

INTERLOCKING FLOORING TILES

This invention relates to interlocking flooring tiles, for example carpet tiles which may be installed in an interlocking relationship with a series of adjacent
5 tiles to carpet a floor.

Currently available carpet tiles are in the form of squares having edges with projections and gaps, such as grooves, therebetween. The projections and gaps complement each other so that the projections on one tile
10 can be received in the gaps of an abutting tile to form an interlocking connection therebetween. In this way, the tiles can be installed in an abutting relationship so as to form a one-piece carpet. Each tile of uniform size may be formed of a light plastic plate having non-woven
15 fabrics adhered thereonto. Each such tile can have patterns provided on the non-woven fabrics to enable the aesthetic quality of said carpet to be varied by changing the arrangement of said tiles.

However, such tiles can generally not be combined
20 together in echelon, or with tiles of a different size.

It is accordingly desirable to provide carpet tiles which may be interlocked with one another whilst giving more freedom for variation of the overall carpet design by variation of the placement of said tiles.

25 According to a first aspect of the invention there is provided a rectangular flooring tile, first and second mutually perpendicular edges of which are provided with respective arrays of mutually-similar equally-spaced lateral interlock portions projecting from the edge
30 concerned in the plane of the tile, each of which portions has the form of an isosceles trapezium one of whose two parallel sides, of a length L' shorter than the length L of the other, coincides with the tile edge concerned, the gaps between successive lateral interlock
35 portions of each array being complementary in form to the said interlock portions;

the tile including a first corner interlock portion

provided at a first corner of the tile, defined by the intersection of the said first and second edges, which portion has the form of a right-angled isosceles triangle added to a right-angled trapezium the shorter of whose
5 parallel sides coincides with the said second edge of the tile and is of length $L-H$, where H is the distance between the two parallel sides of each said trapezium, the other of those two parallel sides being of the length L' ;

10 a third side of the said right-angled trapezium being aligned with the said first edge, so as to be perpendicular to the two parallel sides of that trapezium, and forming the hypotenuse of the added triangle so that the right-angled apex of the triangle
15 points in the direction which is along the said second edge towards the said first edge;

the first of the said lateral interlock portions along the said first edge being spaced at a distance L' along that edge from the said first corner, and the first
20 of the said lateral interlock portions along the said second edge being spaced at a distance L along that edge from the said right-angled trapezium;

and there being a second corner interlock portion provided at a second corner of the tile, defined between
25 the said second edge and a third edge of the tile, which portion is similar in form to the said first corner interlock portion but is disposed so that the right-angled apex of its added triangle points in the direction along the said third edge towards the said second edge;

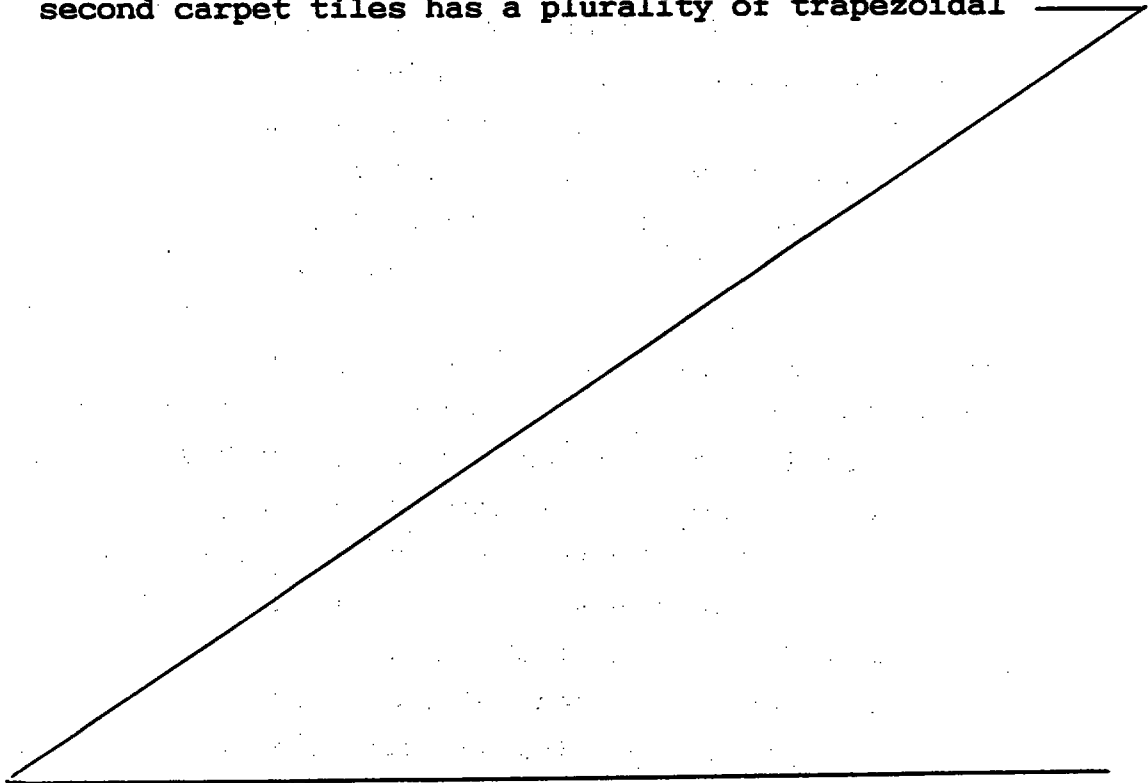
30 wherein, at an intermediate location along the first edge, one of the said lateral interlock portions projecting therefrom and the gap bounded thereby at its side remote from the said first corner are modified in form so that the interlock portion concerned has the form
35 of a trapezium the longer of whose two parallel sides is of the length L and coincides with the said first edge, the other of those two parallel sides being distant H

from the longer of those sides and of the length L' , and the said gap bounded by that interlock portion being complementary in form thereto;

5 and wherein the peripheral form of the tile is symmetrical about a central point of the tile;

whereby such corner interlock portions of adjacent such tiles can fit together with such modified lateral interlock portions to enable a plurality of such tiles to be interlocked together at their edges in echelon.

10 An embodiment of a second aspect of the invention can provide a carpet comprising a first set of carpet tiles and a second set of carpet tiles of different sizes. The first and second sets of carpet tiles, which are generally in the form of squares, have a plurality of
15 lateral projections and grooves of the same size formed along the edges thereof, the length of the edge of the second carpet tile being an integral multiple of the length of the edge of the first carpet tile, which is equal to one unit length. Said projections and grooves
20 may have the same shape, except that each edge of said second carpet tiles has a plurality of trapezoidal



teeth each having a notch adjacent thereto. Said trapezoid teeth are spaced from one another as well as the corners of said second carpet tile at a distance equal to said one unit length. Each of said trapezoidal teeth has an altitude equal to that of each lateral projection of the first carpet tile, a first parallel side (coinciding with the edge of the second carpet tile) which has a length equal to that of the parallel side of a lateral projection which is remote from the tile edge concerned of the second carpet tile, a second parallel side (opposite said first parallel side) which has a length equal to that of the parallel side of each lateral projection that coincides with the edge concerned of the second carpet tile, a third side bounding one of the grooves of the second carpet tile, and a fourth side which is greater in length than the said third side and bounds the said adjacent notch of said second carpet tile. Each of said notches is complementary in shape to the said tooth so as to interfit with corresponding projections of adjacent carpet tiles. In this way, the carpet can be assembled to form a variety of patterns.

Reference will now be made, by way of example, to the accompanying drawings, in which:

Fig. 1 is a plan view of a previously-considered carpet tile, not embodying the present invention, for use with further such tiles to form a carpet;

Fig. 2 is a schematic plan view showing the carpet tile of Fig. 1 interlocked with further such tiles;

Fig. 3 is a schematic view showing a corner part of the carpet tile of Fig. 1;

Fig. 4 is a plan view of a corner interlock portion of the corner part of Fig. 3;

Fig. 5 is a plan view of a large carpet tile embodying the present invention;

Fig. 6 is an enlarged plan view showing part of an

edge region of the tile of Fig. 5;

Fig. 7 is a plan of a modified interlock portion of the edge region of Fig. 6;

Fig. 8 is a schematic plan view showing the tile of Fig. 5 interlocked with two smaller carpet tiles; and

Fig. 9 is an enlarged schematic plan view showing interlocking edge regions of the carpet tiles of Fig. 8.

Fig. 1 shows a flooring tile 10 which is generally square in outline, has a plurality of lateral interlock portions in the form of isosceles trapezoidal projections 11 arrayed along the edges thereof, and a plurality of gaps in the form of complementary grooves 12 defined between the projections 11 for receiving interlock projections 11 of adjacent tiles, as shown in Fig. 2.

Four corner interlock portions in the form of specific protrusions 13 are provided respectively at the corners of the tile 10. Referring to Figs. 3 and 4, each of the specific protrusions 13 is in the shape of a pentagon constituted by a combination of a right-angled trapezoid (trapezium) 131 and an isosceles right-angled triangle 132. The hypotenuse 1321 of the triangle 132 coincides with a side of the trapezoid 131 that is aligned with a top edge 141 of the tile. The opposing side 1311 of the trapezoid 131 bounds an adjacent one of the complementary grooves 12. the length L' of that one (1312) of the two parallel sides of the trapezoid which is remote from the side edge of the tile 10 in Fig. 3 is equal to that of the parallel side 111 of the trapezoidal projection 11 which coincides with that side edge of the tile 10. The length of the other parallel side 1313 of the trapezoid 131, which side coincides with the side edge of the tile 10, is equal to the difference between the length L of the other parallel side 112 of the trapezoidal

projection 11 and the distance H between the parallel sides of the trapezoid 131 (i.e., equal to L-H).

As illustrated in Fig. 3, a side 1322 of the triangular portion 132 of the specific projection 13 defines an edge of a specific groove 14. The specific projection 13 is spaced from the first of the lateral interlock portions 11 on the top edge of the tile by the specific groove 14 which extends a distance L' along that top edge of the tile 10.

Each of the four specific projections, forming respective corner interlock portions on the four edges of the tile, has the rectangular apex of its triangular portion 132 pointing in an anticlockwise direction around a central point of the tile in the example shown, so that the periphery of the tile is symmetrical about that central point.

The flooring tile of Figs. 1 to 3 cannot be used with similar tiles of a different size and cannot be interlocked in echelon with other identical tiles.

A carpet formed of tiles embodying the present invention, however, can include at least two sets of tiles of different respective sizes. Figs. 5 to 9 show how a carpet can be made up of a plurality of small carpet tiles 30 interlocked with a plurality of large carpet tiles 20 in accordance with an embodiment of the present invention. Each of the small carpet tiles 30 is similar in shape to the above-described carpet tile 10 of Fig. 1. The small tiles 30 are square in outline and are provided with projections 31, complementary grooves 32, specific projections 33 and specific grooves 34 similar to those of the carpet tile 10, so as to interlock with adjacent such carpet tiles in a manner similar to that of the carpet tiles 10, as illustrated in Fig. 8. Each edge of the small carpet tile 30 has a length which is referred to below as one unit length.

Fig. 5 shows a large carpet tile 20 which is square in overall outline. Each edge of the large carpet tile 20 has a length equal to two unit lengths, i.e. twice the length of the edge of the small carpet tile 30. An array of isosceles trapezoidal projections 21, with grooves 22 therebetween, is provided along each edge of the large carpet tile 20, and four specific projections 23 and specific grooves 24 are respectively provided at the corners of the large carpet tile 20, which features are similar to the features 31 to 34 respectively of the small carpet tile 30.

Each of the large carpet tiles 20 has a modified lateral interlock portion in the form of a trapezoidal tooth 25, and a modified gap in the form of a notch 26 bounded on one side by the tooth 25, provided at a central location along each edge thereof, i.e. at a position one unit length from the corner of the tile 20. The notch 26 has a configuration complementary to that of the tooth 25. Referring to Figs. 6 and 7, the outermost side 251 of the tooth 25 being one of its two parallel sides, is at the distance H from the edge of the carpet tile 20 and is of the length L' equal to that of the inner parallel side 211 (of the projection 21) that coincides with the edge of the carpet tile 20. The inner parallel side 252 of the tooth 25, coinciding with the edge of the carpet tile 20, is of the length L equal to that of the outer parallel edge 212 of the projection 21 (remote from the edge of the carpet tile 20). A side 253 of the tooth 25, which bounds an adjacent one of the grooves 22, is shorter than the remaining side 254 of said tooth 25. The combined configuration of the tooth 25 and the adjacent notch 26 has the same length $(L + L')$, along the edge of the tile, as a projection 21 and an adjacent groove 22. The orientation of the tooth 25 on each edge of the tile is such that its longer non-parallel side 254 is

towards the specific projection 23 on the edge concerned, so that the periphery of the tile is symmetrical about a central point thereof.

5 The projections 21 and 23, and the grooves 22 and 24, are of the same shape and size as those of the small carpet tile 30, so that the large carpet tiles 20 and the small carpet tiles 30 can interlock with each other.

10 Referring to Fig. 8, two interlocking small carpet tiles 30 are connected to a large carpet tile 20 with projections 21 interlocking with projections 31. As best seen in Fig. 9, a tooth 25 of the large carpet tile 20 fits into a specific groove 34 of the lower (as seen in the drawings) small carpet tile 30, whilst a
15 notch 26 of the large carpet tile 20 receives a specific projection 33 of the upper small carpet tile 30 and a part of a specific projection 33 of the lower small carpet tile 30.

20 It will be appreciated that the large carpet tiles 20 can also be interlocked with each other, either in register with one another laterally (similarly to the tiles in Fig. 2) or in echelon. Thus, a carpet including tiles embodying the invention can be assembled in a variety of patterns. In addition, in
25 further embodiments one pair of opposing edges of the large tile may be different in length from the other pair, and/or the lengths of the edges constituting one such pair may be some other integral multiple (for example three) of the aforesaid unit length, so that
30 for example a large rectangular carpet tile can interlock with three small square carpet tiles to cover a relatively large floor surface in a cost-efficient manner whilst also allowing the creation of a wide variety of patterns.

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CLAIMS:

1. A rectangular flooring tile, first and second mutually perpendicular edges of which are provided with respective arrays of mutually-similar equally-spaced lateral interlock portions projecting from the edge concerned in the plane of the tile, each of which portions has the form of an isosceles trapezium one of whose two parallel sides, of a length L' shorter than the length L of the other, coincides with the tile edge concerned, the gaps between successive lateral interlock portions of each array being complementary in form to the said interlock portions;

the tile including a first corner interlock portion provided at a first corner of the tile, defined by the intersection of the said first and second edges, which portion has the form of a right-angled isosceles triangle added to a right-angled trapezium the shorter of whose parallel sides coincides with the said second edge of the tile and is of length $L-H$, where H is the distance between the two parallel sides of each said trapezium, the other of those two parallel sides being of the length L' ;

a third side of the said right-angled trapezium being aligned with the said first edge, so as to be perpendicular to the two parallel sides of that trapezium, and forming the hypotenuse of the added triangle so that the right-angled apex of the triangle points in the direction which is along the said second edge towards the said first edge;

the first of the said lateral interlock portions along the said first edge being spaced at a distance L' along that edge from the said first corner, and the first of the said lateral interlock portions along the said second edge being spaced at a distance L along that edge from the said right-angled trapezium;

and there being a second corner interlock



portion provided at a second corner of the tile, defined between the said second edge and a third edge of the tile, which portion is similar in form to the said first corner interlock portion but is disposed so that the right-angled apex of its added triangle points in the direction along the said third edge towards the said second edge;

wherein, at an intermediate location along the first edge, one of the said lateral interlock portions projecting therefrom and the gap bounded thereby at its side remote from the said first corner are modified in form so that the interlock portion concerned has the form of a trapezium the longer of whose two parallel sides is of the length L and coincides with the said first edge, the other of those two parallel sides being distant H from the longer of those sides and of the length L' , and the said gap bounded by that interlock portion being complementary in form thereto;

and wherein the peripheral form of the tile is symmetrical about a central point of the tile;

whereby such corner interlock portions of adjacent such tiles can fit together with such modified lateral interlock portions to enable a plurality of such tiles to be interlocked together at their edges in echelon.

2. A tile as claimed in claim 1, wherein at an intermediate location along the said second edge one of the said lateral interlock portions projecting therefrom and the gap bounded thereby at its side remote from the said second corner are modified in form similarly to those at the said intermediate location along the said first edge.

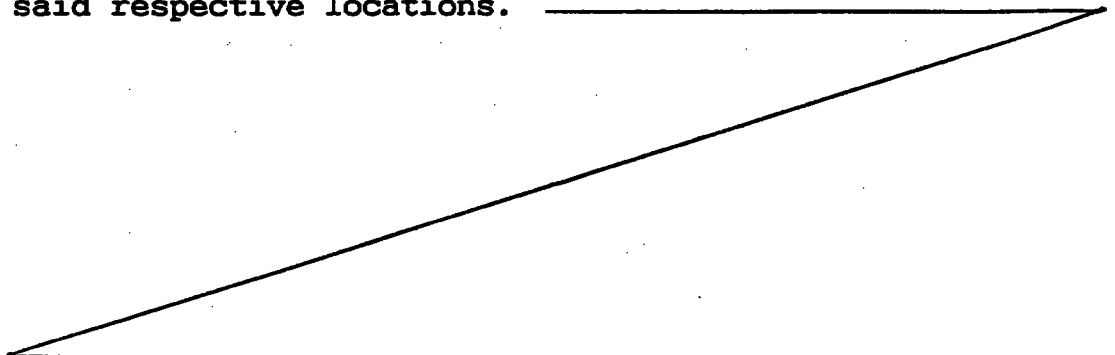
3. A tile as claimed in claim 1 or 2, wherein the or each said intermediate location is midway along the edge concerned.



4. A tile as claimed in claim 3 in combination with two smaller rectangular tiles having respective second edges each equal in length to one-half the length of the said first edge of the tile of claim 1, the said second edges of the smaller tiles being provided with respective first arrays of such mutually-similar equally-spaced lateral interlock portions and with such first and second corner interlock portions at opposite ends respectively of each of the said second edges, the smaller tiles being interlocked with one another along mutually-adjacent respective edges thereof and being interlocked along their respective second edges with the tile of claim 1, along the said first edge thereof, in such a manner that respective corner interlock portions of the smaller tiles are fitted together with the modified lateral interlock portion and gap provided at the said intermediate location along the first edge of the tile of claim 1.

5. A tile as claimed in claim 1 or 2, wherein a plurality of such modified lateral interlock portions are provided along the or each edge concerned at respective locations which divide the length of that edge into equal sub-divisions.

6. A tile as claimed in claim 5, interlocked along one such edge concerned with smaller tiles having respective sides equal in length to the said sub-divisions of the said one edge concerned, by means of such corner interlock portions of the said smaller tiles that fit together with the said modified lateral interlock portions and gaps of the tile of claim 1 at the said respective locations.





7. A carpet comprising:

a first set of carpet tiles and a second set of carpet tiles, said first and second sets of carpet tiles being of different sizes and being adapted to interlock with one another;

each of said first carpet tiles being in the form of square with four edges, each edge equaling one unit length, and a first plurality of exposed projections which are equally spaced apart therealong, each of said first projections being in the shape of an isosceles trapezoid with a first parallel side adjacent to said edge of said first carpet tile and a second parallel side having a length which is longer than that of said first parallel side, each side of said first carpet tile further having a first plurality of equally spaced complementary grooves arranged between said first projections so as to interlock with corresponding projections of an adjacent carpet tile;

each of said first carpet tiles having four first protrusions respectively extending from four corners thereof, each first protrusion being of a configuration which is a combination of a right-angled trapezoid and an isosceles right-angled triangle with a hypotenuse that overlaps a vertical side of said trapezoid;

said trapezoid having an altitude equal to that of each said isosceles trapezoidal projection; an inclined



side which is opposite to said vertical side, adjacent to one of said first grooves of said first carpet tile; a first parallel side, remote from said edge of said first carpet tile, having a length equal to that of said first parallel side of said first projection; and a second parallel side opposite to said first parallel side of said trapezoid which has a length equal to the difference of the length between said second parallel side of said first projection and the length of said altitude of said first projection; the first of said first projections along each edge of said first tile being spaced at a distance equal to the length of said first parallel side of said trapezoid along the edge from one of the corners of the tile;

each of said second carpet tiles, which are in the form of a rectangle with four edges, each edge of which has a length integrally proportional to that of said first carpet tile; a second plurality of projections and complementary grooves having the same size, configuration and arrangement as those of said first projections and complementary grooves of said first carpet tiles; four second protrusions respectively extending from four corners thereof which have the same size and configuration as those of first protrusions of said first carpet tiles; wherein the improvements lie in the fact that each edge of said second carpet tile has a plurality of trapezoidal teeth each having a



notch adjacent thereto, said trapezoidal teeth being spaced apart from one another and said corners of said second carpet tile at a distance equal to said unit length, each of said trapezoidal teeth having an altitude equal to that of said first projection of said first carpet tile; a first parallel side adjacent said edge of said second carpet tile which has a length equal to that of said second parallel side of said second projection; a second parallel side opposite to said first parallel side of said tooth which has a length equal to that of said first parallel side of said second projection; a third side adjacent said second complementary groove of said second carpet tile; and a fourth side which is adjacent said notch of said second carpet tile having a length which is greater than that of said third side of said tooth; each of said notches being in a shape which accommodates that of said tooth so as to interlock with a corresponding projection of an adjacent carpet tile.

8. A carpet substantially as hereinbefore described with reference to Figs. 5 to 9 of the accompanying drawings.

9. A flooring tile substantially as hereinbefore described with reference to Figs. 1 to 4 of the accompanying drawings, modified as described with reference to Figs. 5 and 6 of the accompanying drawings.

10. Interlocking flooring tiles substantially as hereinbefore described with reference to Figs. 8 and 9 of the accompanying drawings.
