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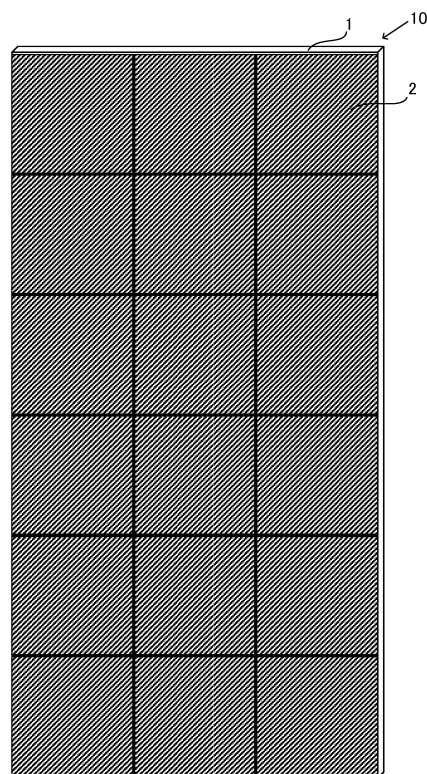
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(54) **INTERIOR BUILDING MATERIALS**

(57) The present invention intends to provide a technique by which, in an interior building material which is represented by a gypsum board and to which a magnet does not attach, the surface of such an interior building material can be modified so that a magnet can attach to the surface by simple means that can be put into practical use, a wall face and the like for which a stopper with a magnet, which is a substitute for a thumbtack, and a magnet sheet are usable can thereby be formed, and an interior building material which has realized favorable construction efficiency such that the interior building material can be easily cut with a cutter knife or the like can be made, and this object is realized by providing an interior building material having a plurality of sheet-like magnetic materials fixed to at least a portion of a surface or back surface of a plate-like base material to which a magnet does not attach, wherein adjacent magnetic materials are disposed in such a way as to have a portion where the adjacent magnetic materials are in contact with each other, or adjacent magnetic materials are disposed through a gap having a narrow portion.

[Figure 1]



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Description

Technical Field

[0001] The present invention relates to an improvement in an interior building material including a plate-like base material, such as a gypsum board, to which a magnet does not attach inherently and specifically relates to an interior building material to be used for forming an interior wall and the like, wherein: a functionality that a magnet, which is a magnetic material, can be attached to a surface of the interior building material has been imparted; and, in addition to this functionality, favorable construction efficiency such that the interior building material can be easily cut with a cutter knife or the like has been achieved.

Background Art

[0002] A gypsum board (also called a plaster board) is a building material obtained by shaping a material which uses gypsum as a main component into a plate and wrapping the plate with a special paperboard, and is very strong, has excellent fire resistance, and has high levels of heat insulating properties and sound insulating properties, so that gypsum boards are widely used as interior building materials in making walls and ceilings. The reason that the gypsum boards have been widely used as interior building materials is also due to the fact that, in addition to the above-described excellent functionalities, the gypsum boards are excellent in construction efficiency by which the gypsum boards can be easily cut with a simple sharp cutting tool such as a cutter knife even though the gypsum boards are building materials made of an inorganic material.

[0003] However, to favorably display, for example, a picture, a photograph, or the like on a wall face made of a gypsum board, a special anchor developed for gypsum boards needs to be used. In addition, there is a problem that in the case where a usual screw, nail, or thumbtack, or a special anchor for gypsum boards, which has been forcibly used for a wall face made of a gypsum board, is pulled out when it becomes unnecessary to use them, a hole is left on a wall. The problem that a hole is left on a wall after a screw, a nail, a thumbtack, or the like is pulled out occurs similarly to other interior building materials, not limited to the gypsum boards.

[0004] To solve this problem, a stopper with a magnet, which makes it unnecessary to make a hole in a wall and is a substitute for a thumbtack is developed, and such stoppers with a magnet are widely used for walls made of steel or the like. In addition, a magnet sheet which can be easily attached to walls made of steel or the like and has an image, characters, or the like thereon, a magnet sheet which can also be utilized as a white board, and the like are known, and such magnet sheets are widely used because they are freely attachable and detachable, and a trace of detachment is not left on a wall.

[0005] However, these products which employ a system of attaching them to a wall with a magnet restrict wall materials and cannot be used, for example, for generally used wall faces made of a gypsum board. To use such products, a sheet dedicated for attaching a magnet sheet needs to be installed on a wall face, and therefore another problem that the design property of a wall face is impaired arises in addition to complication.

[0006] To solve the above-described problems, there is a proposal on a wall member in which a magnetic sheet such as a steel sheet is pasted to a surface of a support member such as a gypsum board, and wallpaper is superimposed on the surface of the magnetic sheet (see Patent Literature 1). In addition, a building material in which a material such as a gypsum board and a metal sheet are laminated and made into a composite, the building material being developed in order to prevent malfunction of electronic devices, has been known in recent years, and there is a possibility that a magnet can be attached to the surface of the building material in some cases (see Patent Literature 2).

Citation List

Patent Literature

[0007]

Patent Literature 1: Japanese Patent Laid-Open No. 2014-152596

Patent Literature 2: Japanese Patent Laid-Open No. 2008-87404

Summary of Invention

Technical Problem

[0008] However, according to studies conducted by the present inventors, in the wall member described in Patent Literature 1, the magnetic sheet such as a steel sheet is pasted to almost the whole face of the support member such as a gypsum board or pasted to the support member over a large area even if the magnetic sheet is pasted to only a portion of the support member, and therefore the construction efficiency of the support member is remarkably inferior. In addition, the specific wall member described in Patent Literature 1 has constitution in which: a magnetic sheet such as a steel sheet is pasted, with a double sided tape or an adhesive, to the surface of a commercially available gypsum board both surfaces of which are covered with paper; and a paperboard is superposed on the magnetic sheet, so that a part where a magnet can be attached to a wall face is formed by construction work, and therefore, the construction work is extremely complicated and the constitution is such that the wall member cannot be used for general purposes.

[0009] In addition, the previously described building material developed in order to prevent malfunction of

electronic devices intends to impart electromagnetic wave shielding properties, and therefore most of the metal sheets that are described to be usable are those of types to which a magnet does not attach. Further, with respect to the structure of the building material, many materials are laminated on the metal sheet, and therefore the building material is not constituted so that a magnet can attach to the surface thereof.

[0010] On the other hand, paints each obtained by blending a magnetic substance such as an iron powder are commercialized, and an interior building material such as a gypsum board can be constructed so that a magnet can attach thereto by providing a coating film on the surface thereof. However, in this case, construction of thick coating on the construction site needs to be carried out, and therefore it is difficult to apply a paint uniformly and there are various problems that the construction requires a great deal of skill, the construction site gets dirty, high incombustibility of a gypsum board cannot be secured, etc., so that such paints cannot be used for general purposes, which is similar to the technique described in Patent Literature 1.

[0011] To solve these problems, it is also considered that a coating film layer containing a magnetic substance is formed in advance by applying a paint containing a magnetic substance blended therein on an interior building material such as a gypsum board. However, in this case, there is a practical problem that facilities and a technique for coating the surface of the interior building material uniformly with a paint, and facilities and a technique for drying are required, making the scale of the facilities large.

[0012] Accordingly, an object of the present invention is to provide an interior building material by which: in an interior building material which is represented by a gypsum board and to which a magnet does not attach, the surface of such an interior building material can be modified so that a magnet can attach to the surface by simple means that can be put into practical use; a wall face and the like for which a stopper with a magnet, which is a substitute for a thumbtack, and a magnet sheet are usable can thereby be formed; and favorable construction efficiency such that the interior building material can be easily cut with a cutter knife or the like has been achieved.

Solution to Problem

[0013] The above-described object is achieved by the present invention described below. That is, the present invention provides an interior building material comprising a plurality of sheet-like magnetic materials fixed to at least a portion of a surface or back surface of a plate-like base material to which a magnet does not attach, wherein adjacent magnetic materials are disposed in such a way as to have a portion where the adjacent magnetic materials are in contact with each other, or adjacent magnetic materials are disposed through a gap having a narrow portion.

[0014] Preferred embodiments of the interior building material according to the present invention include the followings.

[0015] The adjacent magnetic materials are disposed in such a way as to be in contact with each other and the plurality of sheet-like magnetic materials are fixed in a state of being arranged without a gap; the narrow portion of the gap is within a range of 0.05 to 5.0 mm; the narrow portion of the gap is within a range of 0.10 to 1.0 mm; the plurality of sheet-like magnetic materials have the same shape, and the shape is any one of shapes selected from the group consisting of a square, a rectangle, a trapezoid, a triangle, a circle, and an ellipse; four sides of the square, two sides of the rectangle, at least one side of the trapezoid or the triangle, a diameter of the circle, or at least one of a major axis and a minor axis of the ellipse is 10 cm to 35 cm; the gap is formed by only the narrow portion, and the narrow portion is linear; at least one of the plurality of sheet-like magnetic materials is a sheet-like magnetic material having a through hole; at least one of the plurality of sheet-like magnetic materials has a chamfered portion at an outer circumference thereof; when the interior building material is stood in such a way as to be vertical, and one sheet of A4 plain paper is held at a portion where the sheet-like magnetic materials are disposed with one disk-like magnet having a diameter of a magnet portion of 17 mm ϕ and having a force of attraction of 3.5 N to an iron sheet having a thickness of 1 mm, the portion where the sheet-like magnetic materials are disposed has force of attraction by which the plain paper does not fall; having a structure in which the base material is a plate-like member made of gypsum, and, further, a paper sheet is pasted on the plurality of disposed sheet-like magnetic materials; the sheet-like magnetic materials have a thickness of 0.1 to 1.0 mm; the sheet-like magnetic materials have a thickness of 0.2 to 0.8 mm; any one of the plurality of sheet-like magnetic materials is an iron sheet or a steel sheet having rust-proofing performed on both faces or one face thereof; having a thickness of 9.5 to 10.0 mm; and having a thickness of 12.5 to 13.0 mm.

Advantageous Effects of Invention

[0016] According to the present invention, a highly convenient interior building material in which an interior building material the surface of which cannot be attached to a magnet, the interior building material represented by a gypsum board, has been modified so that the surface thereof can be attached to a magnet by simple means that can be put into practical use is provided although the highly convenient interior building material has simple constitution. According to the present invention, a highly convenient interior building material wherein when plain paper or the like is held on the surface of the interior building material with a stopper with a magnet which is a substitute for a thumbtack, a magnet sheet, or the like, which has been used in various types and forms in a wide

range of fields, the interior building material exhibiting force of attraction of the magnet which is sufficient for the interior building material to be able to hold the plain paper, and, further, a highly convenient wall face using the highly convenient interior building material are provided by adopting the above-described constitution. The most advantageous point of the present invention is in that according to the present invention, there is provided an interior building material which is a highly convenient interior building material as described above, and by which favorable construction efficiency such that a cutter knife can be inserted between adjacent sheet-like magnetic materials, and thereby the interior building material can be easily cut into an appropriate size has been achieved.

Brief Description of Drawings

[0017]

[Figure 1] Figure 1 is a schematic diagram illustrating an interior building material of Example 2 according to the present invention.

[Figure 2] Figure 2 is a schematic diagram illustrating an interior building material of Example 1 according to the present invention.

[Figure 3] Figure 3 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 4] Figure 4 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 5] Figure 5 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 6] Figure 6 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 7] Figure 7 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 8] Figure 8 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 9] Figure 9 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 10] Figure 10 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 11] Figure 11 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 12] Figure 12 is a schematic diagram illustrating another example of the interior building material according to the present invention.

[Figure 13] Figure 13 is a schematic diagram describing a method for measuring force of attraction

of a magnet to a 1-mm iron sheet, the magnet used in evaluating the force of attraction of the interior building material according to the present invention to the magnet.

Description of Embodiments

[0018] Hereinafter, the present invention will be described in detail giving preferred embodiments. The present invention is not restricted by the following embodiments, and various modifications and replacements of the following embodiments can be added without deviation from the scope of the present invention.

[0019] The present inventors have conducted diligent studies in order to solve the previously described problems of the conventional techniques to recognize that any of the conventional techniques in which a plate-like base material, such as a gypsum board, to which a magnet does not attach is modified so that the surface thereof can be attached to a magnet deteriorates the construction efficiency and design property of the base material and lacks the industrial applicability, and this point is the biggest technical problem in the conventional techniques. Studies have been conducted based on such recognition to find that in the case where constitution is made in such a way that a plurality of sheet-like magnetic materials are disposed and fixed to at least a portion of the surface or the back surface of the base material so that the surface can be attached to a magnet, an embodiment is made in such a way that adjacent magnetic materials are made to be in contact with each other and the plurality of sheet-like magnetic materials are fixed in a state of being arranged without a gap, or an embodiment is made in such a way that a plurality of adjacent sheet-like magnetic materials are disposed and fixed through a gap having at least a narrow portion, and thereby an interior building material in which the problems of the conventional techniques are solved, which is highly convenient, and which is excellent in construction efficiency can be made, and thus the present inventors have reached the present invention.

[0020] That is, the present inventors have found that by fixing a plurality of sheet-like magnetic materials in a state of being arranged without a gap, or by arranging and fixing a plurality of sheet-like magnetic materials through a gap having a narrow portion, the interior building material according to the present invention is in a state where the adjacent sheet-like magnetic materials are cut and separated even in the state where the sheet-like magnetic materials are arranged without a gap, not to mention the case where the gap is provided, so that a blade of a cutter knife can be easily inserted between the sheet-like magnetic materials, and the construction efficiency which is similar to that before the modification can thereby be secured.

[0021] According to studies conducted by the present inventors, for example, even in the case where an interior building material 10 is made by fixing on a gypsum board,

which is a plate-like base material shown by reference sign 1 in Figure 1, a plurality of galvanized steel sheets, which are sheet-like magnetic materials shown by reference sign 2, in a state of being arranged without a gap, surprisingly, a blade of a cutter knife can be easily inserted between the adjacent magnetic materials by bending the above-described interior building material 10 a little so that the side on which the plurality of galvanized steel sheets are fixed is made convex, and as a result, the present inventors have found that the interior building material having the above-described constitution can be easily cut by a cutter knife. In addition, in the case where an interior building material 10 the constitution of which is such that, as illustrated in Figure 2, adjacent sheet-like magnetic materials 2 are arranged and fixed through a gap having a narrow part shown by reference sign 3 is made, a blade of a cutter knife or even a blade of a sharp cutting tool the thickness of which is thicker than a blade of a cutter knife can be easily inserted into this gap, and the base material can be easily cut by this blade. In this embodiment for carrying out the present invention, which is illustrated in Figure 2, it is preferable to design the shape and disposition of the plurality of sheet-like magnetic materials 2 based on the recognition that the gap having a narrow portion 3 and being formed by disposing the plurality of sheet-like magnetic materials 2 on the base material 1 is a portion to be a position that is freely cut in the interior building material according to the present invention. By designing the shape and disposition of the plurality of sheet-like magnetic materials 2 in this way, an interior building material that is more excellent in construction efficiency can be provided.

[0022] The gap having a narrow portion 3 in the interior building material according to the present invention may be appropriately designed as necessary considering the above-described construction efficiency of the interior building material. That is, the size of the gap may have a width such that a blade of a sharp cutting tool such as a cutter knife can be easily inserted without an operation of, for example, bending the interior building material as described above at the narrow portion 3. As the specific size of the narrow portion 3 in the case where the constitution in which the gap is provided is adopted, the shortest distance between adjacent magnetic materials (narrow portion 3) may be approximately within a range of 0.05 to 5.0 mm or may be narrower as narrow as approximately within a range of 0.10 to 1.0 mm. In addition, the position where the gap is provided may be arbitrarily determined considering the convenience in cutting and using the interior building material.

[0023] Usually, the size of an interior building material is 3 shaku $\times$ 6 shaku, which is a standard shaku size of panel plywood, in many cases. Therefore, in the present invention, in the case where a plurality of sheet-like magnetic materials are arranged according to either of the above-described types of constitution, it is preferable to adopt the constitution in which magnetic materials are each disposed at a position where construction work is

easily done and the magnetic materials can be cut at every desired, predetermined intervals. In the case where the interior building material is cut at a portion where adjacent magnetic materials are in contact with each other or at a gap formed by adjacent magnetic materials, it is preferable to adopt the constitution in which the gaps are disposed at every predetermined intervals in such a way that the width thereof is in a range of, for example, 10 to 35 cm, more specifically, a width of either 10 cm, 15 cm, or 30 cm.

[0024] Any of the conventional interior building materials using a metal sheet uses a metal sheet having a large area, and this has been a cause for deteriorating the construction efficiency. In contrast, in the present invention, an interior building material 10 having an embodiment in which, for example, a gypsum board which is an interior building material of 3 shaku $\times$ 6 shaku is used as a base material 1, and sheet-like magnetic materials 3 of about 30-cm square are orderly arranged and fixed to the surface of the base material 1 in such a way as to be in contact with each other or through a narrow gap, as illustrated in Figure 1 or Figure 2, is made. By constituting the interior building material 10 in this way, the above-described deterioration of the construction efficiency, which is caused by using the above-described metal sheet having a large area, is solved, and remarkable effects of the present invention are obtained. It is to be noted that Figure 1 and Figure 2 are schematic diagrams and illustrates the contact portions and gaps with emphasis. The same applies to the other figures.

[0025] By constituting the interior building material 10, which is illustrated in Figure 1 or Figure 2, in the manner as described above, the interior building material 10 according to the present invention has the constitution in which the interior building material 10 can be cut by a cutter knife of the like at this portion where a blade of a cutter knife can be easily inserted between the adjacent sheet-like magnetic materials 2 and is divided about every 30 cm. As a result, in the interior building material according to the present invention, by utilizing these divisions (contact portions and gaps) where a blade of a cutter knife can be easily inserted and cutting can be conducted, a gypsum board which is a base material 1 can be easily cut in a width (length) of, for example, 30 cm, 60 cm, 90 cm, etc. using the magnetic materials as guides without using a safety ruler or the like. In this way, the interior building material product according to the present invention can be used up without waste and therefore is excellent in effective utilization of resources and in economic efficiency. When sheet-like magnetic materials of about 10-cm square or about 15-cm square, not limited to those described above, are used, the interior building material according to the present invention is a useful product which can be easily cut into a width (length) of 10 cm, 15 cm, 20 cm, 40 cm, 45 cm, 50 cm, 60 cm, 70 cm, 75 cm, 80 cm, etc.

[0026] The shape of a plurality of sheet-like magnetic materials 2 that constitute the interior building material

10 according to the present invention is not limited to a square illustrated in Figure 1 and Figure 2, but may be any one of, for example, a rectangle (see Figures 3 and 4), a trapezoid (not illustrated in Figures), a circle (see Figure 5), an ellipse (not illustrated in Figures), a triangle (see Figures 6 and 7), and the like. In the examples illustrated in Figures, the shapes of a plurality of sheet-like magnetic materials are the same, but in the present invention, the shapes are not limited to these, and combinations of the above-described geometrical figures may be used. For example, in interior finishing, it is preferable to appropriately select the shapes and disposition of the magnetic materials to use the magnetic materials so that a portion where the base material is greatly exposed exists in a region surrounded and formed by a plurality of adjacent sheet-like magnetic materials when considering that a case where through holes need to be provided in the interior building material occurs.

[0027] In addition, the interior building material 10 according to the present invention includes a plurality of sheet-like magnetic materials 2 disposed over the whole face of the base material 1 in the examples given in Figure 1 to Figure 10. It is preferable that the magnetic materials 2 be disposed in 90% or more, more preferably 95% of the area of the surface or back surface of the base material 1. However, the magnetic materials 2 are not necessarily disposed in this manner. For example, as illustrated in Figure 11 and Figure 12, the magnetic materials 2 may be disposed in a range where the convenience is considered to be improved when the surface of the interior building material can be attached to a magnet. Further, as illustrated in Figure 8 to Figure 10, it is also a preferred embodiment of the present invention that the constitution in which a plurality of sheet-like magnetic materials 2 are disposed in only the portion where there is a high possibility that the building material which is the base material 1 can be cut and used is adopted considering the construction efficiency, and a sheet-like magnetic material 2 having a large area is disposed in a portion where there is no possibility that the building material is cut and used.

[0028] An important thing in the present invention is, rather than the range where a plurality of sheet-like magnetic materials are arranged, to adopt the constitution in which a state where a plurality of sheet-like magnetic materials are arranged is made, so that a blade of a cutter knife or the like can be easily inserted between the adjacent magnetic materials as necessary in construction work and the base material can be cut along the outer circumferences of the sheet-like magnetic materials (that is, sheet-like magnetic materials are not cut). That is, as a result of adopting such constitution, an interior building material can be made into a size as needed freely, and easily and without waste, and therefore it can be achieved to provide a product which can make the surface of a formed wall, in forming an interior wall, highly convenient in such a way that a magnet can attach thereto, and which is excellent in convenience/construction efficiency/eco-

nomonic efficiency by which the construction efficiency is not impaired, and the amount of left-over materials produced can be reduced.

[0029] More preferred embodiments of the interior building material being the object of the present invention and having the constitution in which a blade of a cutter knife or the like can be easily inserted between adjacent magnetic materials include an embodiment using a building material in which a chamfered portion is provided at the outer edge (outer circumference) of at least one of a plurality of sheet-like magnetic materials 2, or, if necessary, of all the plurality of sheet-like magnetic materials 2. When such an embodiment is adopted, even in an interior building material having the constitution particularly as illustrated in Figure 1 in which adjacent magnetic materials are disposed on the base material 1 in such a way as to be in contact with each other, and a plurality of sheet-like magnetic materials 2 are fixed in a state of being arranged without a gap, a blade of a cutter knife or the like can be inserted more easily between adjacent sheet-like magnetic materials. In addition, when the chamfered portion is provided at the outer edge (outer circumference) of the magnetic materials 2, a blade of a cutter knife or the like can be easily inserted between the adjacent magnetic materials even in the state where a sheet-like material such as wallpaper is pasted to the surface of the interior building material according to the present invention, so that the interior building material according to the present invention is easily cut.

[0030] The method for fixing a plurality of sheet-like magnetic materials that constitute the interior building material according to the present invention on the base material may any of conventionally known methods. For example, the magnetic materials may be pasted to the base material with an adhesive or stopped to the base material with a double-sided tape. The adhesive is not particularly limited, and, for example, organic adhesives such as vinyl acetate-based adhesives and epoxy-based adhesives and inorganic adhesives such as alkali metal silicates may be used.

[0031] Examples of the sheet-like magnetic material that constitutes the interior building material according to the present invention include an iron sheet or a steel sheet. The steel sheet may be a surface-treated steel sheet on which a surface treatment has been performed. The surface treatment on the surface-treated steel sheet may be any of surface treatments that can make a state where a magnet attaches to the surface of the building material when the interior building material according to the present invention is constituted. Examples of the steel sheet include steel sheets plated with a monometal (monometal-plated steel sheets) such as a zinc-plated steel sheet and steel sheets plated with alloy (alloy-plated steel sheets) such as hot-dip 55% aluminum-zinc alloy steel sheet (Galvalume(R)). In Examples, which will be described later, cases where galvanized steel sheets, as a representative example of the steel sheets are disposed are shown, but, as a matter of course, the steel sheet is

not limited thereto.

[0032] The sheet-like magnetic material to be used in the present invention may be a sheet-like magnetic material having one through hole or a plurality of through holes (not illustrated in Figures). By constituting the sheet-like magnetic material in this way, a nail or a screw can be driven to this through hole during or after the construction work for the interior building material according to the present invention, and therefore the construction efficiency, convenience, and design property of the interior building material according to the present invention can be more improved. More specifically, for example, when the through hole is provided in the sheet-like magnetic material in the case of stopping the interior building material according to the present invention, in which the sheet-like magnetic materials are fixed to a base material face, the interior building material according to the present invention can be simply stopped with a screw or the like using a general-purpose electric tool by utilizing this through hole, and a surface state after stopping the interior building material according to the present invention is made flat and favorable. In contrast, in the case where a through hole is not provided in the sheet-like magnetic material, when an attempt of stopping the interior building material according to the present invention with a screw or the like using a general-purpose electric tool is made, a bulge occurs on the surface of the magnetic material (protrusion occurs on the side of the surface) to no small extent although it depends on the thickness of the magnetic material, and therefore there is a risk that when the surface of the magnetic material is finished with wallpaper or the like, a problem occurs to the appearance, and the design property is impaired. From these points, it is preferable that one through hole or a plurality of through holes be provided in advance in the sheet-like magnetic materials to be used in the present invention.

[0033] Accordingly, it is preferable that the size of the through hole be, for example, the size of about 10 to about 20 mm ϕ , in which the screw head or the nail head can fall. The position where the through hole is provided and the number of through holes are not particularly limited and may be appropriately determined considering improvements in the construction efficiency, improvements in the convenience, and improvements in the design property each obtained by providing a through hole or through holes in the interior building material according to the present invention. In addition, the through hole portions into which a screw head or a nail head falls can be treated to be flat by treating through hole portions using a paste material containing a magnetic material, and a resin or the like.

[0034] In addition, examples of preferred embodiments of the interior building material according to the present invention include an embodiment having constitution in which, on the surface side of a plurality of sheet-like magnetic materials such as iron sheets disposed on one face of the base material, a sheet of paper or the like

is further pasted. By constituting the interior building material according to the present invention in this way, painting can be performed without performing a primer treatment, and, in addition, wall paper can be pasted with a usual paste for wallpaper. The material of the sheet to be used above is not limited to paper and may be any material. Examples of the preferred material include materials on which paste for wallpaper is easily spread or materials by which a surface property enabling a paint to be directly applied are obtained.

[0035] The thickness of the sheet-like magnetic material such as an iron sheet is not particularly limited as long as, for example, force of attraction by which one or more sheets of A4 printing paper can be held with one commercially available stopper with a magnet (so called magnet), which is a substitute for a thumbtack, is obtained. According to studies conducted by the present inventors, it is preferable that the thickness be specifically 0.1 mm or more, more preferably 0.2 mm or more. In addition, the thickness of the sheet-like magnetic material, such as an iron sheet, that constitutes the interior building material according to the present invention may be thick, but even when the thickness exceeds 1 mm, resultant force of attraction is not so large, and when thick magnetic materials are used, the interior building material is heavy although it depends on the range of disposing the sheet-like magnetic materials, so that it is concerned that the heavy interior building material is a cause for deteriorating the construction efficiency and the workability. In addition, when the thickness is too thick, material costs increase unnecessarily, which is uneconomical, and therefore it is preferable to make the thickness 1 mm or less. When the desired force of attraction is such an extent that a sheet of A4 paper is fixed with one magnet, use of a sheet-like magnetic material having a thickness of about 5 mm is enough. According to studies conducted by the present inventors, it is preferable that the sheet-like magnetic material have a thickness of about 0.8 mm in the case of considering that a heavy, small shelf is installed with a commercially available stopper with a magnet, the stopper having realized strong force of attraction.

[0036] Considering various situations that occur in the case where an inner wall face is formed, it is preferable that the interior building material according to the present invention be an interior building material that can exhibit the force of attraction at least to such an extent that a sheet of A4 paper can be held with one magnet as described previously. More specifically, it is desired that when the interior building material is stood in such a way as to be vertical, and one sheet of A4 plain paper is held at the portion where the sheet-like magnetic materials are disposed with one disk-like magnet having a diameter of a magnet portion of 17 mm ϕ and having a force of attraction of 3.5 N to an iron sheet having a thickness of 1 mm, the portion where the sheet-like magnetic materials that constitute the interior building material according to the present invention are disposed has force of

attraction by which the plain paper does not fall. That the attraction force of the disk-like magnet having a diameter of 17 mm ϕ used in the above-described test to the iron sheet having a thickness of 1 mm is 3.5 N is measured in the manner as illustrated in Figure 13. That is, a magnet 5 with a hook, the magnet having a diameter of 17 mm ϕ , is placed on an iron sheet 3 having a thickness of 1 mm, and the magnet 5 is pulled over with the hook by hand under a condition of a testing speed of 3 mm/sec to read the maximum strength using Autograph (not illustrated in Figures).

[0037] Most common interior wall materials (base materials) include gypsum boards. In addition, among them, the gypsum boards which are most often used as an interior wall material are gypsum boards having a thickness of 9.5 to 10.0 mm or 12.5 to 13.0 mm. Accordingly, it is suitable that the thickness of the interior building material according to the present invention, in which a plurality of sheet-like magnetic materials, such as iron sheets, are arranged and fixed through a particular gap, is 9.5 to 10.0 mm or 12.5 to 13.0 mm because finishing work can be conducted without causing unevenness between a surrounding wall and the interior building material.

[0038] Accordingly, it is preferable to use gypsum boards as the base material that constitutes the interior building material according to the present invention. The gypsum boards include, not limited to general-purpose boards, waterproof boards in which waterproof properties are improved, fire-resistant gypsum boards in which fire resistance performance is reinforced more, and the like. Besides, the base materials that constitute the interior building material include boards made of rock wool, boards using a glass fiber, and the like. According to studies conducted by the present inventors, in the interior building material according to the present invention of any embodiments in which a plurality of sheet-like magnetic materials are disposed on one face of a gypsum board in a state where adjacent magnetic materials are in contact with each other without a gap, or in which adjacent magnetic materials are disposed through a gap, the gypsum board which is a base material can be easily cut by easily inserting a blade of a cutter knife or the like between adjacent magnetic materials and making a cut into the base paper on the surface of the gypsum board under the magnetic materials. Therefore, by using an existing gypsum board as the base material, a product in which the convenience is highly enhanced can be realized without deteriorating high construction efficiency which the gypsum board has.

Examples

[0039] Hereinafter, the present invention will be described further specifically giving Examples. However, the present invention is not limited to these Examples.

[Example 1]

[0040] In an interior building material of the present Example, a plate-like member made of gypsum (gypsum board) and having a thickness of 12.5 mm, a length of 1820 mm, and a width of 901 mm was used as a base material. In addition, 18 sheets of 30-cm square galvanized steel sheets each having a thickness of 0.5 mm were prepared as sheet-like magnetic materials. Subsequently, as illustrated in Figure 2, on the surface of the gypsum board, which is the base material 1, the 18 sheets of galvanized steel sheets 2 were disposed so that adjacent galvanized steel sheets were arranged orderly with 3 sheets in a horizontal direction $\times$ 6 sheets in a vertical direction through a predetermined gap. Specifically, the galvanized steel sheets were disposed over the whole face of the base material by disposing the 3 sheets in the horizontal direction each through a gap formed by a linear narrow portion 3 having a width of 0.5 mm and disposing the 6 sheets in the vertical direction each through a gap formed by a linear narrow portion 3 having a width of 0.4 mm, and thus the interior building material of the present Example was obtained. A vinyl acetate-based adhesive was used as the means for fixing the galvanized steel sheets. It is to be noted that the gaps in Figure 2 are illustrated to be larger than the actual size with emphasis in order to be easily understood.

[0041] The obtained plate-like interior building material 10 was observed visually and by means of touch to find that the appearance on the face of the side where the galvanized steel sheets were arranged to be disposed gave an impression which is similar to those of conventional gypsum boards because the gap between adjacent galvanized steel sheets were extremely narrow, and, in addition, the feeling of touching by hand was flat including the feeling of touching by hand on the face of the side where the galvanized steel sheets were disposed, which is similar to the feeling of touching by hand for conventional gypsum boards.

[0042] In addition, the force of attraction by a magnet to the face of the side where the galvanized steel sheets were arranged to be disposed was checked by the following method. That is, the interior building material was stood in such a way as to be vertical, and sheets of A4 paper each having a thickness of 0.09 mm and a mass of 64 g/m² were held at the face of the galvanized steel sheet side with one magnet having a diameter of a magnet portion of 17 mm ϕ and having a force of attraction of 3.5 N to an iron sheet having a thickness of 1 mm. As a result, 5 sheets of paper can be held without a fall.

[0043] A blade of a cutter knife can be easily inserted into a gap portion formed by the linear narrow portion 3 having a width of 0.5 mm or having a width of 0.4 mm, the linear narrow portion 3 formed by adjacent galvanized steel sheets in the interior building material obtained above, and it was thereby ascertained that the interior building material can be easily cut. As a result, the interior building material cut without using a tape measure can

be easily cut into members each having a width (length) of 30 cm or having a width (length) of 60 cm, etc.

[Example 2]

[0044] In an interior building material of the present Example, a plate-like member made of gypsum (gypsum board) and having a thickness of 12.5 mm, a length of 1800 mm, and a width of 900 mm was used as a base material 1. Subsequently, the plate-like interior building material of the present Example was obtained in the same manner as in Example 1 except that adjacent galvanized steel sheets were disposed in a state of being in contact with each other using 18 sheets of 30-cm square galvanized steel sheets which are the same as those used in Example 1, and the sheet-like magnetic materials were fixed in a state of being arranged with 3 sheets in the horizontal direction $\times$ 6 sheets in the vertical direction without a gap on the surface of the base material 1 as illustrated in Figure 1. As a result, a building material in which the appearance gave an impression which is similar to those of conventional gypsum boards, and, in addition, the feeling of touching by hand was flat including the feeling of touching by hand on the face of the side where the galvanized steel sheets were disposed, which is similar to the feeling of touching by hand for conventional gypsum boards was obtained, which was the same as in Example 1. With respect to the force of attraction by a magnet to the face of the side where the galvanized steel sheets were arranged to be disposed, 5 sheets of A4 paper can be held with the magnet, which was the same as in the case of Example 1.

[0045] A blade of a cutter knife can be easily inserted at a portion where adjacent galvanized steel sheets are in contact with each other by protruding the interior building material obtained above on the side where the galvanized steel sheets were arranged, and as a result, the plate-like member made of gypsum, which is a base material, can be easily cut. In addition, the interior building material cut without a tape measure can be easily cut into members each having a width (length) of 30 cm or having a width (length) of 60 cm, etc.

[Example 3]

[0046] In an interior building material of the present Example, a plate-like member made of gypsum and satisfying the size of a gypsum board defined in JIS Standard, the plate-like member having a thickness of 12.5 mm, a length of 1820 mm, and a width of 910 mm, was used as a base material 1. In addition, 18 sheets of 30.3-cm square galvanized steel sheets each having a thickness of 0.5 mm were prepared as sheet-like magnetic materials. Subsequently, as illustrated in Figure 2, the 18 sheets of galvanized steel sheets were disposed so that adjacent steel sheets were arranged orderly with 3 sheets in a horizontal direction $\times$ 6 sheets in a vertical direction through a predetermined gap. Specifically, the

galvanized steel sheets were disposed over the whole face of the base material 1 by disposing the 3 sheets in the horizontal direction each through a gap formed by a linear narrow portion 3 having a width of 0.5 mm and disposing the 6 sheets in the vertical direction each through a gap formed by a linear narrow portion 3 having a width of 0.4 mm, and thus the interior building material of the present Example was obtained.

[0047] The plate-like interior building material obtained above was observed visually and by means of touch to find that the appearance on the face of the side where the galvanized steel sheets were arranged to be disposed gave an impression which is similar to those of conventional gypsum boards because the gap between adjacent galvanized steel sheets were extremely narrow, which was the same as in the building material of Example 1, and, in addition, the feeling of touching by hand was flat including the feeling of touching by hand on the face of the side where the galvanized steel sheets were disposed, which is similar to the feeling of touching by hand for conventional gypsum boards. The force of attraction to the face of the side where the galvanized steel sheets were arranged to be disposed was checked using the magnet having particular force of attraction to find that 5 sheets of A4 paper can be held with the magnet, which was the same as in the case of Example 1.

[0048] A blade of a cutter knife can be easily inserted into a gap portion formed by the linear narrow portion 3 having a width of 0.5 mm or having a width of 0.4 mm, the linear narrow portion 3 formed by adjacent galvanized steel sheets in the interior building material obtained above, and it was thereby ascertained that the interior building material can be easily cut. As a result, the interior building material cut without using a tape measure can be easily cut into members each having a width (length) of 30 cm or having a width (length) of 60 cm, etc.

Reference Signs List

[0049]

- 1: Base material
- 2: Sheet-like magnetic material
- 3: Narrow portion of gap
- 4: Iron sheet
- 5: Magnet with hook, having force of attraction of 3.5 N
- 10: Interior building material

Claims

1. An interior building material comprising a plurality of sheet-like magnetic materials fixed to at least a portion of a surface or back surface of a plate-like base material to which a magnet does not attach, wherein adjacent magnetic materials are disposed in such a way as to have a portion where the adjacent mag-

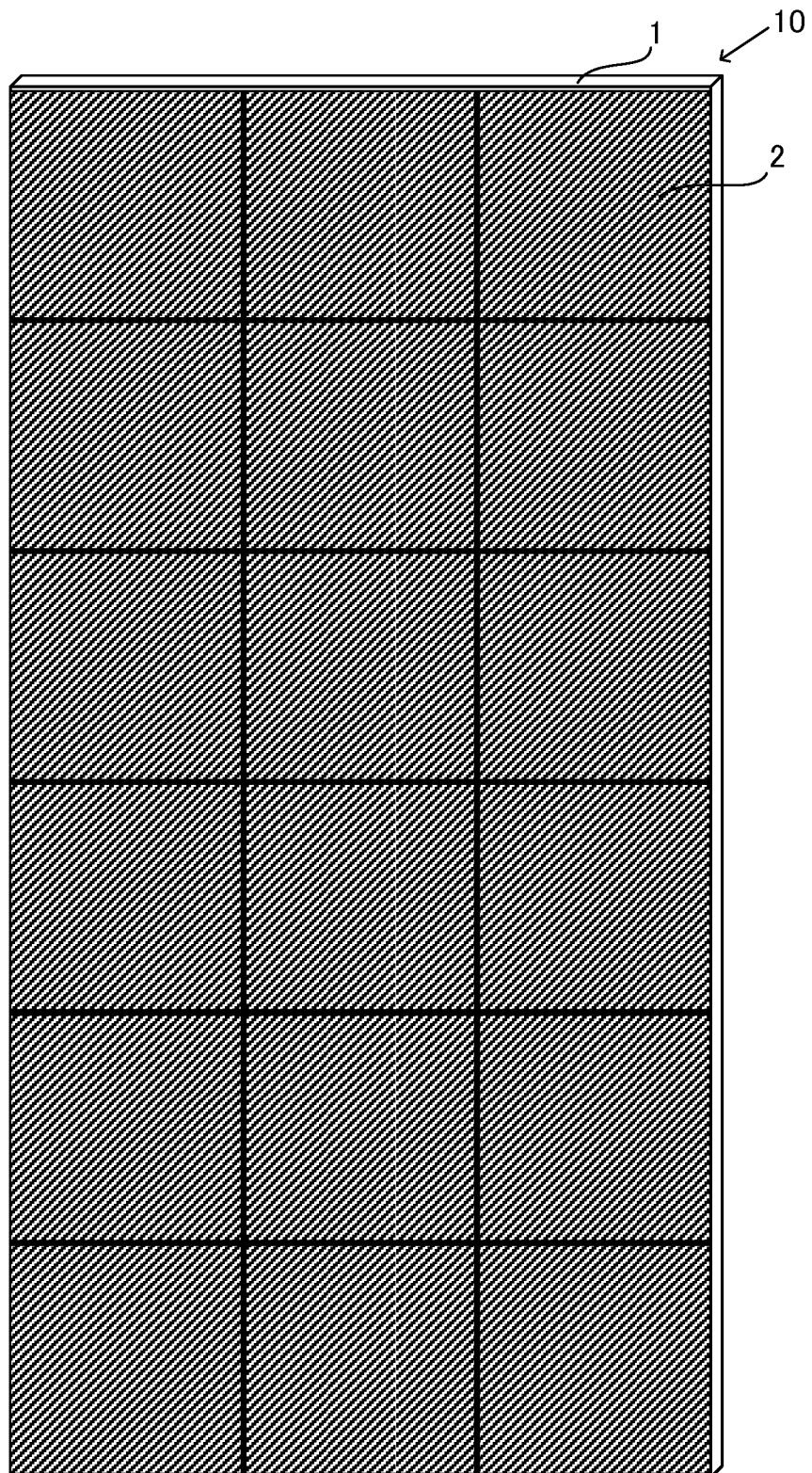
netic materials are in contact with each other, or adjacent magnetic materials are disposed through a gap having a narrow portion.

2. The interior building material according to claim 1, wherein the adjacent magnetic materials are disposed in such a way as to be in contact with each other and the plurality of sheet-like magnetic materials are fixed in a state of being arranged without a gap. 5
3. The interior building material according to claim 1, wherein the narrow portion of the gap is within a range of 0.05 to 5.0 mm. 10
4. The interior building material according to claim 1, wherein the narrow portion of the gap is within a range of 0.10 to 1.0 mm. 15
5. The interior building material according to any one of claims 1 to 4, wherein the plurality of sheet-like magnetic materials have the same shape, and the shape is any one of shapes selected from the group consisting of a square, a rectangle, a trapezoid, a triangle, a circle, and an ellipse. 20
6. The interior building material according to claim 5, wherein four sides of the square, two sides of the rectangle, at least one side of the trapezoid or the triangle, a diameter of the circle, or at least one of a major axis and a minor axis of the ellipse is 10 cm to 35 cm. 25
7. The interior building material according to any one of claims 1, 3, and 4, wherein the gap is formed by only the narrow portion, and the narrow portion is linear. 30
8. The interior building material according to any one of claims 1 to 7, wherein at least one of the plurality of sheet-like magnetic materials is a sheet-like magnetic material having a through hole. 35
9. The interior building material according to any one of claims 1 to 8, wherein at least one of the plurality of sheet-like magnetic materials has a chamfered portion at an outer circumference thereof. 40
10. The interior building material according to any one of claims 1 to 9, wherein when the interior building material is stood in such a way as to be vertical, and one sheet of A4 plain paper is held at a portion where the sheet-like magnetic materials are disposed with one disk-like magnet having a diameter of a magnet portion of 17 mm ϕ and having a force of attraction of 3.5 N to an iron sheet having a thickness of 1 mm, the portion where the sheet-like magnetic materials are 45

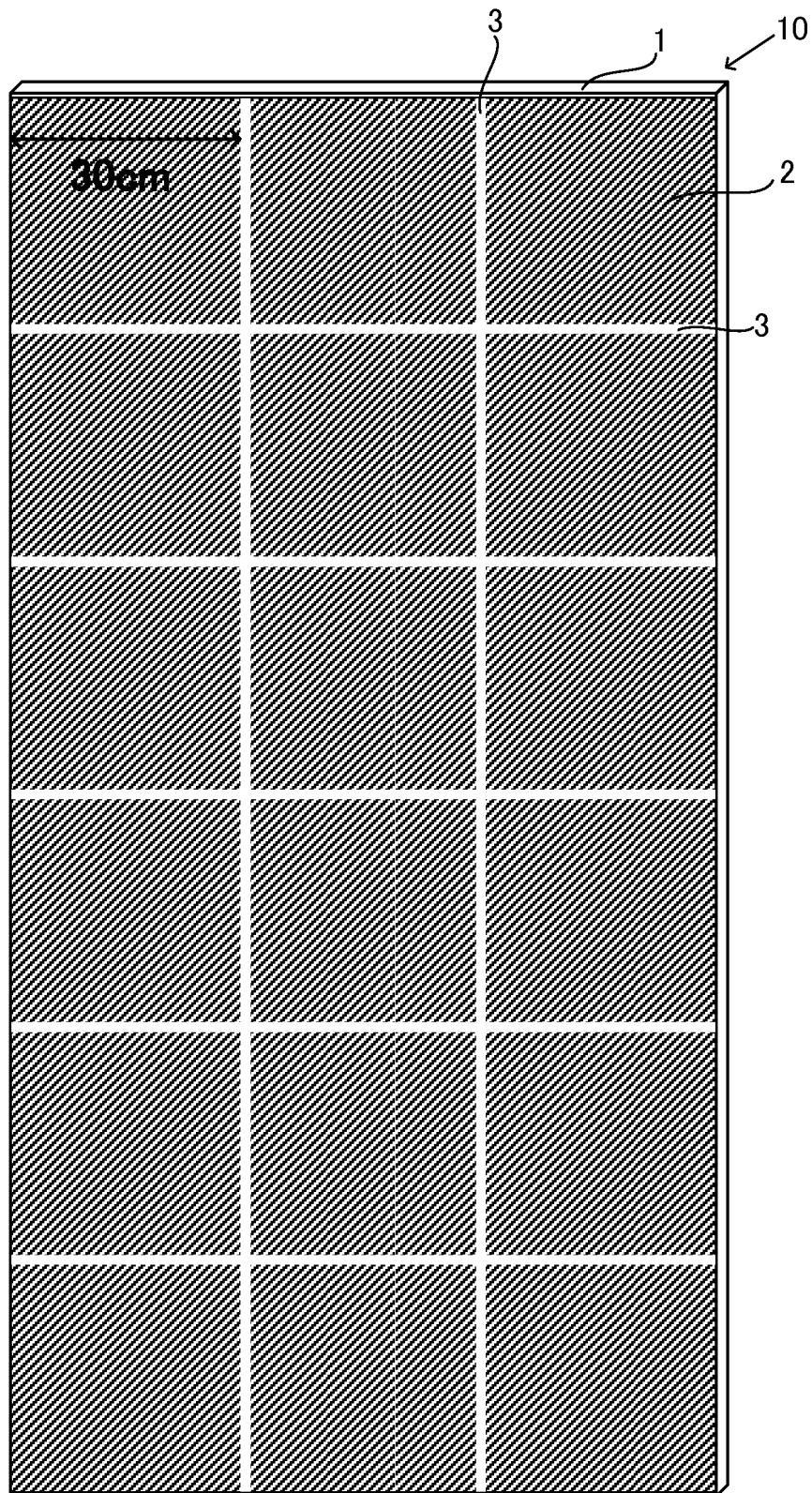
disposed has force of attraction by which the plain paper does not fall.

11. The interior building material according to any one of claims 1 to 10, having a structure in which the base material is a plate-like member made of gypsum, and, further, a paper sheet is pasted on the plurality of disposed sheet-like magnetic materials. 50
12. The interior building material according to any one of claims 1 to 11, wherein the sheet-like magnetic materials have a thickness of 0.1 to 1.0 mm. 55
13. The interior building material according to any one of claims 1 to 11, wherein the sheet-like magnetic materials have a thickness of 0.2 to 0.8 mm.
14. The interior building material according to any one of claims 1 to 13, wherein any one of the plurality of sheet-like magnetic materials is an iron sheet or a steel sheet having rust-proofing performed on both faces or one face thereof.
15. The interior building material according to any one of claims 1 to 14, having a thickness of 9.5 to 10.0 mm.
16. The interior building material according to any one of claims 1 to 14, having a thickness of 12.5 to 13.0 mm.

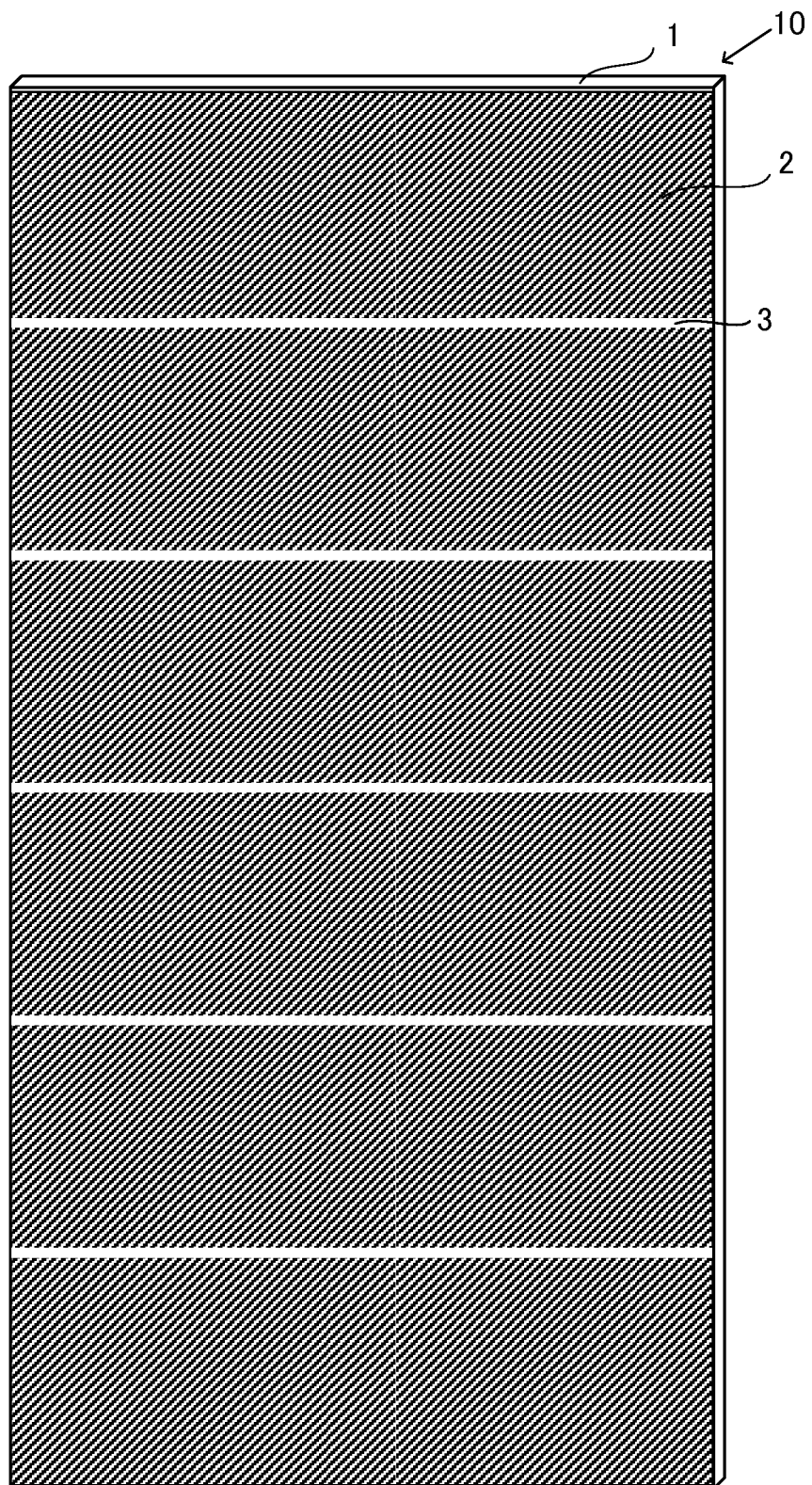
[Figure 1]



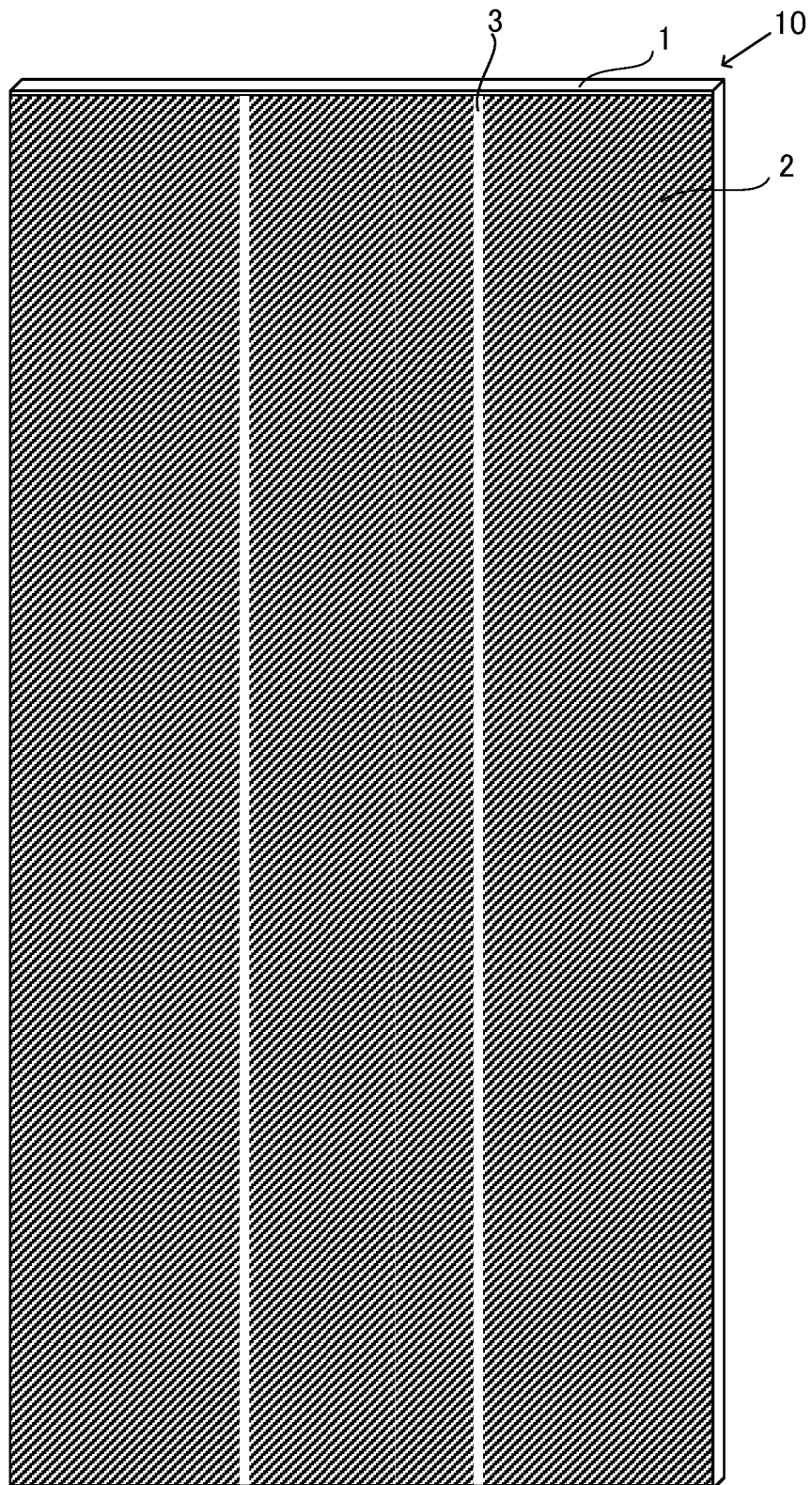
[Figure 2]



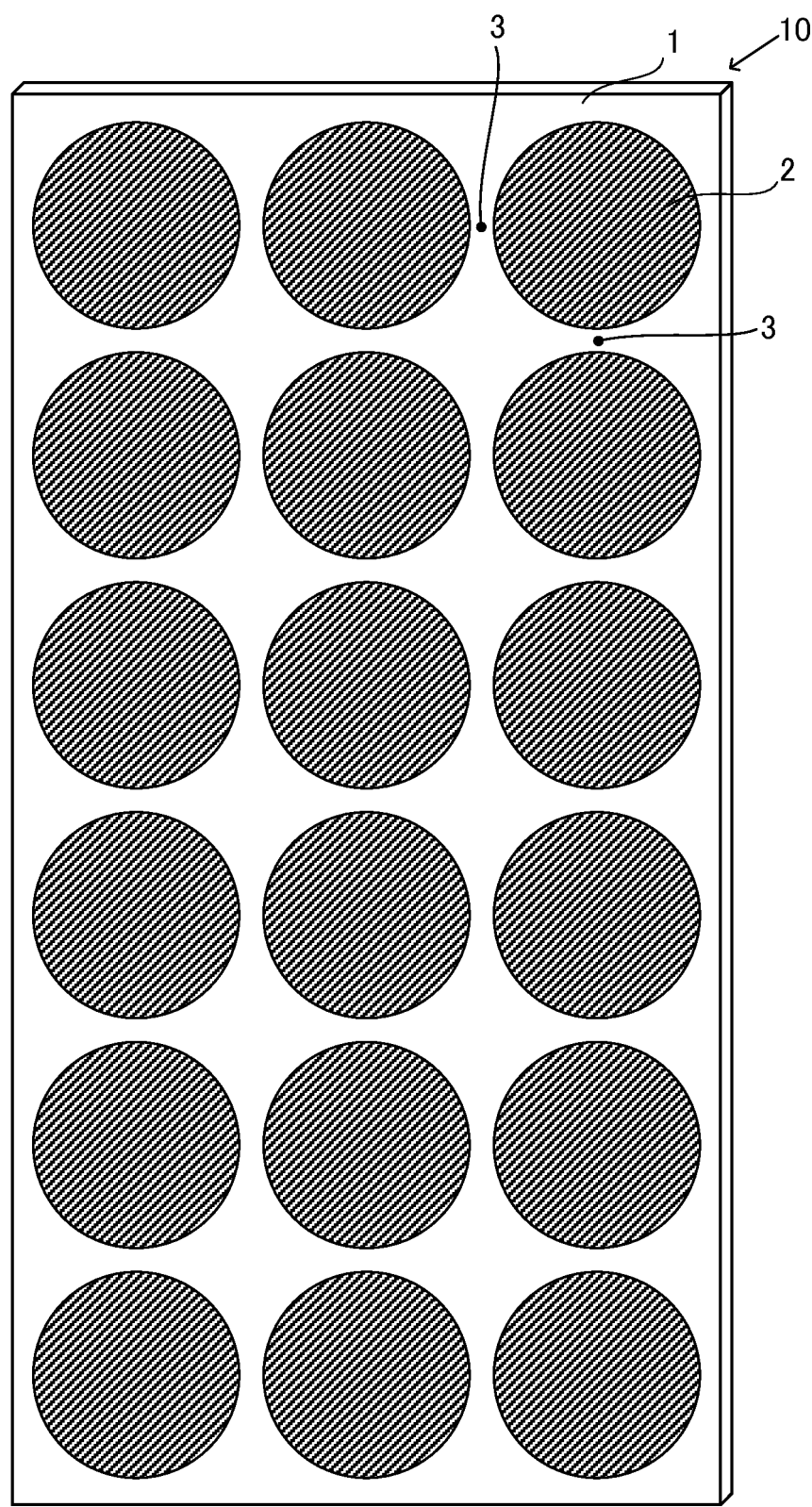
[Figure 3]



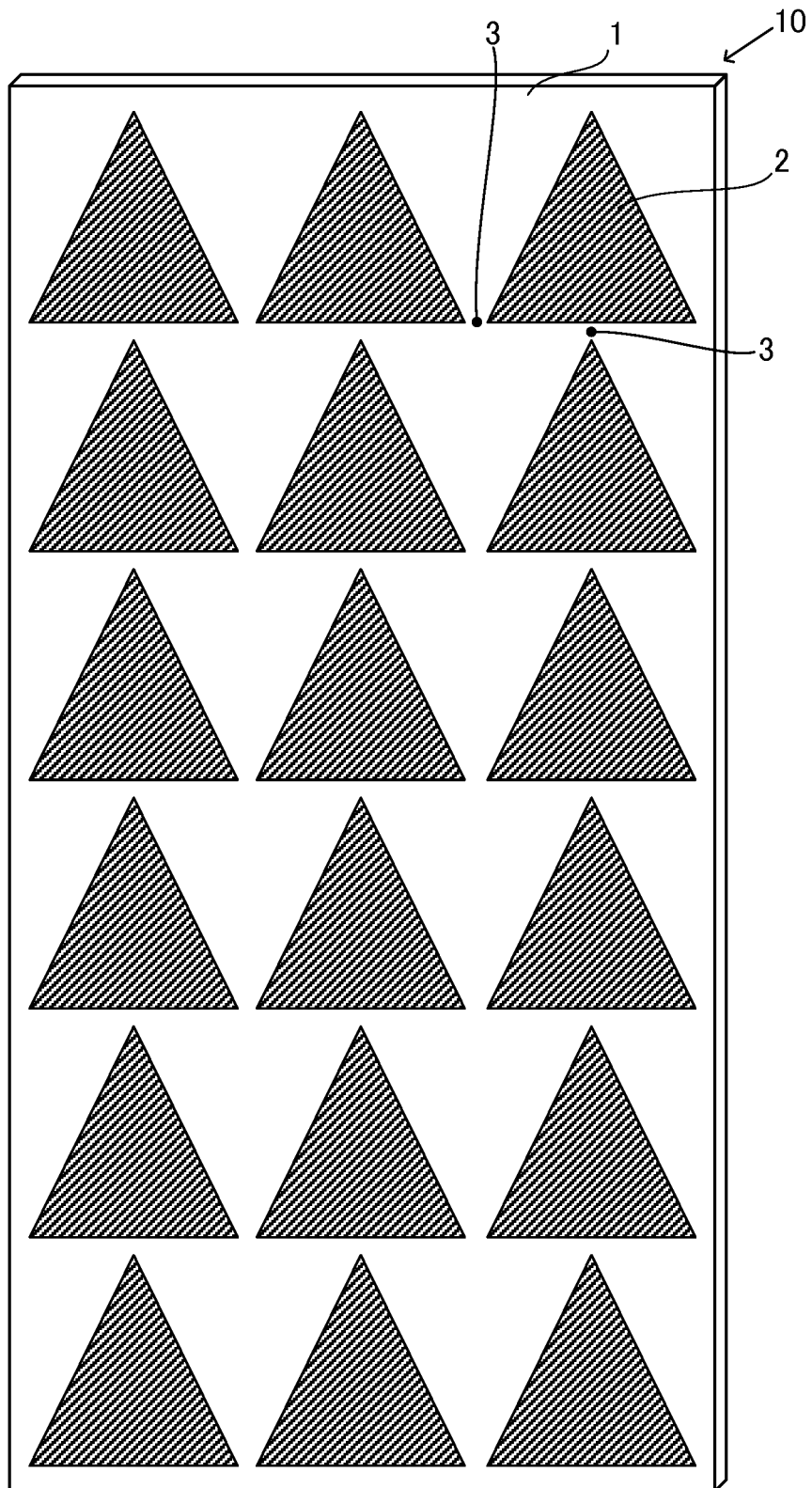
[Figure 4]



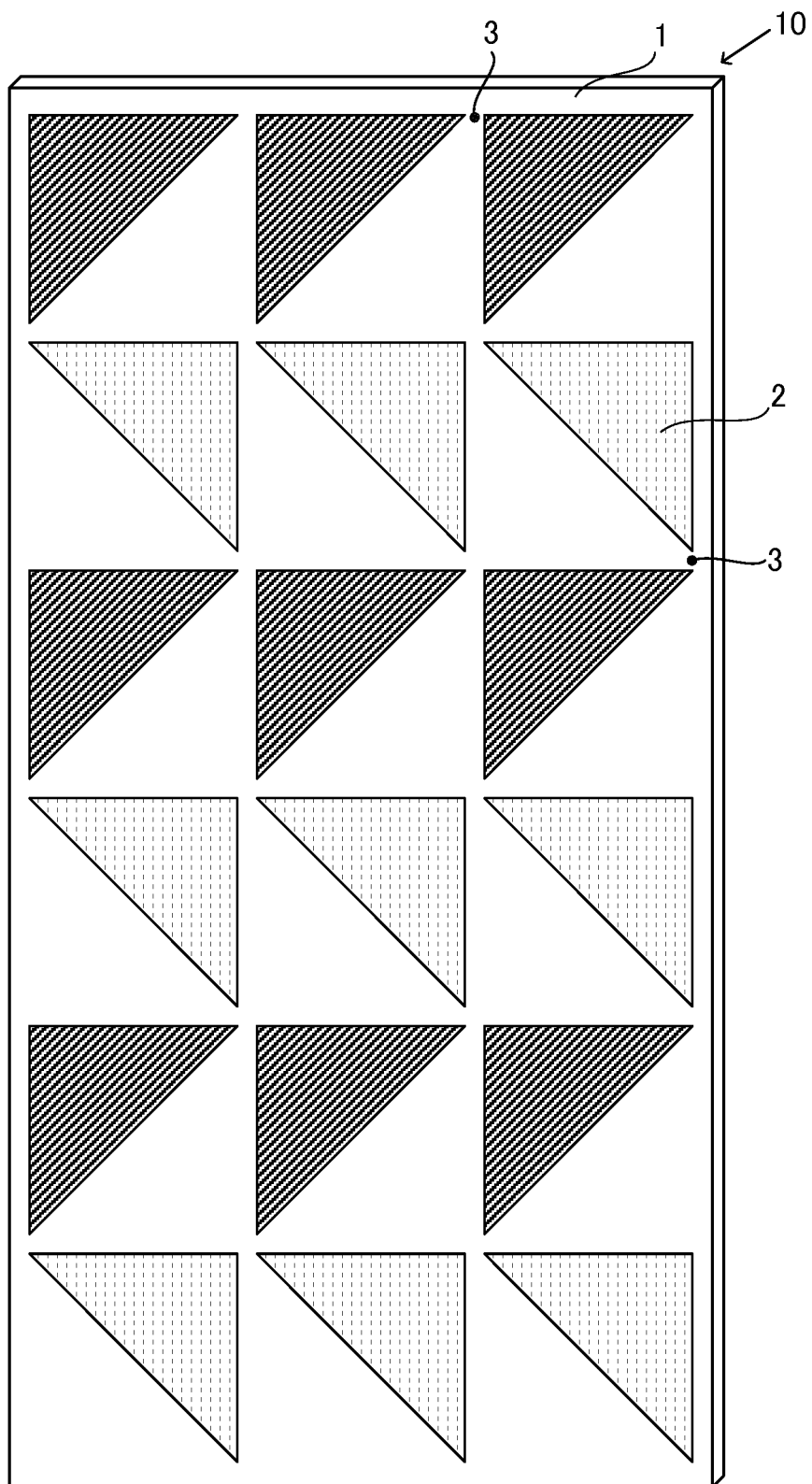
[Figure 5]



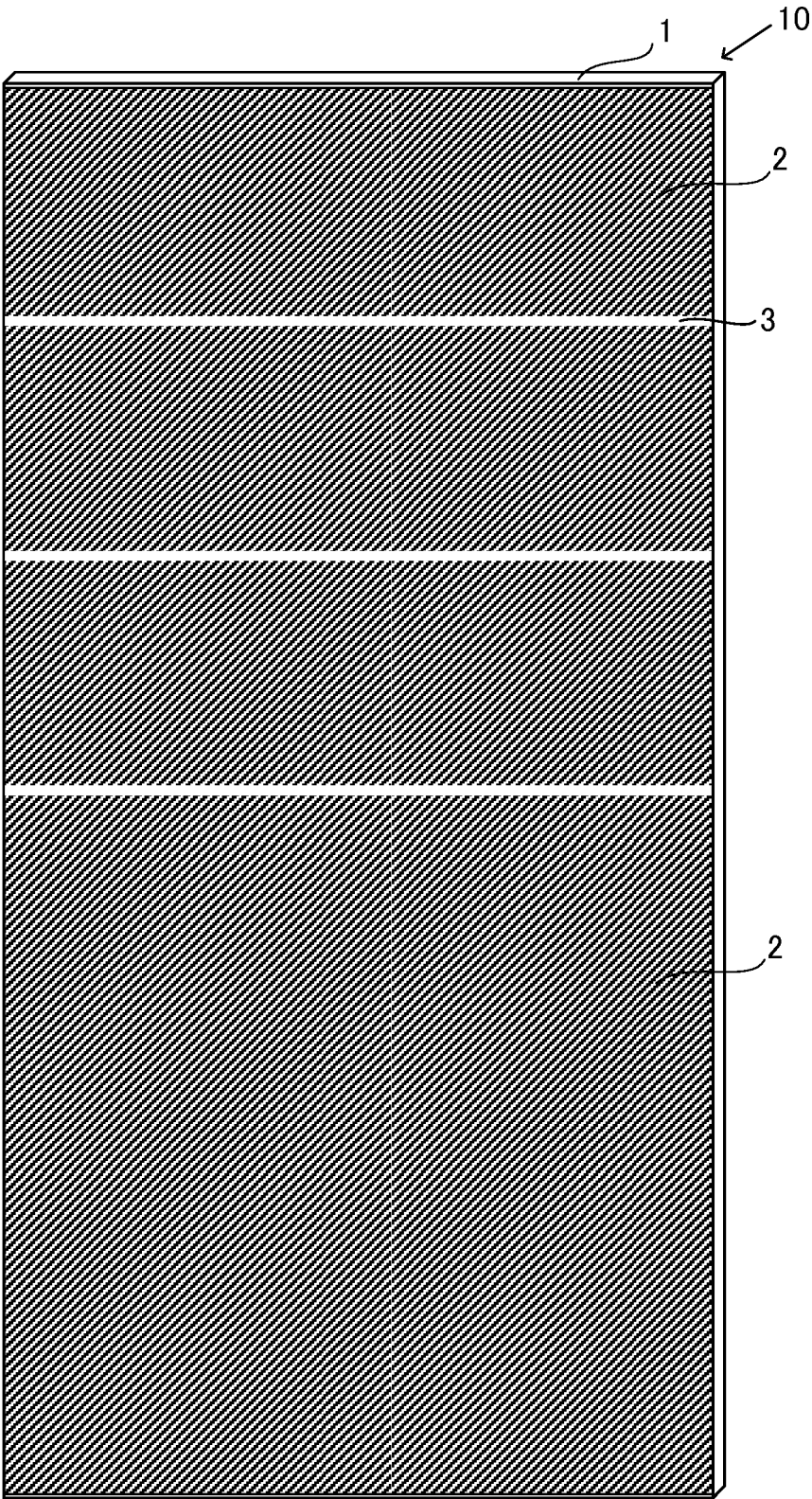
[Figure 6]



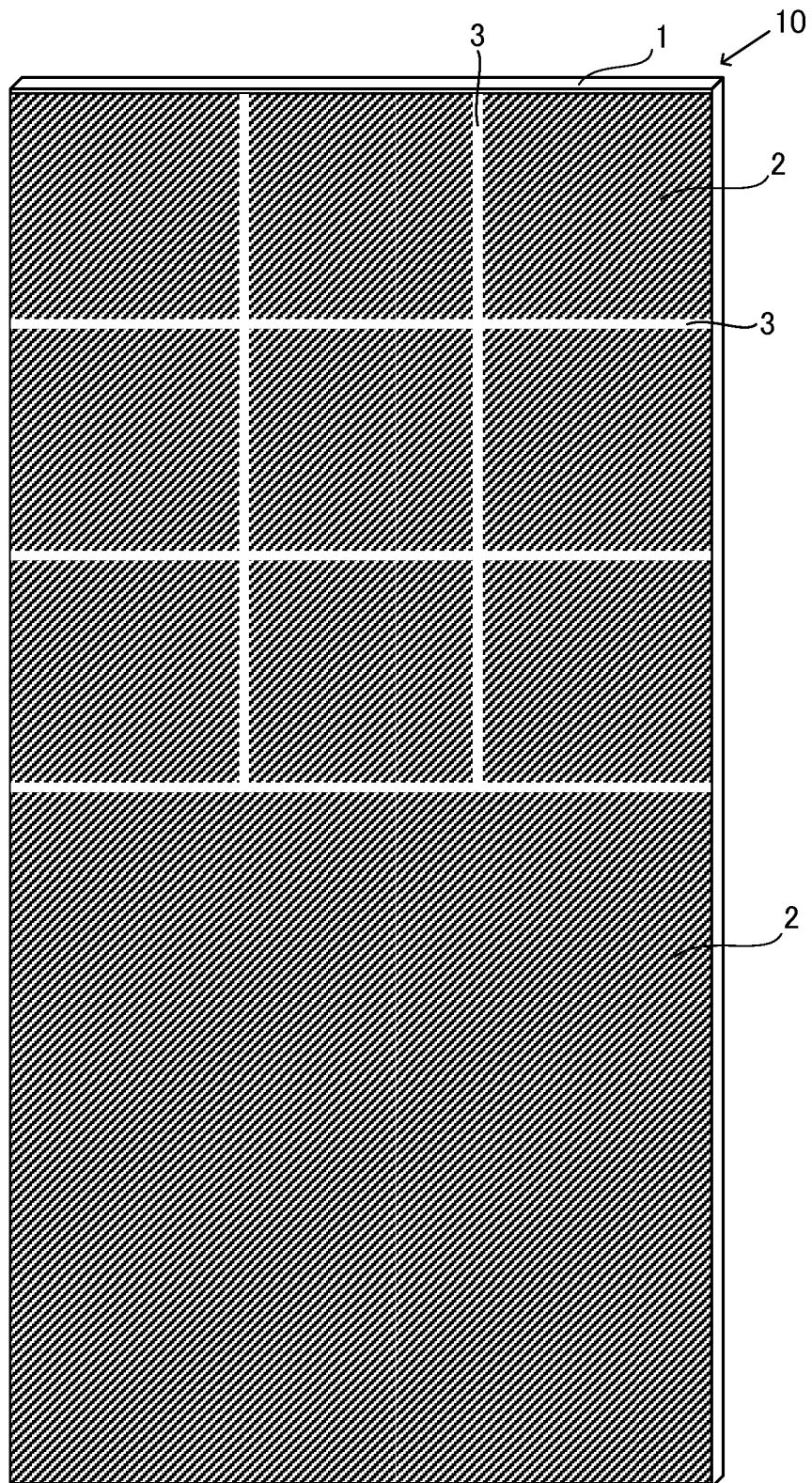
[Figure 7]



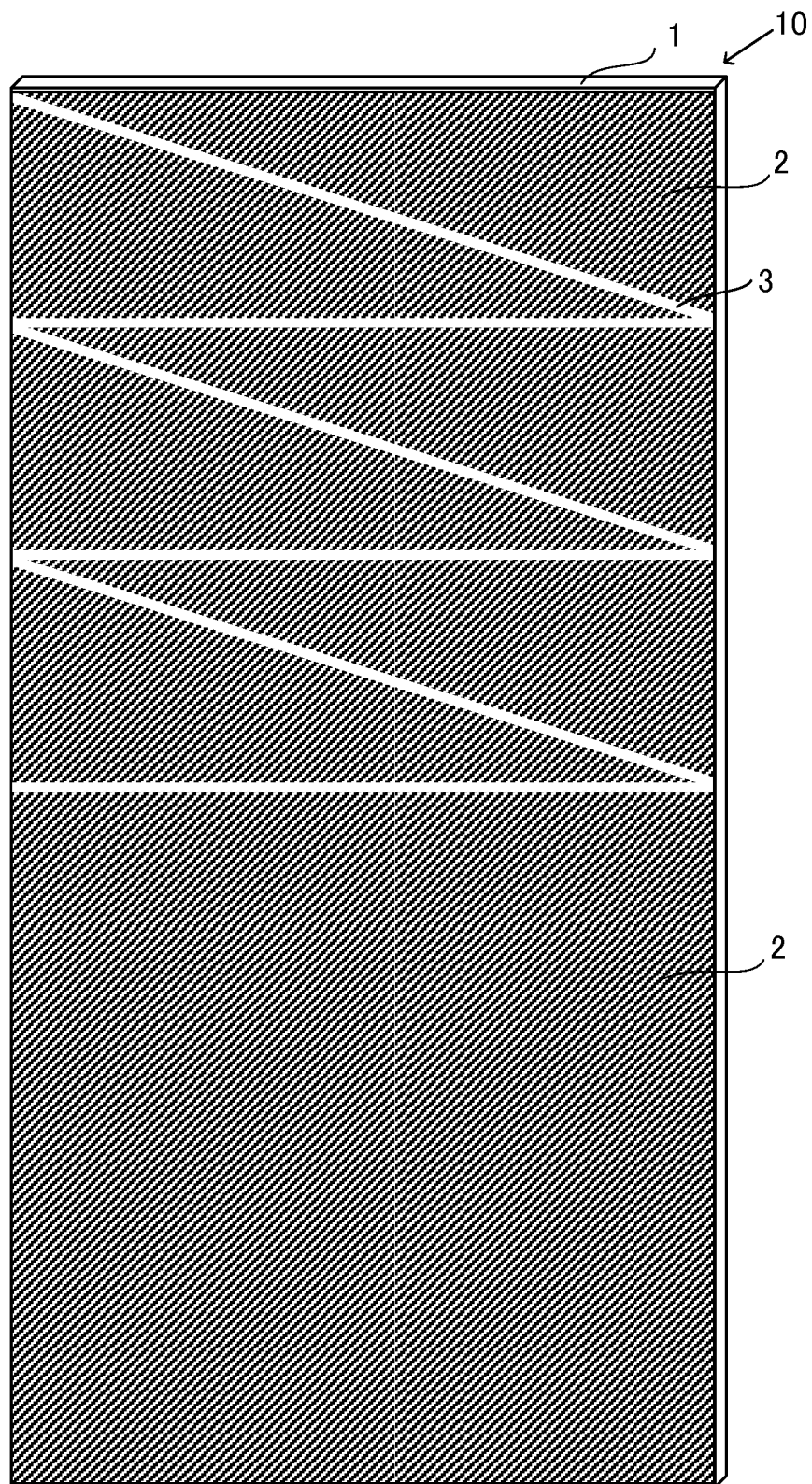
[Figure 8]



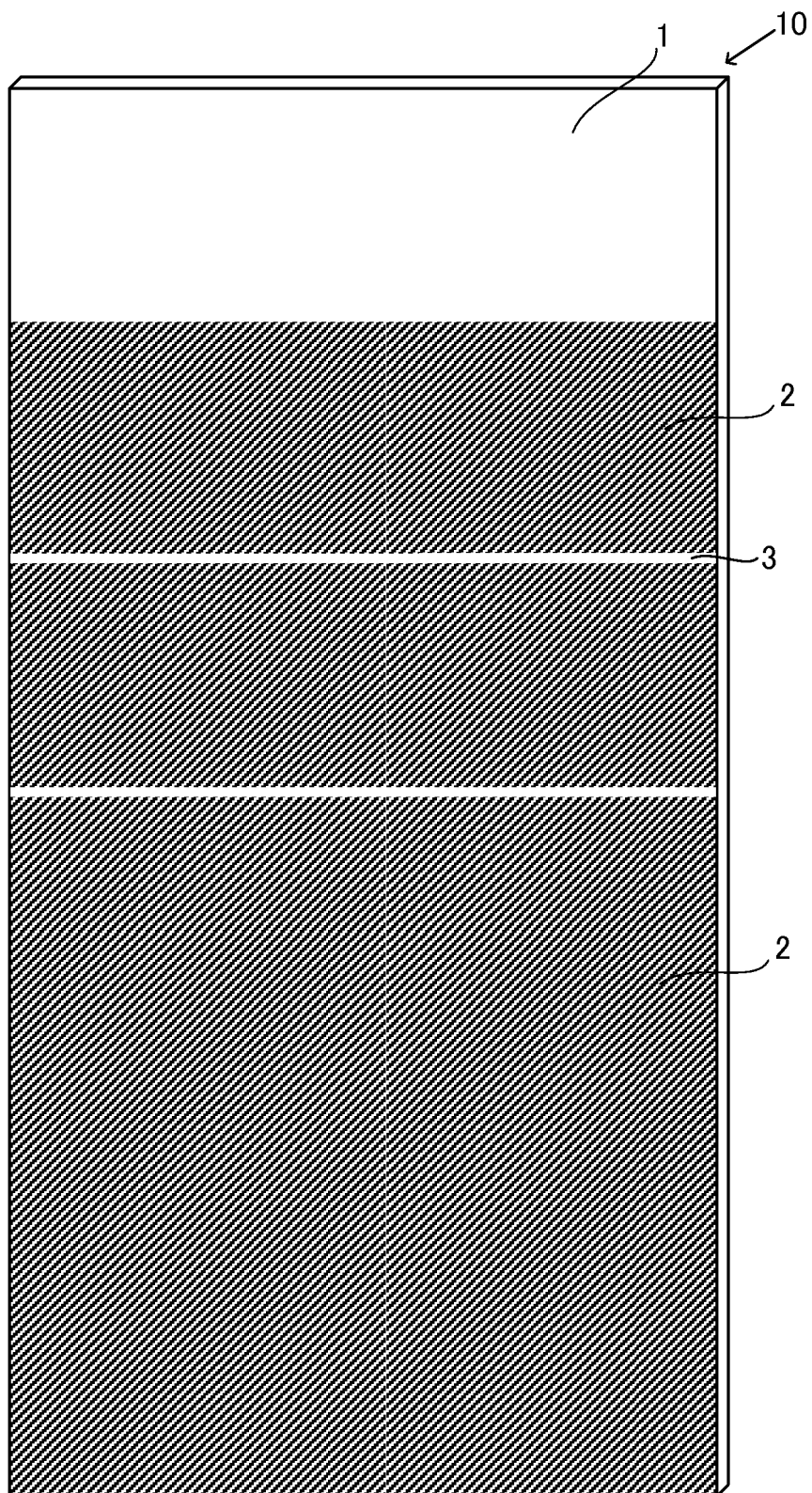
[Figure 9]



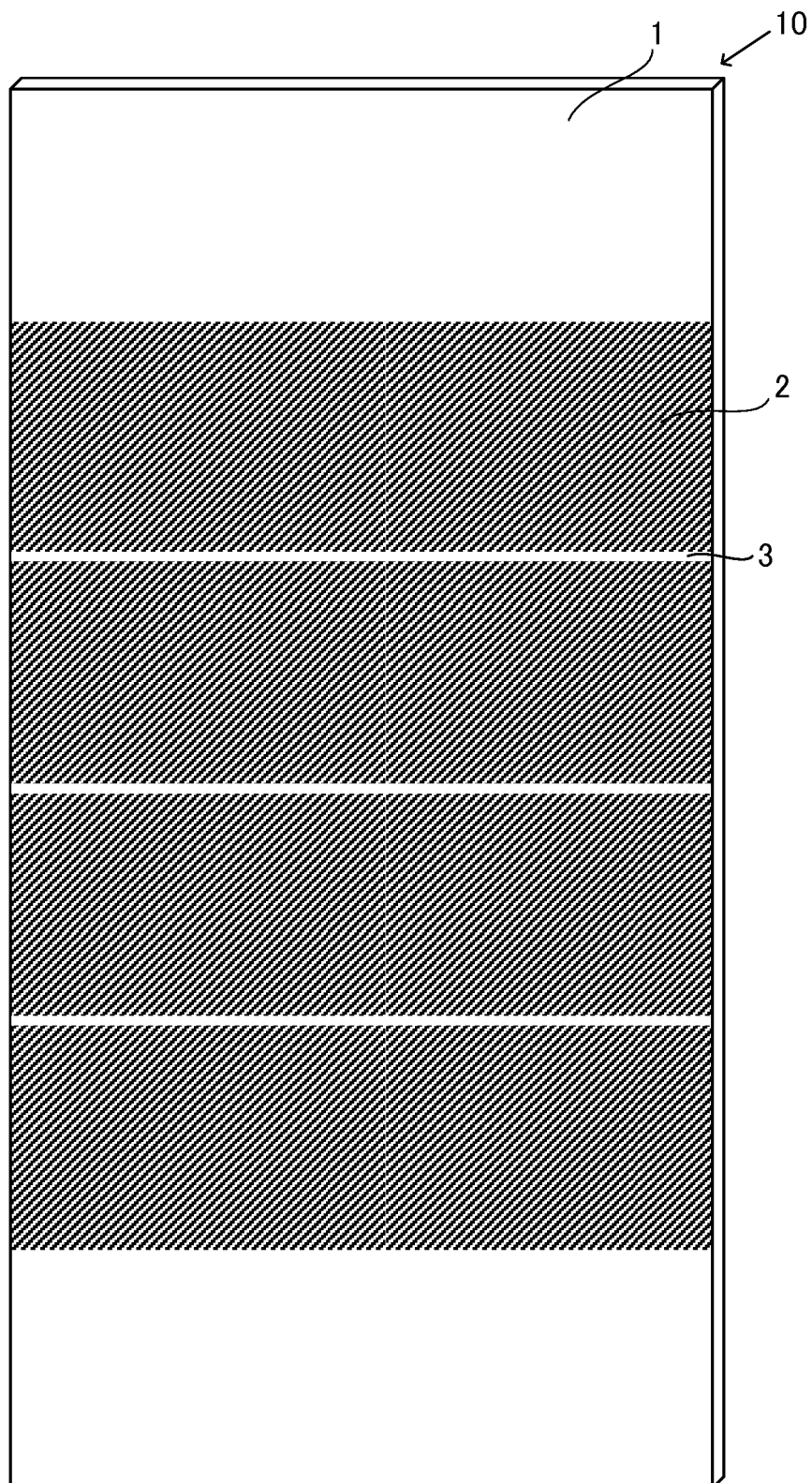
[Figure 10]



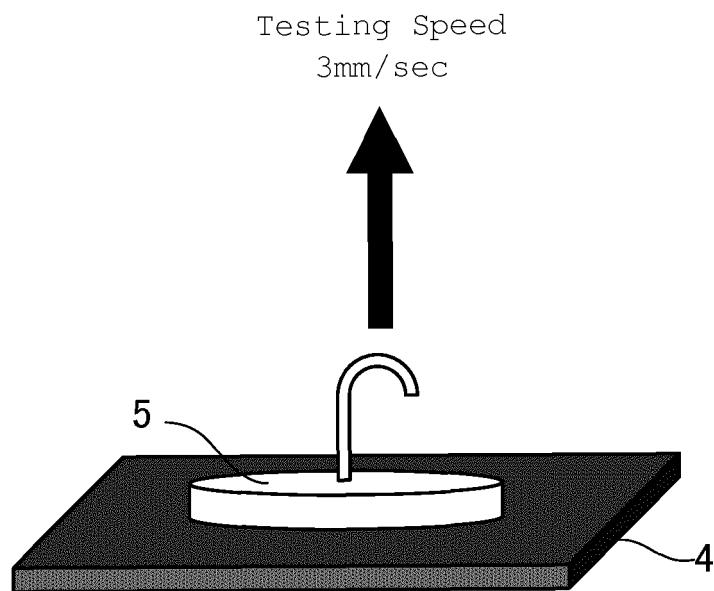
[Figure 11]



[Figure 12]



[Figure 13]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/009504

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. E04F13/08 (2006.01) i, E04F13/12 (2006.01) i, E04F13/14 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. E04F13/00-13/30, E04C2/00-2/54, E04B2/72-2/82

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2018

Registered utility model specifications of Japan 1996-2018

Published registered utility model applications of Japan 1994-2018

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2003-501705 A (ROCHE, Bonnie) 14 January 2003, paragraphs [0014]-[0043], fig. 1-2, 15C & US 2011/0052866 A1, paragraphs [0033]-[0061], fig. 1-2, 15C & US 2004/0231212 A1 & US 2009/0139065 A1 & US 2010/0319166 A1 & US 2012/0260467 A1 & US 2012/0256717 A1 & WO 2000/076700 A1 & EP 1218133 A1 & AU 6540300 A & CA 2374343 A1 & CN 1368910 A	1-16



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Date of the actual completion of the international search

20 April 2018 (20.04.2018)

Date of mailing of the international search report

01 May 2018 (01.05.2018)

Name and mailing address of the ISA/
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/009504

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2006-97356 A (DAIWA HOUSE INDUSTRY CO., LTD.) 13 April 2006, paragraphs [0015]-[0029], all drawings (Family: none)	1-16
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 86361/1979 (Laid-open No. 3941/1981) (NISHIO, Keiji, et al.) 14 January 1981, specification, page 2, line 5 to page 4, line 18, all drawings (Family: none)	3-16
Y	JP 2014-152596 A (KAWAHARA, Manabu) 25 August 2014, paragraphs [0024]-[0034], all drawings (Family: none)	11-16
P, X	JP 2017-155583 A (YOSHINO GYPSUM CO., LTD.) 07 September 2017, entire text, all drawings (Family: none)	1-16

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REFERENCES CITED IN THE DESCRIPTION

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- JP 2014152596 A [0007]
- JP 2008087404 A [0007]