completed flooring system.

By providing tongues which interlock in the manner of this invention, greater reliability during installation and use is achieved. The tongues are directly supported by the channel members and do not have cantilever support as in typical boards and, therefore, there is less tendency for fracture of the tongues during installation or when a flooring system is subjected to particularly heavy stress. The maximum bearing surface provided by the mating first surface portions of adjacent boards is also a distinct advantage since this substantially reduces formation of compression ridges, of warping and cupping which occurs in many conventional installations. The relationship of the angular clip, tongue structure, and bearing face also results in neutralization of forces which are built-up by compression of boards when they expand upon absorbing moisture.

It will be understood that various changes and modifications may be made in the above described construction which provide the characteristics of this invention without departing from the spirit thereof.

THAT WHICH IS CLAIMED IS:

1. In a flooring system comprising a plurality of flooring boards each comprising an upper wearing surface, a bottom surface, and longitudinally extending sides comprising a first side and a second side, said boards being located in side-by-side relationship on a support with clips having engaging fingers for securing the boards to the support, the improvement wherein the first side of each board defines a first surface portion extending downwardly from said wearing surface and tapering inwardly away from the vertical and toward the center of the board, a second horizontal surface portion extending from its intersection with said first surface portion outwardly away from the center of the board, and a third surface portion extending downwardly from the outer edge of said second surface portion and tapering inwardly away from the vertical and toward the center of the board to said bottom surface, the combination of said second and third surfaces defining a tongue on said board, the second side of each board comprising a first surface portion extending downwardly from said wearing surface and tapering outwardly away from the vertical and away from the center of the board, a second horizontal surface portion extending from its intersection with said first surface portion inwardly toward the center of the board, and a third surface portion extending downwardly from the inner edge of said second surface portion and tapering outwardly away from the vertical and away from the center of the board to said bottom surface, the second and third surfaces of said second side defining a recess for receiving said tongue, the surface portion of said first side comprising uninterrupted surfaces, and a groove extending along the second side only of the board for receiving clip fingers, said groove extending inwardly of the board as a continuation of the second surface on said second side, said clip fingers extending horizontally, the body portion of each clip comprising an angularly extending portion conforming to the third surface portion of said second side whereby this angularly extending portion of each clip snugly engages said third surface of said second side and is snugly engaged by the third surface portion on the first side of the adjacent board, the first, second and third surface portions of said first side mating, respectively, with the first, second and third surface portions of the second side of an adjacent board in said system, the intersections between each of the first and second surface portions being located substantially below center in said boards whereby the wearing depth of the flooring boards is greater than one-half the board thickness.

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