(12) STANDARD PATENT (11) Application No. **AU 2016282948 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
A floor tile

(51) International Patent Classification(s)
E04F 15/02 (2006.01) ***E04F 15/10*** (2006.01)

(21) Application No: **2016282948** (22) Date of Filing: **2016.06.27**

(87) WIPO No: **WO16/207431**

(30) Priority Data

(31) Number	(32) Date	(33) Country
1511201.4	**2015.06.25**	**GB**

(43) Publication Date: **2016.12.29**
(44) Accepted Journal Date: **2021.07.01**

(71) Applicant(s)
Agnes Evans Hurson

(72) Inventor(s)
Evans Hurson, Agnes

(74) Agent / Attorney
Phillips Ormonde Fitzpatrick, PO Box 323, COLLINS STREET WEST, VIC, 8007, AU

(56) Related Art
EP 1726737 A2
GB 2495790 B
WO 2006/027029 A1

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
29 December 2016 (29.12.2016)

WIPO | PCT

(10) International Publication Number
WO 2016/207431 A1

(51) International Patent Classification:
E04F 15/02 (2006.01) *E04F 15/10* (2006.01)

(21) International Application Number:
PCT/EP2016/064825

(22) International Filing Date:
27 June 2016 (27.06.2016)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
1511201.4 25 June 2015 (25.06.2015) GB

(72) Inventor; and
(71) Applicant : **EVANS HURSON, Agnes** [GB/GB]; 61 Bridge Road, Burren, Warrenpoint, County Down, Northern Ireland BT34 3QX (GB).

(74) Agent: **MACLACHLAN & DONALDSON**; 2b Clonskeagh Square, Clonskeagh Road, D14 VON2 Dublin (IE).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: A FLOOR TILE

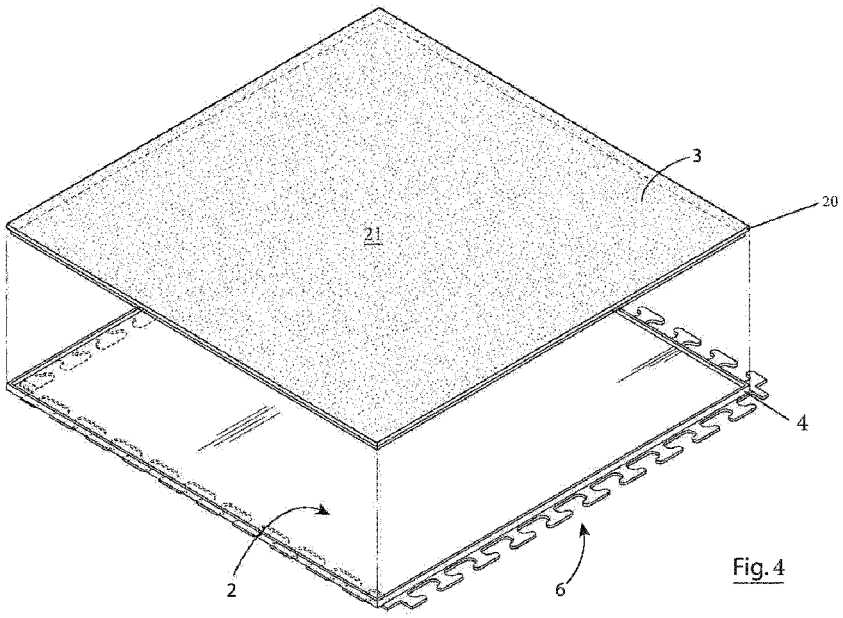

Fig. 4

(57) **Abstract**: The present invention relates to a floor tile comprising a base substrate and a laminate layer, wherein the base substrate comprises at least one aligning member on a top surface thereof, the aligning member operable to engage with a complimentary receiver formed in the laminate layer for aligning the laminate layer on the top surface of the substrate.

WO 2016/207431 A1

2016282948 25 May 2021

A FLOOR TILE

The present invention relates to a floor tile and method of forming same.

More particularly, the present invention relates to a modular flooring system comprising interconnecting floor tiles which is an improvement over that disclosed in United Kingdom Patent Specification No. GB2495790 B, the contents of which are incorporated herein by reference.

A reference herein to a patent document or any other matter identified as prior art, is not to be taken as an admission that the document or other matter was known or that the information it contains was part of the common general knowledge as at the priority date of any of the claims.

Where any or all of the terms "comprise", "comprises", "comprised" or "comprising" are used in this specification (including the claims) they are to be interpreted as specifying the presence of the stated features, integers, steps or components, but not precluding the presence of one or more other features, integers, steps or components.

In a first aspect, the invention provides a tile comprising:

a base substrate and a laminate layer,

wherein the base substrate comprises at least one aligning member on a top surface thereof, the aligning member operable to engage with a complimentary receiver formed in the laminate layer for aligning the laminate layer on the top surface of the substrate,

wherein the aligning member comprises an upstanding projection on the top surface of the base substrate, and the complimentary receiver comprises a recess formed in the underside of the laminate layer for engagement with the upstanding projection,

wherein the upstanding projection is an edge forming a rim that extends along the perimeter of the base substrate, and

wherein the base substrate comprises connecting means for engaging with connecting means of a base substrate of a further tile to form an interconnected flooring system.

2016282948 25 May 2021

In a second aspect, the invention provides a method of forming a tile comprising the steps of:

forming a base substrate according to the first aspect;

forming a laminate layer according to the first aspect;

applying an adhesive to a surface of one or both of the base substrate and laminate layer;

connecting the laminate layer and the base substrate so that the aligning member of the base substrate engages with the complimentary receiver formed in the laminate layer to thereby align the laminate layer on the top surface of the substrate, and

bonding the laminate layer to the substrate to form the tile.

Also described here is a tile comprising:

a base substrate and a laminate layer,

characterised in that base substrate comprises at least one aligning member on a top surface thereof, the aligning member operable to engage with a complimentary receiver formed in the laminate layer for aligning the laminate layer on the top surface of the substrate.

In another embodiment of the invention, the aligning member comprises an upstanding projection on the top surface of the base substrate, and the complimentary receiver comprises a recess formed in the underside of the laminate layer for engagement with the upstanding projection.

Preferably, the upstanding projection is an edge forming a rim that extends along the perimeter of the base substrate.

Preferably, the recess extends along the perimeter of the laminate layer.

Preferably, the recess forms a ledge in the underside surface of the laminate layer, the ledge having a complimentary fit with the rim of the base substrate to align the laminate layer on the base substrate.

In another embodiment of the invention, the aligning member comprises a plurality of upstanding projections forming raised members spaced apart on the top surface of the base substrate.

2016282948 25 May 2021

Preferably, the raised members are cuboid shaped projections.

Alternatively, the raised members are cylindrically shaped projections.

Preferably, the complimentary receiver comprises recesses formed in the underside of the laminate layer for engagement with the raised members to align the laminate layer on the base substrate.

In another embodiment of the invention, the base substrate comprises connecting means for engaging with connecting means of a substrate of a further tile to form an interconnected flooring system.

Preferably, the connecting means comprises a plurality of protruding tongues and grooves at adjacent sides of the base substrate.

Preferably, a protruding tongue or dovetail of the substrate is engaged in a groove of the substrate of another tile to connect adjacent tiles to form the flooring system.

In another embodiment of the invention, engaging the connecting means of a tile with a further tile aligns and positions a side edge of a tile with the side edge of the further tile.

Preferably, the top surface of the base substrate fully extends over the connecting means on at least one side of the substrate.

In another embodiment of the invention, the laminate layer is bonded to the substrate layer using an adhesive.

In a further aspect of the present invention there is provided a method of forming a tile comprising the steps of:

forming a base substrate having features as set out above,

forming a laminate layer having features as set out above;

applying an adhesive to a surface of one or both of the base substrate and laminate layer;

2016282948 25 May 2021

connecting the laminate layer and the base substrate so that the aligning member of the base substrate engages with the complimentary receiver formed in the laminate layer to thereby align the laminate layer on the top surface of the substrate, and

bonding the laminate layer to the substrate to form the tile.

In another embodiment of the invention, the method comprises the step of: operating an injection moulding machine to form the base substrate.

In another embodiment of the invention, the method comprises the step of: removing the base substrate from the injection moulding machine and allowing the base substrate to cool.

In another embodiment of the invention, the method comprises the step of: operating a roller coater machine to apply adhesive to a surface of one or both of the base substrate and laminate layer.

In another embodiment of the invention, the method comprises the step of: applying pressure to the laminate layer on the substrate.

Preferably, the step of applying pressure to the laminate layer on the substrate comprises operating a nip-roller machine.

The present invention will now be described with reference to the accompanying drawings which show, by way of example only, embodiments of the invention. In the drawings:

Fig. 1 is a perspective view from above and of a base substrate of a tile according to one embodiment of the invention;

Fig. 2 is an underside view of the base substrate in Fig. 1;

Fig. 3 are perspective views showing sides of a laminate layer adapted for the base substrate shown in Fig. 1;

Fig. 4 is a perspective view showing the laminate layer and base substrate of Figs. 1 and 3 arranged for coupling together to form a tile according to the invention;

Fig. 5 is a plan view of a tile formed from the laminate layer and base substrate of Figs. 1 to 3;

Fig. 6a and 6b are a sectional side end views of the tile shown in Fig. 5;

Fig. 6c is a side end view of the tile shown in Fig. 5;

Fig. 7 is a perspective view of a base substrate of a tile according to another embodiment of the invention;

Fig. 8 are perspective views showing sides of a laminate layer adapted for the base substrate shown in Fig. 7;

Fig. 9 is a perspective view showing the laminate layer and base substrate of Figs. 7 and 8 arranged for coupling together to form a tile according to the invention;

Fig. 10 is a plan view of a tile formed from the laminate layer and base substrate of Figs. 7 and 8;

Fig. 11 is a sectional side end views of the tile shown in Fig. 10;

Fig. 12 is a perspective view showing two base substrates according to Fig. 1 being connected;

Fig. 13 is a perspective view showing two base substrates according to Fig. 7 being connected;

Fig. 14 is a top view showing two interconnected tiles according to the embodiments of Figs. 1 to 13, and

Fig. 15 is a top view showing four interconnected tiles according to the embodiments of Figs. 1 to 13.

Referring to the drawings, there is shown a tile, indicated generally by the reference numeral 1, comprising a base substrate, indicated generally by the reference numeral 2 and a

2016282948 25 May 2021

laminate layer 3, having a top facing surface 21, and a underside surface 22, which sits on a top surface 5 of the base substrate 2 to form a floor tile 1. The base substrate 2 comprises at least one aligning member on a top surface 5 thereof, the aligning member operable to engage with a complimentary receiver formed in the laminate layer 3 for aligning the laminate layer 3 on the top surface 5 of the substrate 2.

With reference to Figs. 1 to 6, a first embodiment of the invention is shown, in which the aligning member comprises an upstanding projection 4 on the top surface 5 of the base substrate 2, and the complimentary receiver comprises a recess 20 formed in the side edge of the underside surface 22 of the laminate layer 3 for engagement with the upstanding projection 4. As shown, the upstanding projection 4 is an upstanding edge forming a rim 4 that extends along the perimeter of the base substrate 2. The recess 20 also extends along the perimeter of the laminate layer 3 and forms a ledge 20 at the peripheral edge in the underside surface 22 of the laminate layer 3, the ledge 20 having a complimentary fit to seat on the rim 4 of the base substrate 2 to align the laminate layer 3 on the base substrate 2

In another embodiment of the invention, as shown in Figs. 7 to 11, the aligning member comprises a plurality of upstanding projections forming raised members 24 spaced apart and extending upwardly on the top surface 5 of the base substrate 2. The raised members 24 may be cuboid shaped projections, cylindrically shaped projections as shown in Fig. 7, or any other shape as required or as desired. There may also be any number of raised members 24 on the base substrate 2, and although four cylindrically shaped raised members 24 are shown in Fig. 7, this should in no way be seen as essential or limiting on the present invention. A complimentary receiver of the laminate 3 comprises recesses 26 formed in the underside surface 22 of the laminate layer 3 for mutual complimentary engagement with the raised members 24 to align the laminate layer 3 on the base substrate 2. The recesses 26 may have a perimeter slightly larger than the raised members 24 to enable a snug complimentary fit.

The base substrate 2 of both embodiments of the present invention also comprise connecting means, indicated generally by the reference numeral 6, for engaging with connecting means 6 of a base substrate 2 of a further tile 1 to form an interconnected flooring system (see Figs. 12 and 13). The connecting means 6 as shown is a dovetail type connection system comprising a plurality of protruding tongues 7 and grooves 8 at adjacent sides of the base substrate 2, and the top surface 5 of the substrate 2 extends over

connecting means 6 on at least one side of the base substrate 2, and preferably on two sides of the base substrate 2.

As shown in Figs. 12 and 13, the embodiments of Figs. 1 to 11 comprise the same type of connection system, whereby a protruding tongue 7 of the base substrate 2 of one tile 1 is engaged in a groove 8 of the base substrate layer 2 of another tile 1' to connect adjacent tiles 1, 1' to form a flooring system 10. In Figs. 12 and 13, for exemplary purposes, the laminate 3 of the tiles 1, 1' is shown removed so that the connecting means 6 of the substrates 2, 2' can be clearly illustrated, and it should be understood that when tiles 1, 1' are being interconnected they may be done so with or without the laminate 3 bonded to the substrate layer 2.

Figs. 14 and 15 show respectively two and four tiles joined together. As shown, the portion of the top surface 5 of the substrate layer 2 that extends over the connecting means 6 of tile 1 will cover the connecting means 6 of the adjacent tile 1' when the two tiles 1, 1' are interconnected. In this way engaging the connecting means 6 of adjacent tiles 1, 1' aligns and positions a side edge 30 of the tile 1 with the side edge 30' of a further adjacent tile 1' in a side by side arrangement. Notable is that there is no grout line visible between adjacent joined tiles 1, 1' of floor system 10, and a smooth near seamless interconnection is achieved between the side edges 30, 30' of adjacent connected floor tiles 1, 1' according to the present invention. Any number of tiles 1 may be joined to form the required flooring system 10.

There is also provided a method of forming a tile 1 comprising the initial step of forming a base substrate 2 according to the embodiments shown. An injection moulding tool may be fitted to an injection moulding machine an appropriately operated to form the base substrate 2 and the base substrate 2 removed from the machine when formed and allowed to dry. Such a tool is fitted to the machine between the machine plates and secured using mould clamps. Flexible PVC in any of various colours is then vacuum fed to a hopper of the moulding machine and gravity feed into a barrel of the machine where it is melted at between 180-190 degrees Celsius. The injection moulding machine is set to allow a screw inside the barrel to pick up sufficient melted material that is then injected through a nozzle of the barrel and into the closed mould at pre-set speeds and pressures. The mould remains closed for a pre-set time to allow cooling. The mould then opens and the base substrate with a moulded aligning member, that is, with an either upstanding rim or raised members,

2016282948 25 May 2021

is manually or automatically ejected from the mould. This moulded interlocking tile substrate 2 is then stacked on cooling racks for about 24 hours. It will be understood that the dimensions for the base substrate may be moulded as required or as desired. The laminate layer 3 according to the invention, with either a recess ledge 22, according to the embodiment of Figs. 1 to 6, or raised member receiving recesses 26, according to the embodiment of Figs. 7 to 11 may also be formed using the same process.

Next, an adhesive is applied to a bottom surface of a laminate layer 3. Such a step may be performed by operating a roller coater machine to apply adhesive to the laminate layer. The adhesive may be a hot melt polyurethane adhesive or any other suitable adhesive and the laminate layer 3 may comprise a PVC backing layer, a printed middle layer having a desired surface finish or effect for the tile 1, such as wood, porcelain, plastic etc, and a clear PVC top layer. The laminate layer 3 is sized as appropriate to sit in the nest on the substrate.

Next, the laminate layer 3 is oriented as required and placed onto the base substrate so that the aligning member 4, 24 of the base substrate 2 engages with the complimentary receiver 22, 26 formed in the laminate layer 3 to thereby align the laminate layer 3 on the top surface 5 of the substrate 2. Pressure is then applied to the laminate layer 3 on the substrate 2, such as by operating a nip-roller machine, so that the laminate layer 3 is bonded to the substrate 2 to form the tile 1. The completed interlocking tile 1 is then stacked flat on a cooling rack for a further 24 hours before packaging.

Aspects of the present invention have been described by way of example only and it should be appreciated that additions and/or modifications may be made thereto without departing from the scope thereof as attached in the appended claims.

2016282948 25 May 2021

CLAIMS:

1. A tile comprising:

a base substrate and a laminate layer,

wherein the base substrate comprises at least one aligning member on a top surface thereof, the aligning member operable to engage with a complimentary receiver formed in the laminate layer for aligning the laminate layer on the top surface of the substrate,

wherein the aligning member comprises an upstanding projection on the top surface of the base substrate, and the complimentary receiver comprises a recess formed in the underside of the laminate layer for engagement with the upstanding projection,

wherein the upstanding projection is an edge forming a rim that extends along the perimeter of the base substrate, and

wherein the base substrate comprises connecting means for engaging with connecting means of a base substrate of a further tile to form an interconnected flooring system.

2. A tile as claimed in Claim 1, wherein the recess extends along the perimeter of the laminate layer.

3. A tile as claimed in Claim 1 or Claim 2, wherein the recess forms a ledge in the underside surface of the laminate layer, the ledge having a complimentary fit with the rim of the base substrate to align the laminate layer on the base substrate.

4. A tile as claimed in any one of the preceding Claims, wherein the aligning member comprises a plurality of upstanding projections forming raised members spaced apart on the top surface of the base substrate.

5. A tile as claimed in Claim 4, wherein the raised members are cuboid shaped projections.

6. A tile as claimed in Claim 4 or Claim 5, wherein the raised members are cylindrically shaped projections.

7. A tile as claimed in any one of the preceding Claims, wherein the complimentary receiver comprises recesses formed in the underside of the laminate layer for engagement with the raised members to align the laminate layer on the base substrate.

2016282948 25 May 2021

8. A tile as claimed in Claim 1, wherein the connecting means comprises a plurality of protruding tongues or dovetail connectors and grooves at adjacent sides of the base substrate,

9. A tile as claimed in Claim 8, wherein the protruding tongue or dovetail connectors of the substrate are engaged in the grooves of the substrate of another tile to connect adjacent tiles to form an interconnected flooring system.

10. A tile as claimed in Claim 8 or Claim 9, wherein engaging the connecting means of a tile with a further tile aligns and positions a side edge of a tile against the side edge of the further tile.

11. A tile as claimed in any one of Claim 8 to Claim 10, wherein the top surface of the base substrate fully extends over the connecting means on at least one side of the substrate.

12. A tile as claimed in any one of the preceding Claims, wherein the laminate layer is bonded to the substrate layer using an adhesive.

13. A method of forming a tile comprising the steps of:

forming a base substrate according to any one of Claims 1 to 12,

forming a laminate layer according to any one of Claims 1 to 12;

applying an adhesive to a surface of one or both of the base substrate and laminate layer;

connecting the laminate layer and the base substrate so that the aligning member of the base substrate engages with the complimentary receiver formed in the laminate layer to thereby align the laminate layer on the top surface of the substrate, and

bonding the laminate layer to the substrate to form the tile.

14. The method of Claim 13, further comprising the step of: operating an injection moulding machine to form the base substrate.

15. The method of Claim 14, further comprising the optional step of: removing the base substrate from the injection moulding machine and allowing the base substrate to cool.

2016282948 25 May 2021

16. The method of Claim 13, further comprising the step of operating a roller coater machine to apply adhesive to a surface of one or both of the base substrate and laminate layer.

17. The method of Claim 13, further comprising the step of applying pressure to the laminate layer on the substrate.

18. The method of Claim 17, wherein application of pressure is by operating a nip-roller machine.

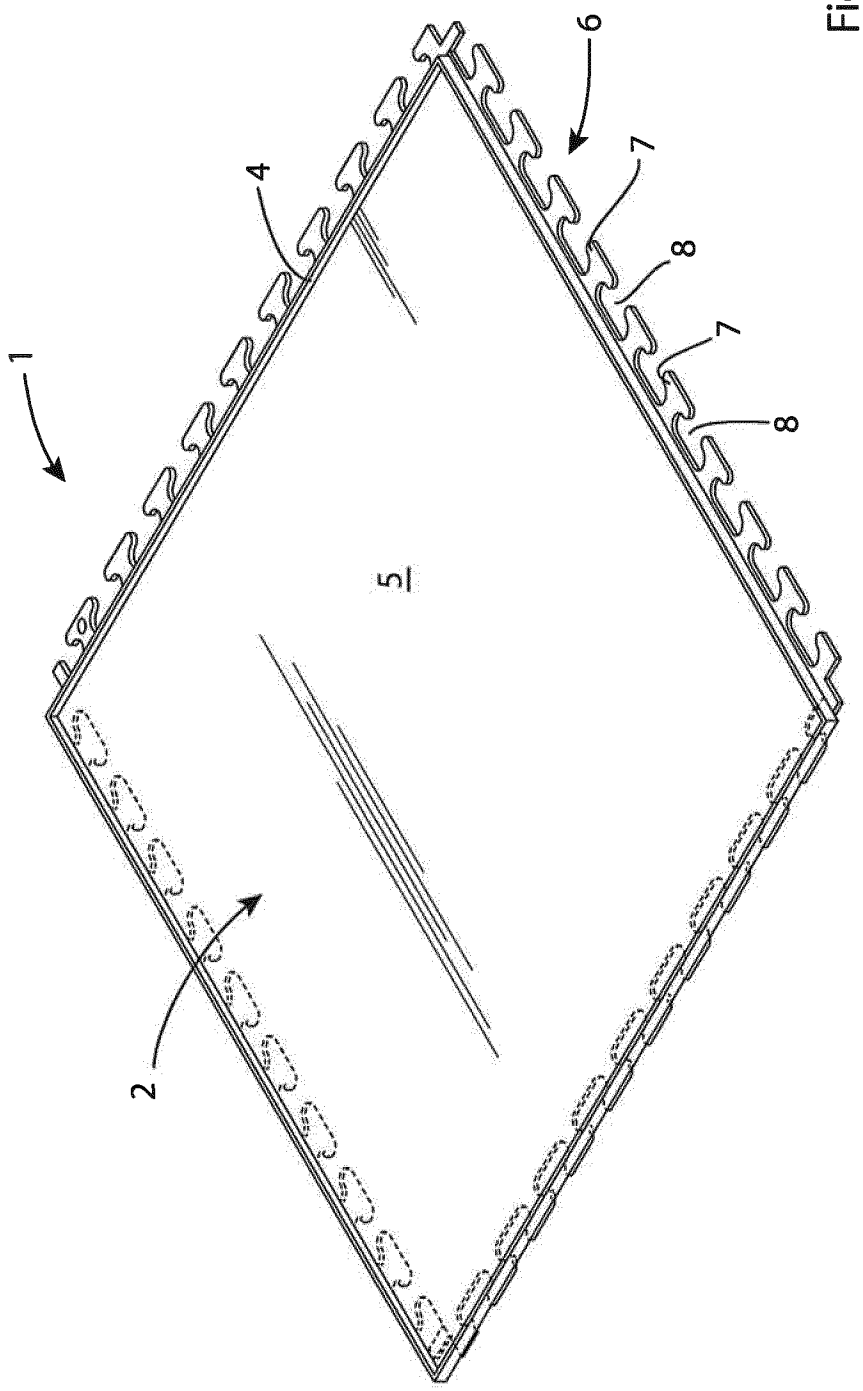

Fig. 1

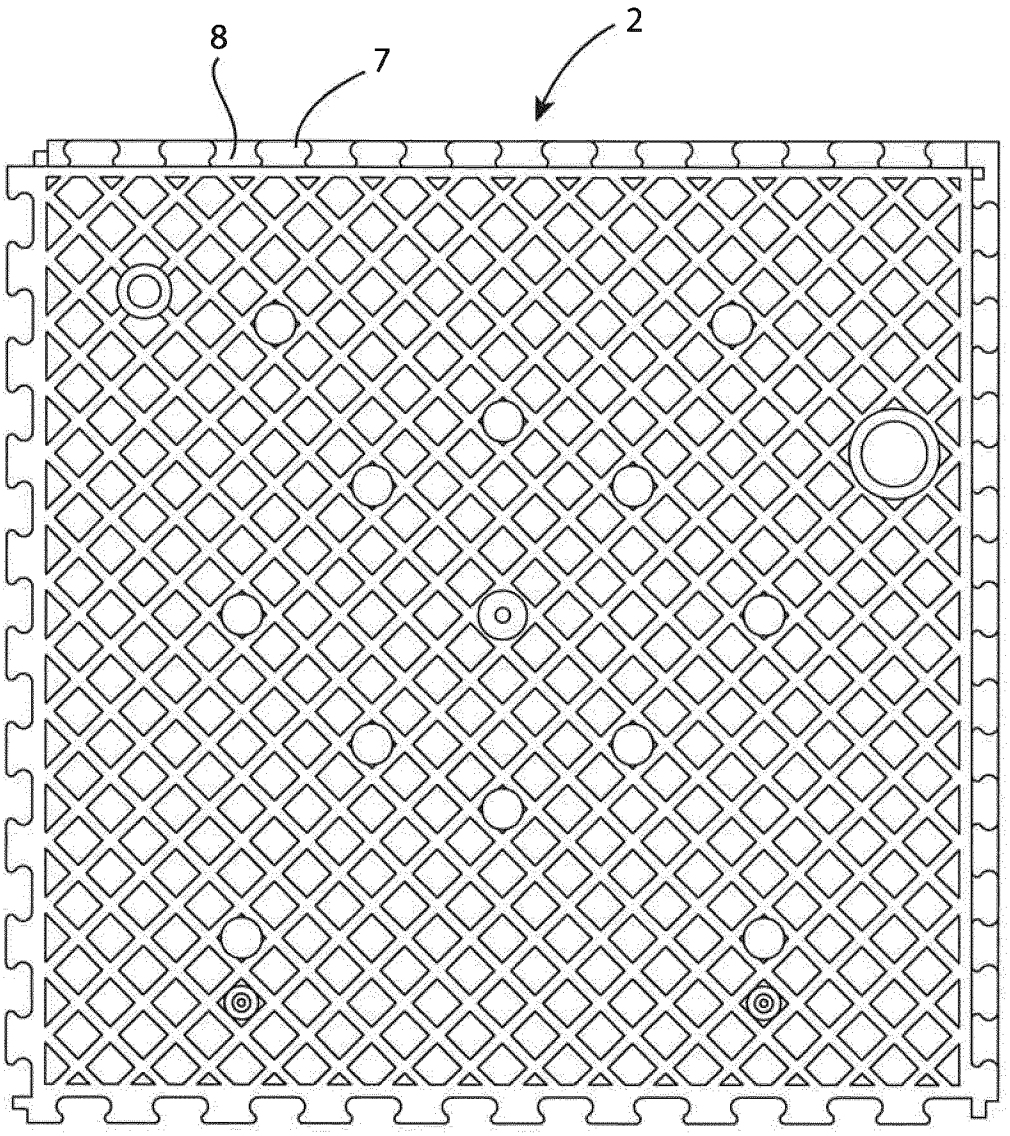

Fig. 2

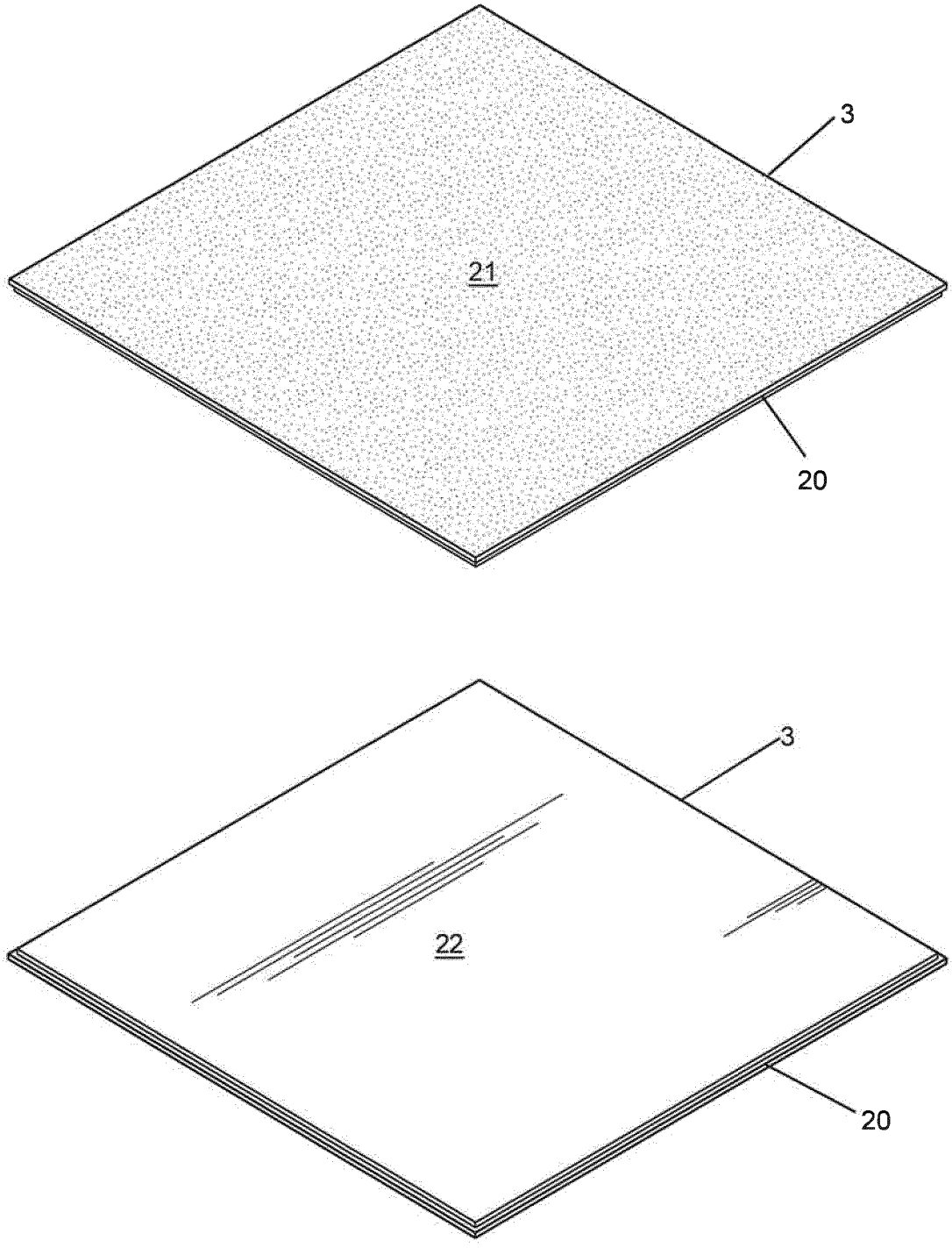

Fig.3

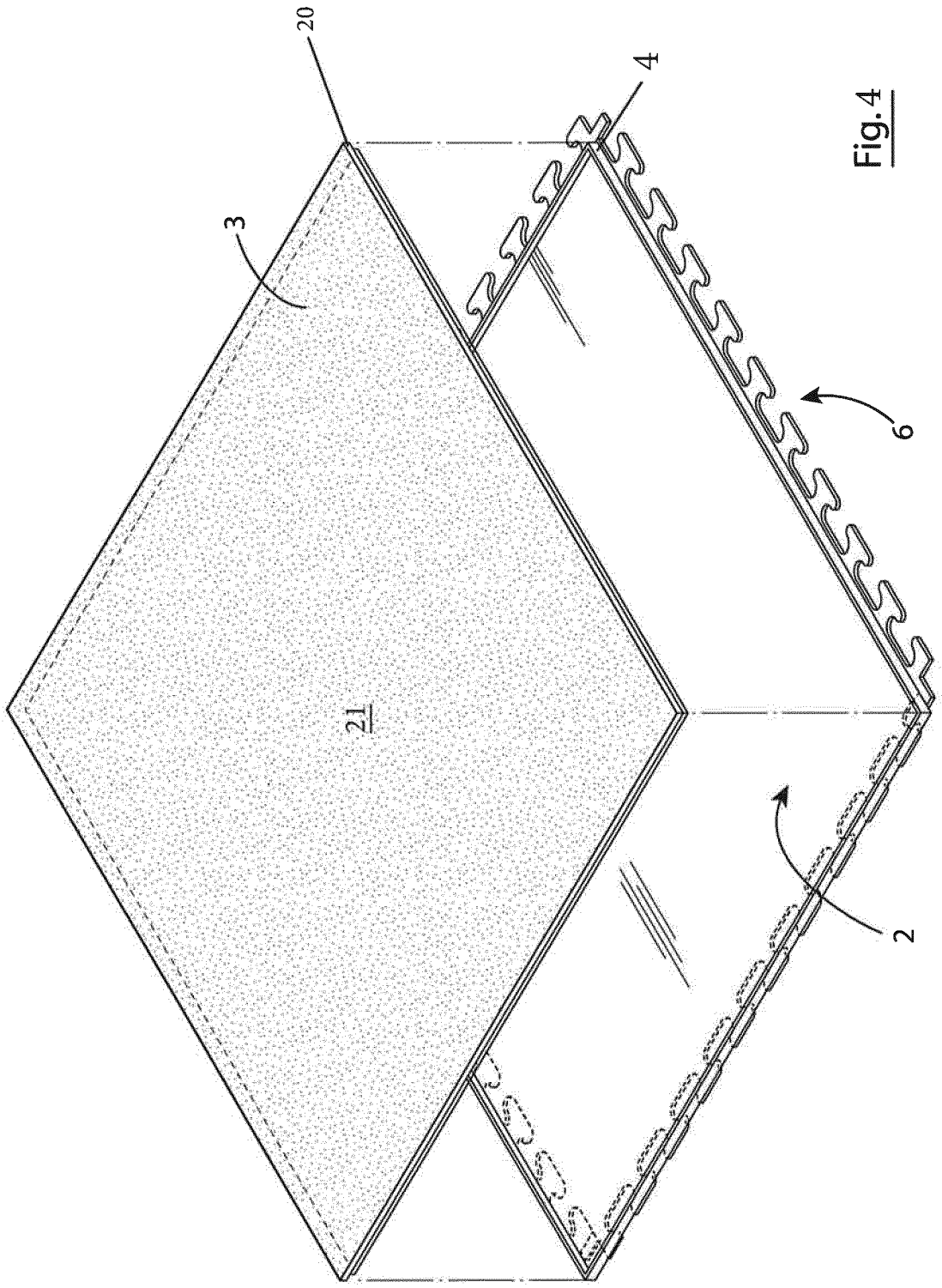

Fig. 4

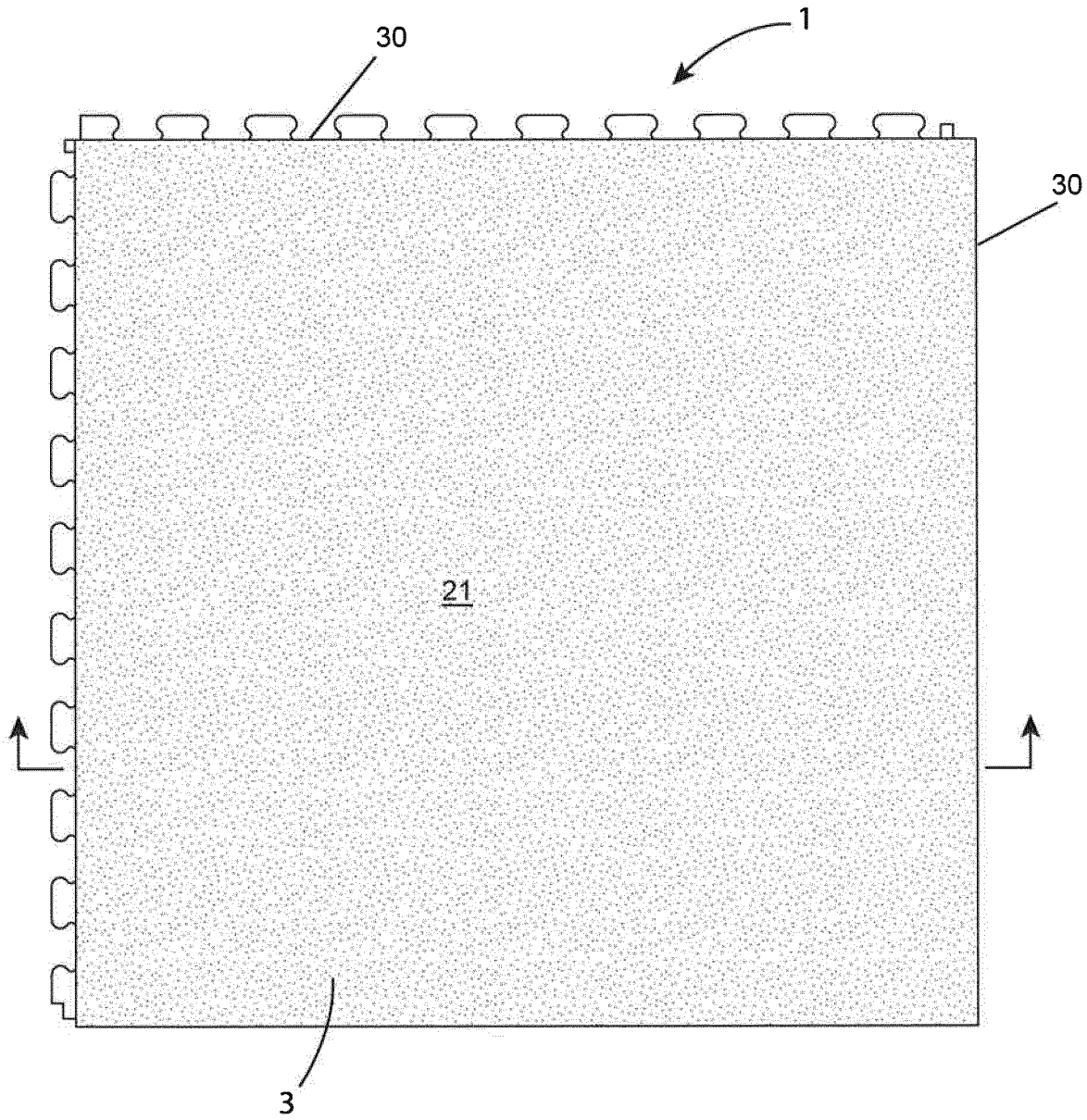

Fig. 5

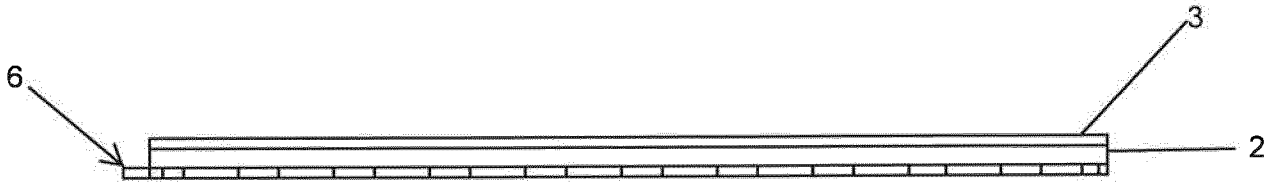

Fig. 6a

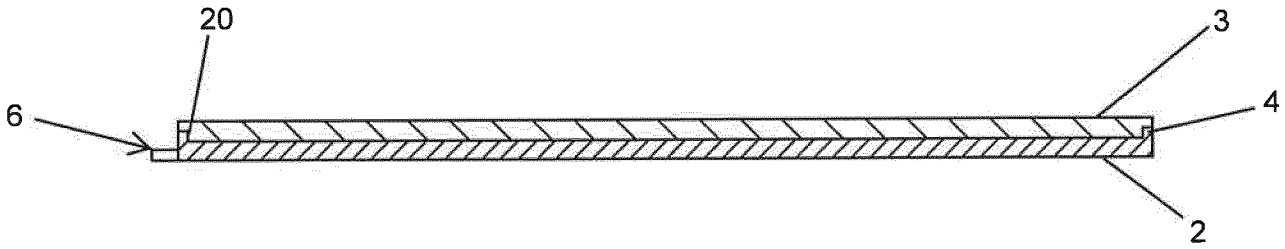

Fig. 6b

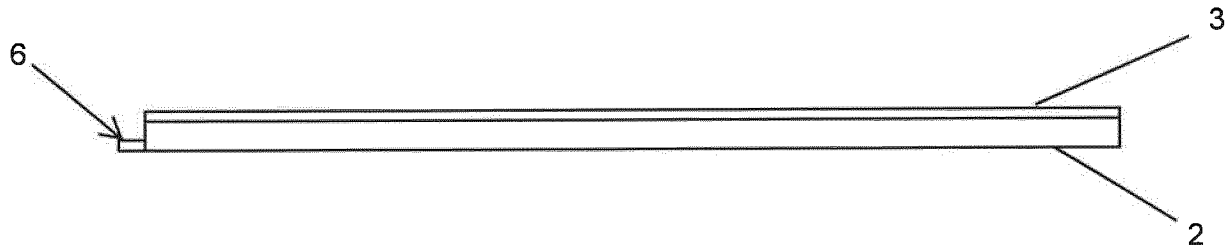

Fig. 6c

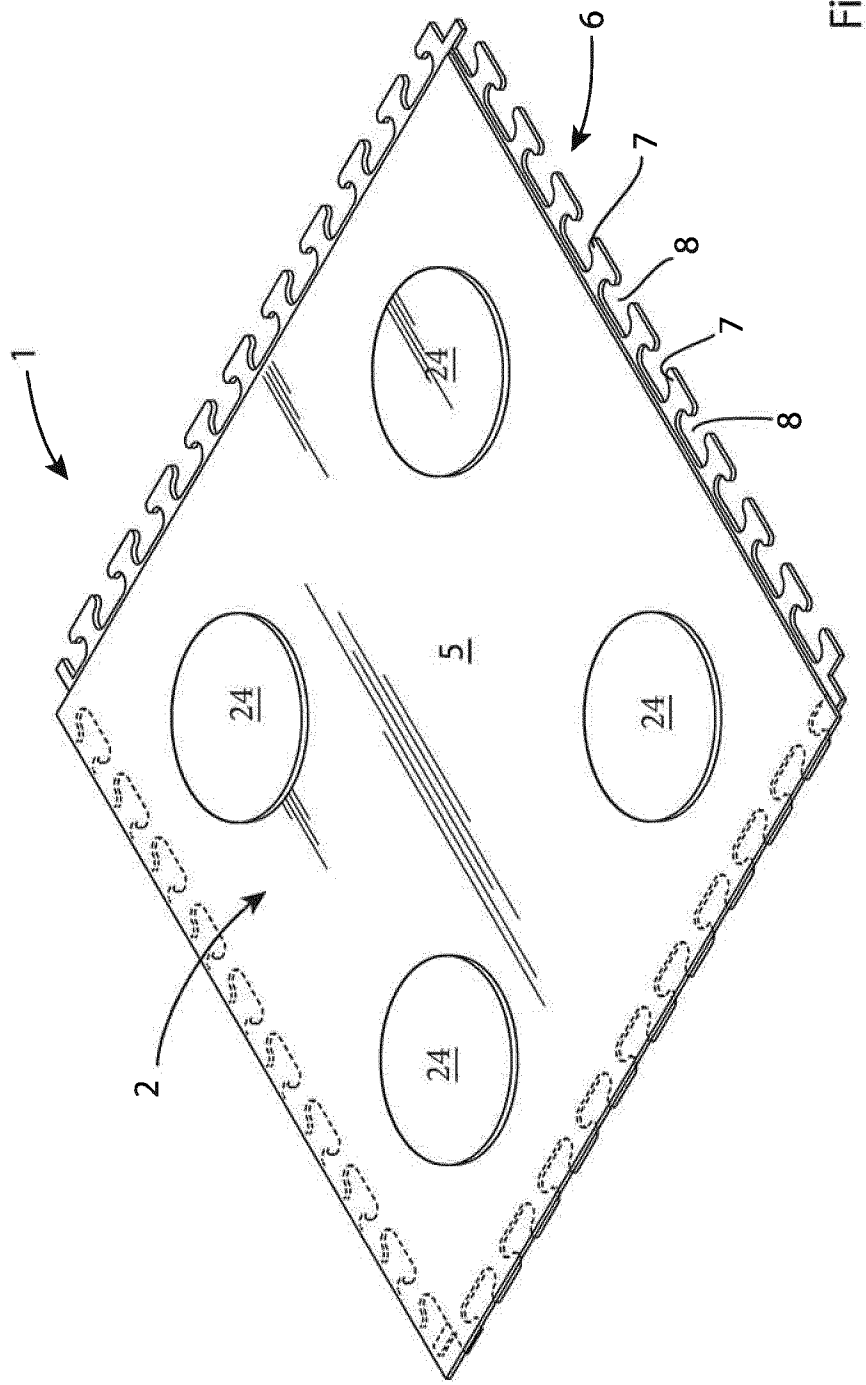

Fig. 7

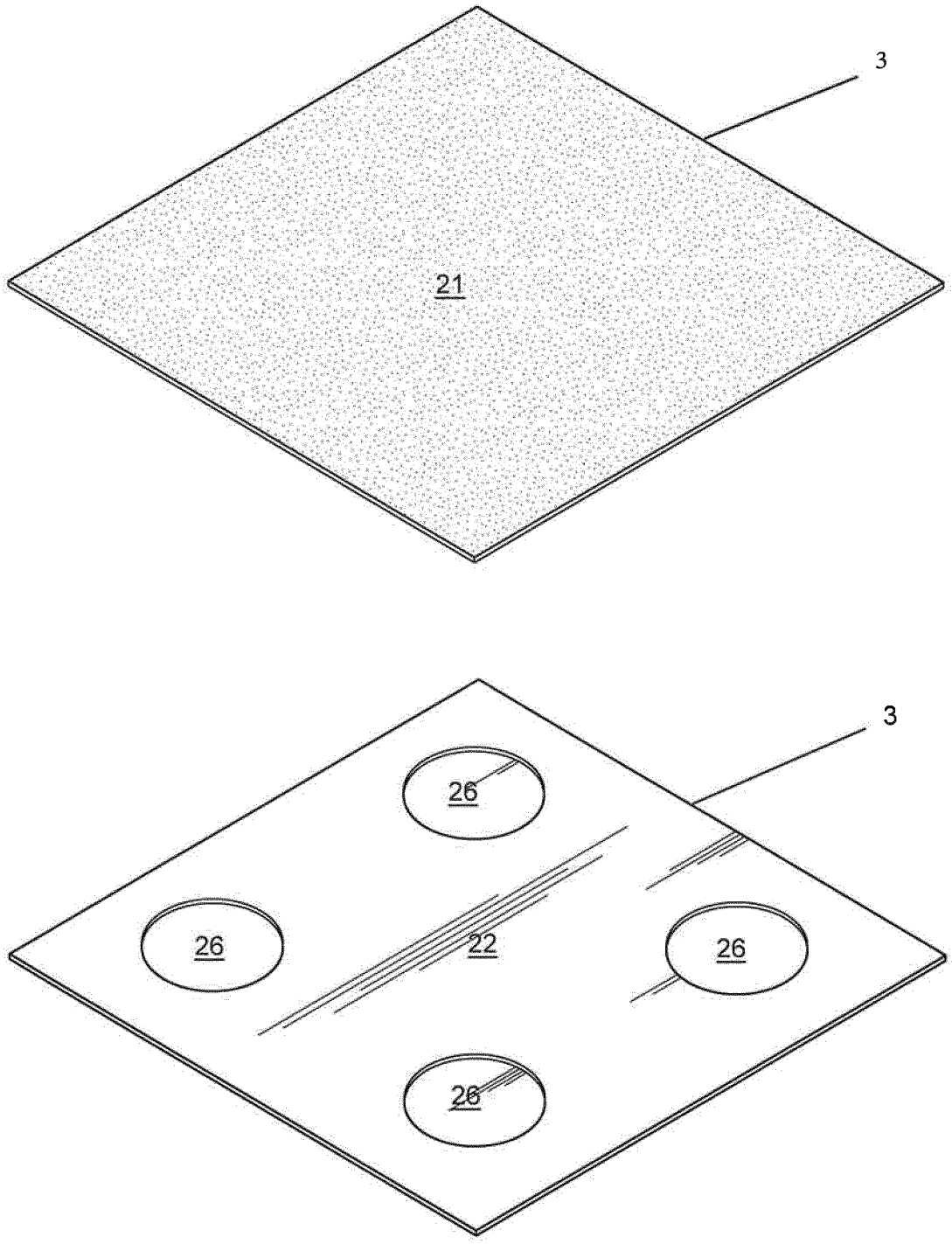

Fig.8

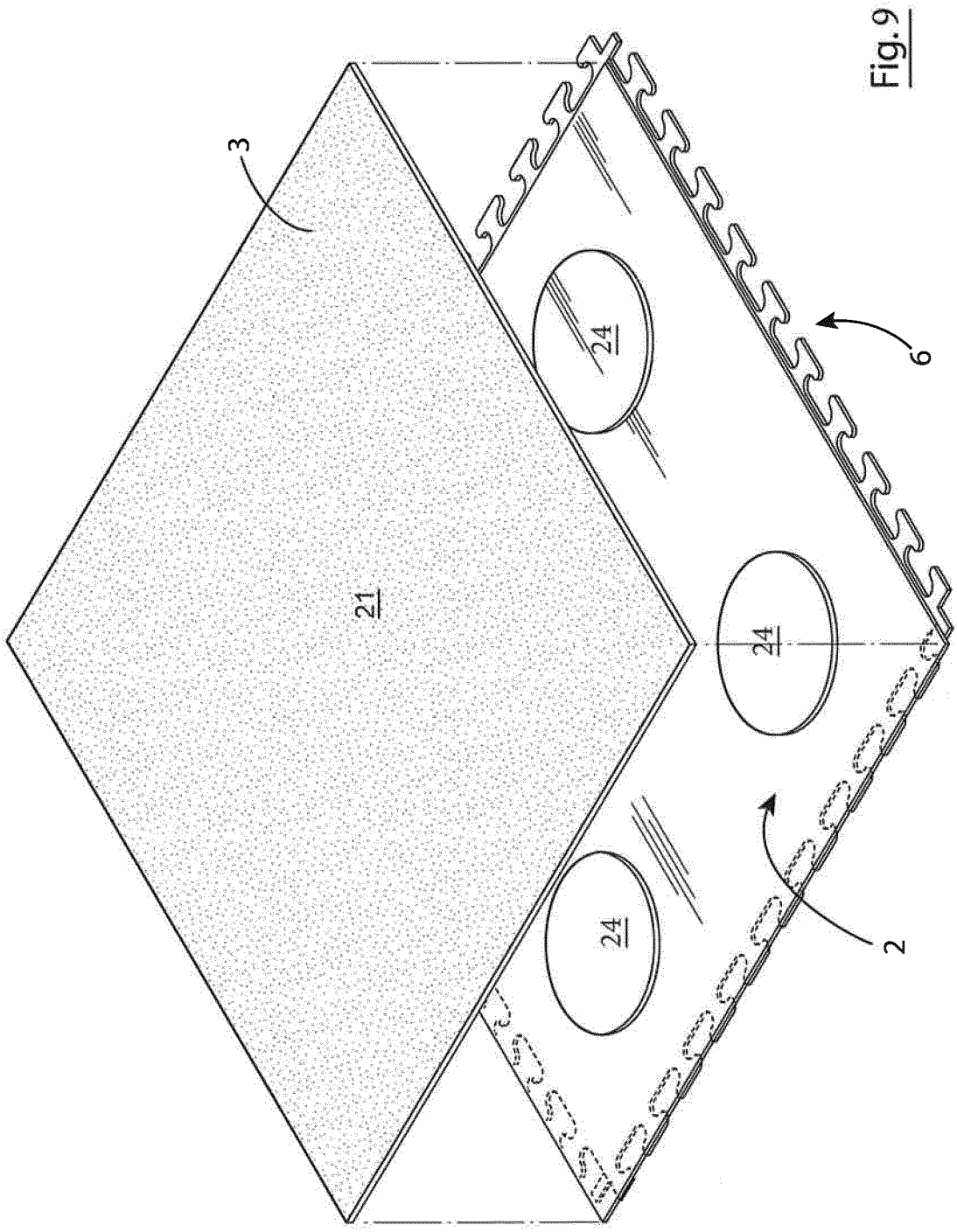

Fig. 9

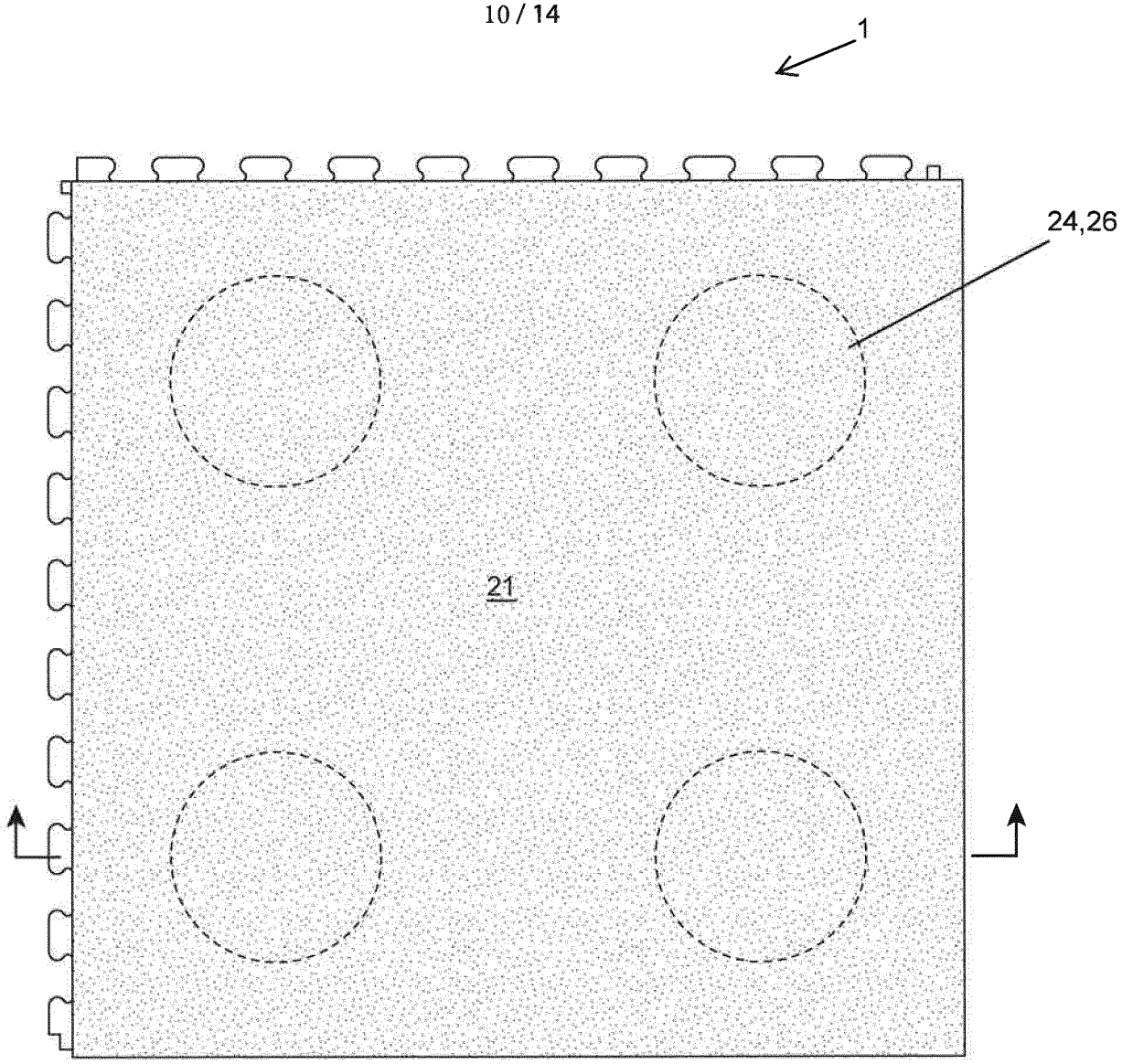

Fig. 10

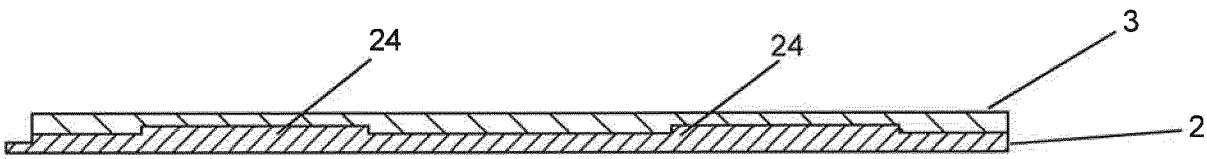

Fig. 11

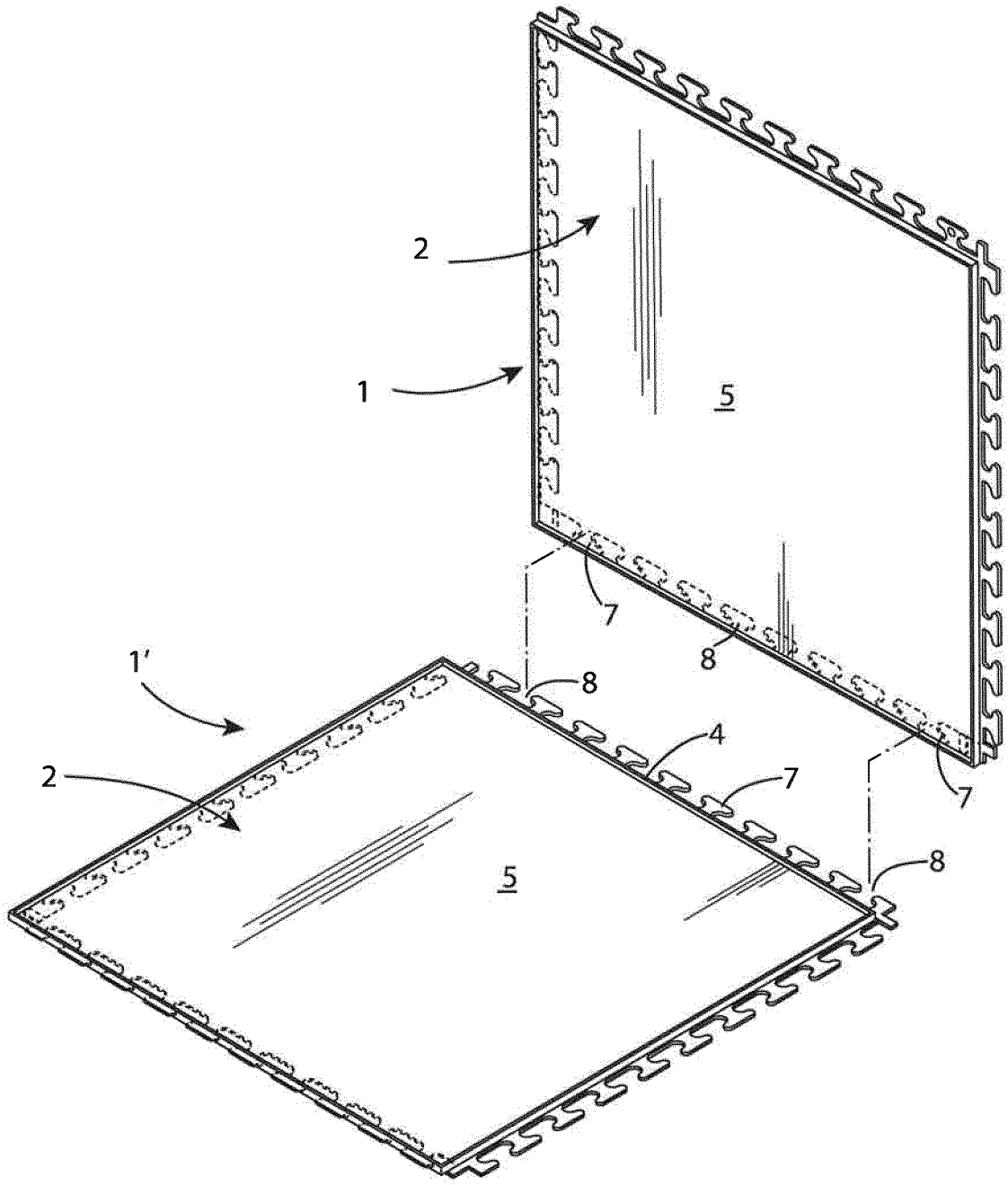

Fig. 12

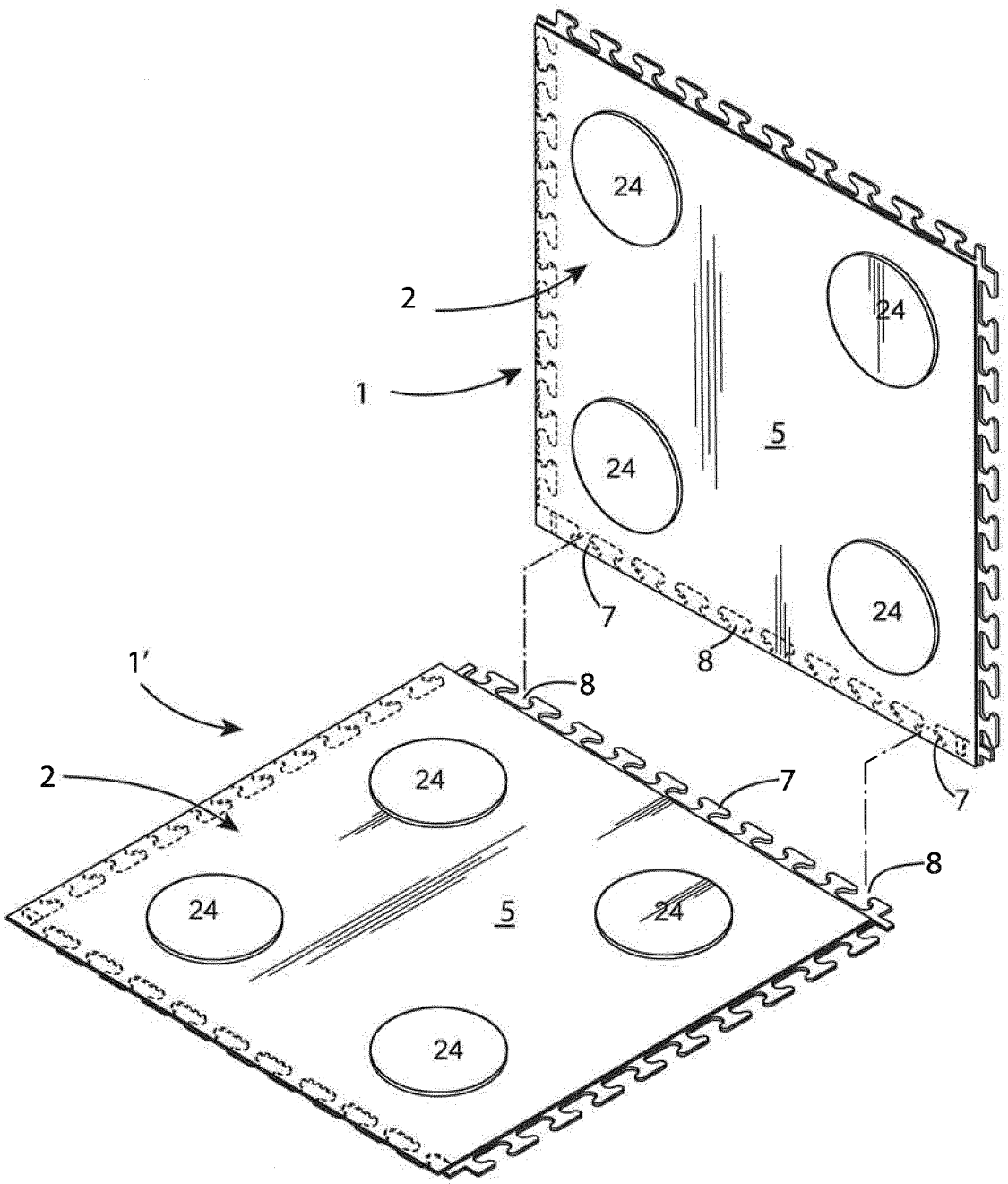

Fig. 13

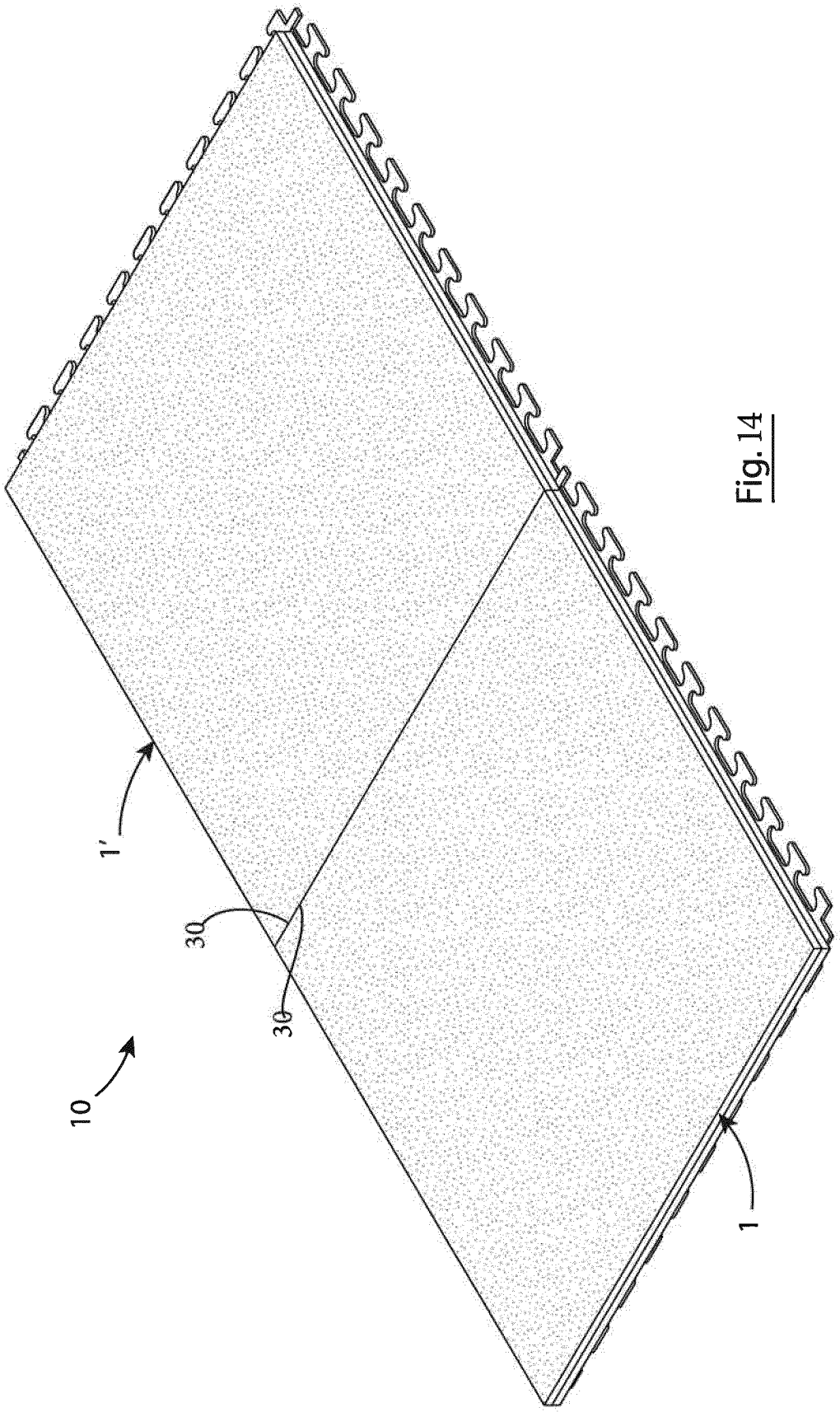

Fig. 14

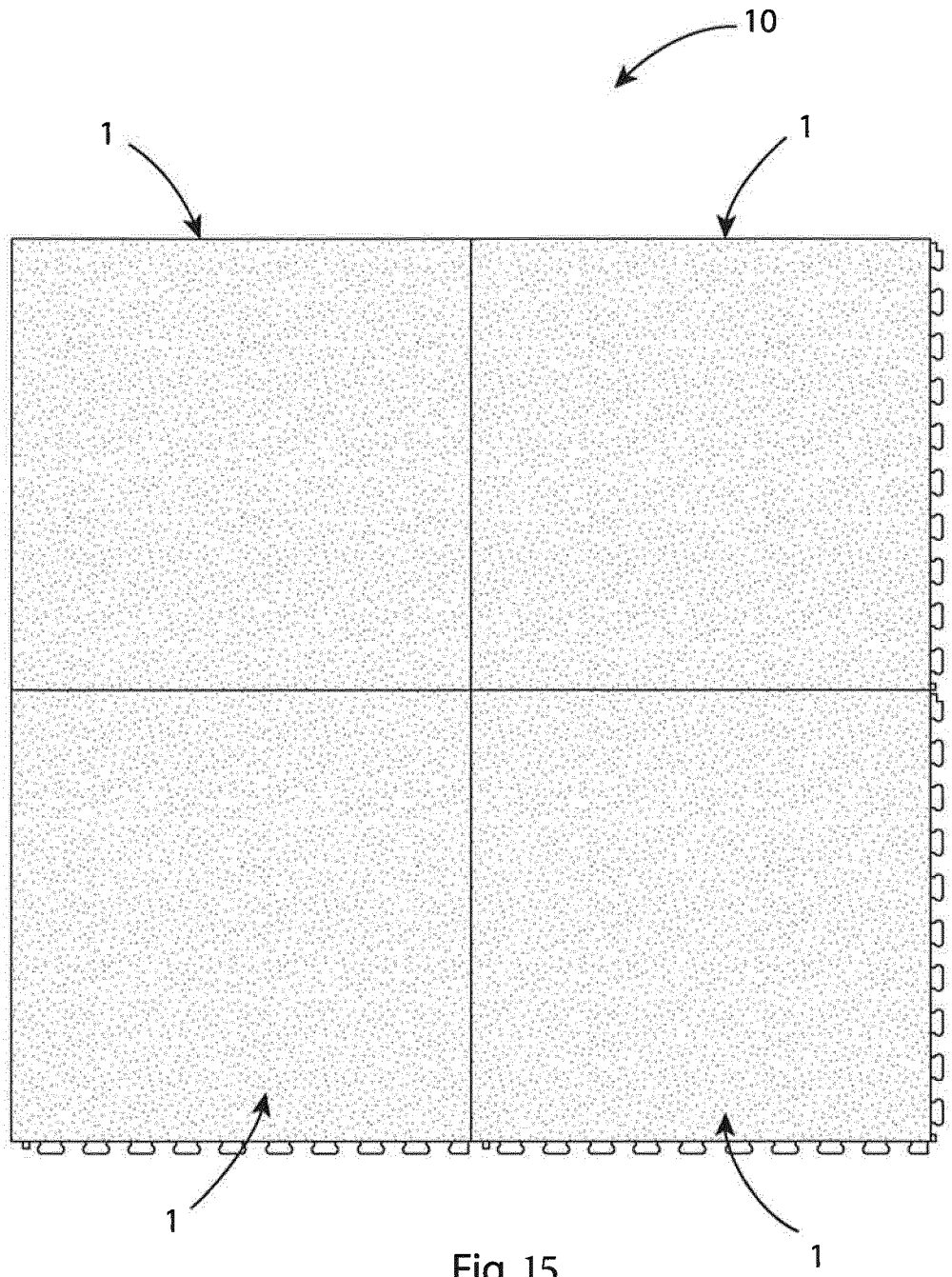

Fig. 15