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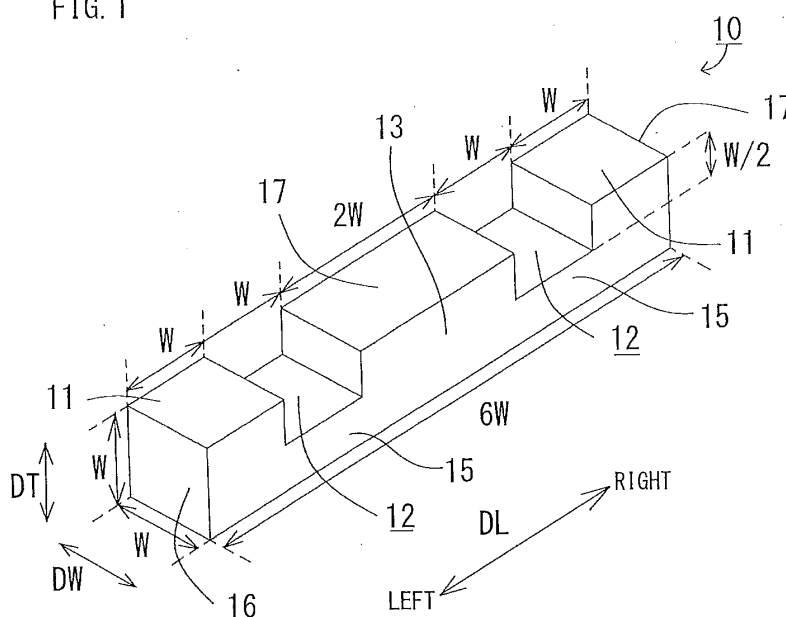
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(54) **WOODEN BLOCK, ASSEMBLY USING SAME, AND FURNITURE**

(57) An interlocking block 10 is configured to be assembled with another interlocking block having the same shape and the same size, and has a base in the shape of a pillar extending in a predetermined direction which has a surface 17 formed with a pair of cutouts 12 in bilateral symmetry. The width and the thickness of an end

surface 16 are the same. When the width of the end surface 16 is W, the length of the surface 17 in the predetermined direction is 6W, and the distance from the end surface 16 to one of the pair of cutouts 12 is W, and the length of the cutout is W, and the depth of the cutout is W/2.

FIG. 1



## Description

### FIELD OF THE INVENTION

[0001] The invention relates to an interlocking block, assembly using the same, and furniture.

### BACKGROUND

[0002] Building blocks are widely and generally familiar toys to pile up such simple geometric shapes as triangle, rectangle, circle, and the like in three dimensions. Building blocks can be piled up to build structures looking like a house. It is, however, difficult to build structures similar to wooden frameworks which are popular in Japanese houses by piling up the building blocks. Also, building block sets include blocks in various shapes, and there is a problem that the number of blocks in each shape restricts creativity.

[0003] Japanese Utility Model No. 3172064 discloses three types of blocks in shapes close to a rectangular parallelepiped. These blocks can be interconnected to build complex assemblies.

### SUMMARY

#### PROBLEMS TO BE SOLVED BY THE INVENTION

[0004] The above-mentioned conventional blocks are, however, in shapes close to a rectangular parallelepiped, which are not in proportion enabling to form frameworks. Also, because there are three types of blocks, there is a problem that the number of each type of blocks restricts creativity.

[0005] It is an object of the invention to provide a simple-shaped interlocking block capable of building a structure similar to wooden frameworks, an assembly using the same, and furniture.

#### MEANS TO SOLVE THE PROBLEMS

[0006] An interlocking block according to one aspect of the invention is an interlocking block configured to be assembled with another interlocking block having the same shape and the same size, comprising a base in the shape of a pillar extending in a predetermined direction, the base having a surface formed with a pair of cutouts in bilateral symmetry in the predetermined direction, wherein: the width and the thickness of the base are the same; when the width of the base is  $W$ , then the length of the surface in the predetermined direction is  $6W$ , and the distance from an end surface of the base to one of the pair of cutouts in the predetermined direction is  $W$ , and the length of each of the cutouts in the predetermined direction is  $W$ , and the depth of each of the cutouts is  $W/2$ .

[0007] The interlocking block preferably has a pair of thin parts formed with the pair of cutouts and a thick part that is thicker than the pair of thin parts, and is configured

to be assembled with the another interlocking block by inserting one of the thin part and the thick part into the cutout of the another interlocking block.

[0008] An assembly according to another aspect of the invention includes a plurality of above-mentioned interlocking blocks assembled with one another.

[0009] A furniture according to still another aspect of the invention has a structure of the assembly mentioned above.

### EFFECTS OF THE INVENTION

[0010] According to one aspect of the invention, because an interlocking block in the shape of a pillar formed with a cutout can be assembled with the same type of interlocking block, a complex assembly can be built of the interlocking blocks even though the blocks have a simple configuration. Also, it is possible to play with the interlocking blocks, create objects with the same, and build furniture with the same.

### BRIEF DESCRIPTION OF THE DRAWINGS

#### [0011]

[Fig. 1] A perspective view of an interlocking block according to an embodiment of the invention.

[Fig. 2] A view showing the interlocking block of Fig. 1, wherein (a) is a plan view, and (b) is a front view, and (c) is a side view.

[Fig. 3] (a) is a perspective view showing a plurality of interlocking blocks, and (b) is a photograph of the plurality of interlocking blocks.

[Fig. 4] (a) is a perspective view of a first assembly, and (b) is a photograph of the first assembly.

[Fig. 5] (a) is a perspective view of a second assembly, and (b) is a photograph of the second assembly.

[Fig. 6] (a) is a perspective view of a third assembly, and (b) is a photograph of the third assembly.

[Fig. 7] (a) and (b) are perspective views of a fourth assembly, and (c) and (d) are photographs of the fourth assembly.

[Fig. 8] (a) is a perspective view of a fifth assembly, and (b) is a photograph of the fifth assembly.

[Fig. 9] (a) is a perspective view of a sixth assembly, and (b) is a photograph of the sixth assembly.

[Fig. 10] (a) is a perspective view of a seventh assembly, and (b) is a photograph of the seventh assembly.

### DETAILED DESCRIPTION

[0012] An interlocking block according to an embodiment of the invention will be described while referring to the accompanying drawings. As shown in Figs. 1 to 3, an interlocking block 10 of the embodiment is a base in the shape of a pillar extending in a longitudinal direction DL (predetermined direction) having an upper surface 17

(a surface) formed with a pair of cutouts 12 in bilateral symmetry, and has an end part 11, a thin part 15, a body part 13, a thin part 15, and an end part 11 formed integrally one another in this order along the longitudinal direction DL. The pair of thin parts 15 correspond to the pair of cutouts 12, and the pair of end parts 11, 11 and the body part 13 are thick parts thicker than the thin part 15.

**[0013]** It should be noted that "length" means a dimension in the longitudinal direction DL, and "width" means a dimension in a width direction DW, and "thickness" and "depth" mean dimensions in a thickness direction DT.

**[0014]** An end surface 16 of the interlocking block 10 in the longitudinal direction DL is substantially in the square shape, and the width and the thickness of the end surface 16 are the same. When the width of the end surface 16 is "W," the length, the width, and the thickness of each end part 11 are all "W." Thus, the distance from the end surface 16 to one of the cutouts 12 in the longitudinal direction DL is also "W." The length of the body part 13 is "2W," and the width and the thickness of the same are both "W." The length and the width of each cutout 12 are both "W," and the depth thereof is "W/2." Thus, the length and the width of the thin part 15 are "W," and the thickness of the same is "W/2."

**[0015]** "W" may be set to any specific dimension. "W" is, however, preferably 3 cm, for example, if the interlocking block 10 is used as a toy or used for small-sized furniture and 7 cm, for example, if the interlocking block 10 is used for medium-sized furniture.

**[0016]** According to an aspect of the invention, it is preferable that the corners of the interlocking block 10 be chamfered. The interlocking block 10 may be formed of various types of materials, such as woods, resin, metals, glass, and the like.

**[0017]** Next, examples of assemblies built of the interlocking blocks 10 will be described. It should be noted that first to seventh assemblies 100 to 700 described below are all built of a plurality of interlocking blocks 10 connected to each other.

**[0018]** The first assembly 100 shown in Fig. 4 is similar to wooden framework structure built of a plurality of interlocking blocks 10 assimilated to a foundation 101, pillars 103, crossbeams 104, and beams 105. The first assembly 100 is built in the following manner. First, four interlocking blocks 10 are connected to form the foundation 101 in the shape of "#" by fitting the cutouts 12 to each other. Next, a pair of beams 105 is connected to a pair of crossbeams 104 to form an assembly 102 in the same shape of "#" as the foundation 101. Then, the foundation 101 is connected to the assembly 102 with four pillars 103. In this connection, the end parts 11 of the foundation 101 and the assembly 102 are inserted into the cutouts 12 of the pillars 103.

**[0019]** By connecting another interlocking block 10 to the assembly 102, the first assembly 100 can be further expanded in the vertical direction. Also, the first assembly 100 can be expanded in the horizontal direction by form-

ing a plurality of first assemblies 100 and connecting these first assemblies 100 with the interlocking block(s) 10.

**[0020]** The second assembly 200 shown in Fig. 5 is a structure having crossbeams 201 connected with arms 202 in the perpendicular direction. Because the width of the cutout 12 is the same as the length of the thin part 15 and because the length of the body part 13 is twice as long as the width of the end part 11, even when an eaves 203 imposes a downward load on the arm 202, the pair of arms 202 abuts each other at the end surfaces and thus presses each other, realizing a stable structure. Also, the crossbeam 201 supports the arm 202 from below at a position deviated from the lengthwise center of the arm 202 in a direction away from the eaves 203, realizing a ratio between one part of the arm 202 located right to the crossbeam 201 and the other part of the same located left to the crossbeams 201, which ratio is not achievable with building blocks.

**[0021]** The third assembly 300 shown in Fig. 6 has a planner structure built by fitting the cutouts 12 of the interlocking blocks 10 into one another. Various patterns can be formed by interlocking many interlocking blocks 10.

**[0022]** The fourth assembly 400 shown in Figs. 7(a) and 7(b) has a lifting structure with the cutouts 12 of the interlocking blocks 10 fitted into one another, supported by a pair of leg parts A from below. Because the structure with the cutouts 12 fitted into one another is well balanced, a user can lift up the assembly 400 as shown in Figs. 7(c) and 7(d) by grabbing its ends 401. This structure is not achievable with conventional building blocks either.

**[0023]** The fifth assembly 500 shown in Fig. 8 is constructed by fitting the cutouts 12 into one another and is stable even though rectangular parallelepipeds are arranged diagonally. A middle part has a pair of interlocking blocks 10 with the thin parts 15 fitted into one cutout 12, forming a stable structure with an asymmetrical eye-catching design.

**[0024]** The sixth assembly 600 shown in Fig. 9 is small-sized furniture designed for placing tablet terminals, and has a structure 601 in the shape of "#" and a support 603 built of a pair of interlocking blocks 10 for supporting the structure 601 in an inclined posture. The structure 601 is built of eight interlocking blocks 10, which include a pair of interlocking blocks 10 with lower surfaces 18 abutting each other and the thin parts 15 sandwiched between the cutouts 12 of another pair of interlocking blocks 10 confronting each other, and the structure 601 has high rigidity. The support 603 is inserted through a center hole 602 of the structure 601, and the body part 13 of the interlocking block 10 of the structure 601 is fitted into the cutout 12 of the interlocking block 10 of the support 603. A front end 603a of the support 603 protrudes frontward beyond the front surface of the structure 601, and it is possible to place a tablet terminal on the front end 603a.

**[0025]** The seventh assembly 700 shown in Fig. 10 is

a medium-sized furniture that can be used as a stool, and is built by placing the thin parts 15 of a pair of interlocking blocks 10 of crossbeams 702 into the cutouts 12 of legs 701 from the horizontal direction to enhance rigidity and by placing four interlocking blocks 10 onto the crossbeams 702 from above to form a top board 703.

**[0026]** As described above, the interlocking block 10 according to the embodiment of the invention has a structure with the pair of cutouts 12 formed at both sides in the longitudinal direction DL of the base in the shape of a pillar and has dimensions that enable to connect a plurality of interlocking blocks 10 with one another by receiving the end part 11 and/or the body part 13 of the interlocking block 10 into the cutout 12 of another interlocking block 10 and/or by placing the cutout 12 into another cutout 12. Thus, it is possible to build complex assemblies using one type of simple interlocking block 10.

**[0027]** It should be noted that in one aspect of the invention, it is preferable that the interlocking block 10 be colored and/or printed with patterns, letters, or the like. In this case, it is preferable that the interlocking block 10 has a different color, pattern, letter, or the like on each surface. Also, in another aspect of the invention, it is preferable that the surfaces of the interlocking block 10 be coated with paint or the like or affixed with a different material.

**[0028]** Also, according to still another aspect of the invention, it is preferable that metal or the like be placed in the interlocking block 10 to make the interlocking block 10 heavier as needed or that the interlocking block 10 have a hollow structure to be less heavier.

**[0029]** According to yet another aspect of the invention, it is preferable to combine the interlocking blocks 10 of different materials. In this case, in order to achieve a balance, heavy interlocking blocks 10 made of metal or embedded with metal are used for a lower part of an object, and lighter interlocking blocks 10 made of wood or with a hollow structure are used for an upper part of the object.

**[0030]** The interlocking block 10 may be formed by machining a piece of material or in various other manners including die casting.

**[0031]** The present invention is not limited to the above-described embodiment, and various changes and modifications may be made therein without departing from the spirit of the invention.

#### INDUSTRIAL APPLICABILITY

**[0032]** The interlocking block of the invention is applicable in the field of interlocking block toys, object creation, and furniture.

#### EXPLANATION OF REFERENCE NUMBERS

**[0033]**

10: interlocking block  
11: end part

12: cutout

13: body part

15: thin part

16: end surface

17: upper surface

18: lower part

100, 200, 300, 400, 500, 600, 700: assembly

#### **10 Claims**

1. An interlocking block configured to be assembled with another interlocking block having the same shape and the same size, comprising;  
a base in the shape of a pillar extending in a predetermined direction, the base having a surface formed with a pair of cutouts in bilateral symmetry in the predetermined direction, wherein:

the width and the thickness of the base are the same; and

when the width of the base is W, then the length of the surface in the predetermined direction is 6W, and the distance from an end surface of the base to one of the pair of cutouts in the predetermined direction is W, and the length of each of the cutouts in the predetermined direction is W, and the depth of each of the cutouts is W/2.

2. The interlocking block according to claim 1, having a pair of thin parts formed with the pair of cutouts and a thick part that is thicker than the pair of thin parts, and configured to be assembled with the another interlocking block by inserting one of the thin part and the thick part into the cutout of the another interlocking block.

3. An assembly including a plurality of interlocking blocks of claim 2, the interlocking blocks being assembled with each other.

4. A furniture having a structure of the assembly of claim 3.

FIG. 1

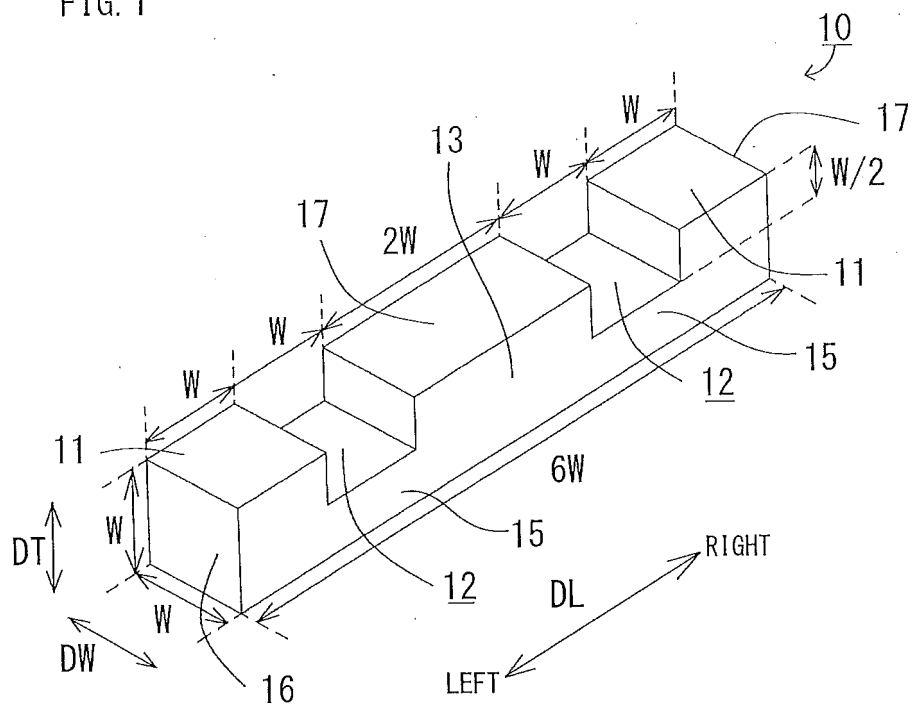


FIG. 2

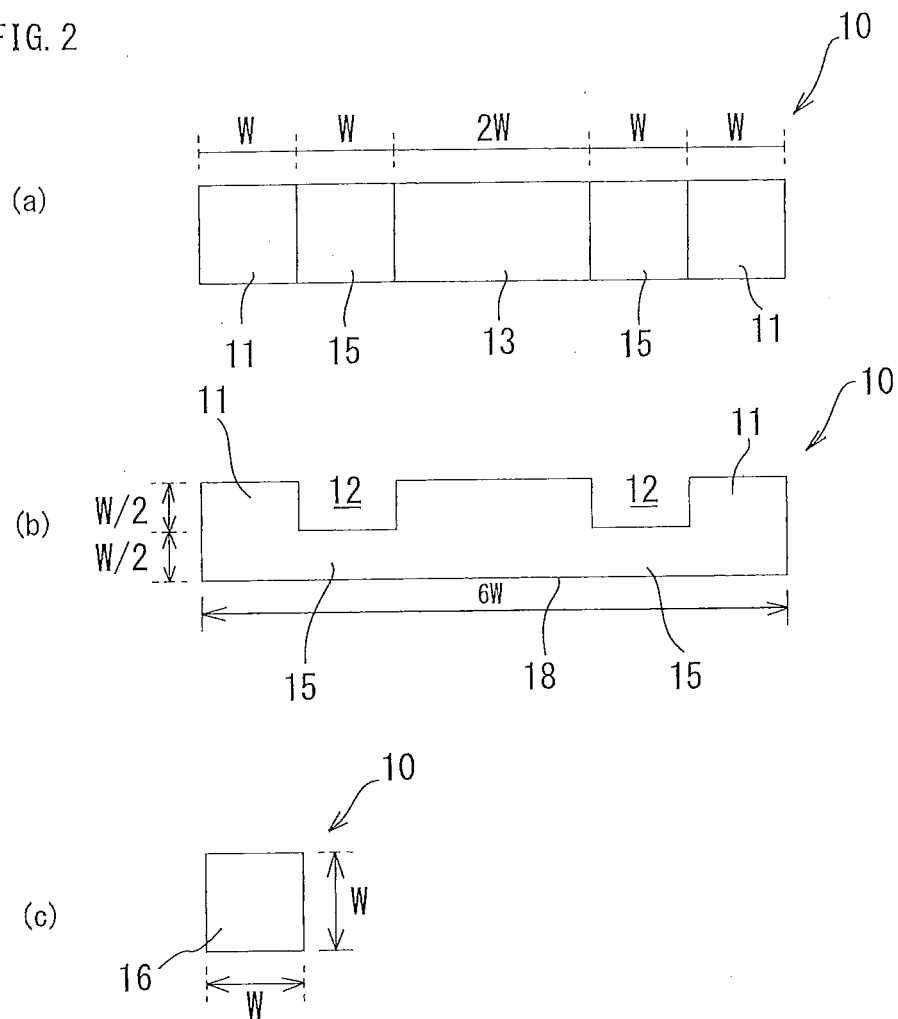
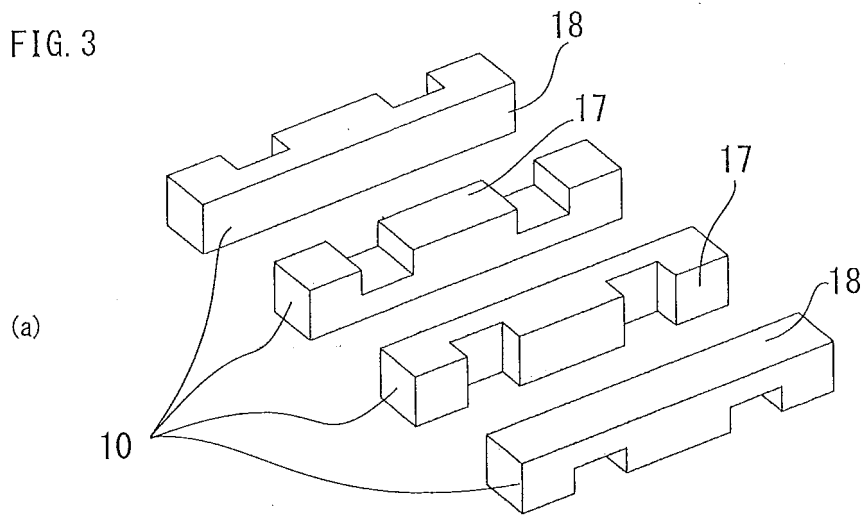


FIG. 3



(b)

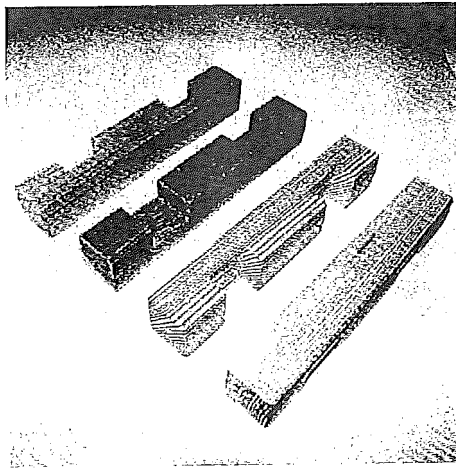
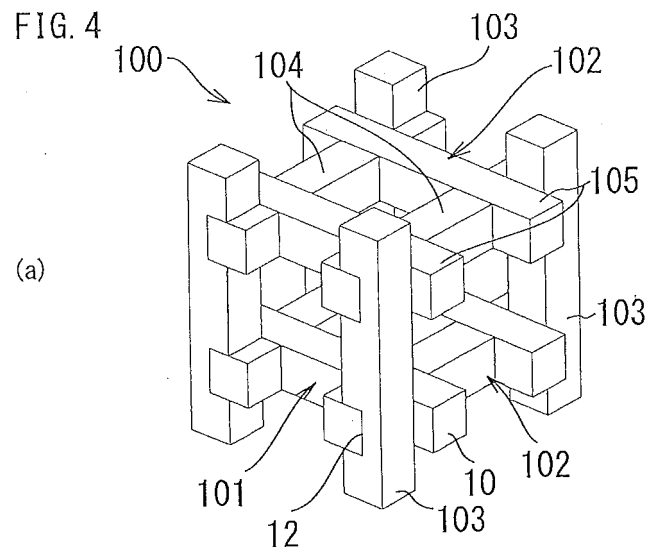
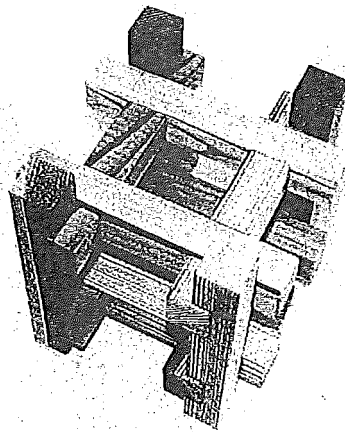


FIG. 4



(b)



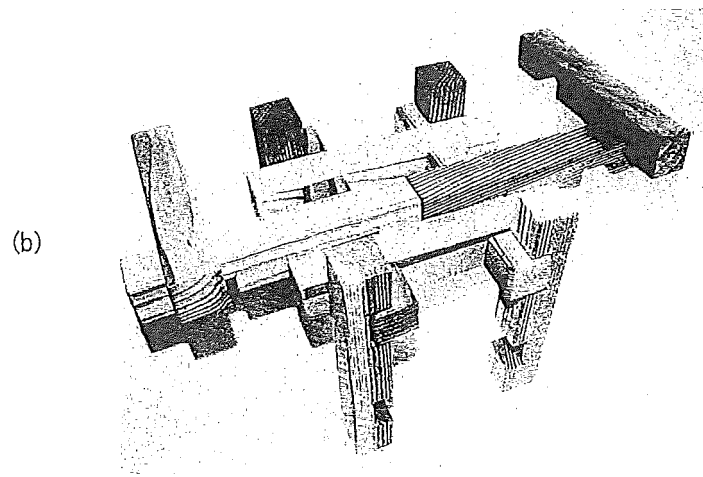
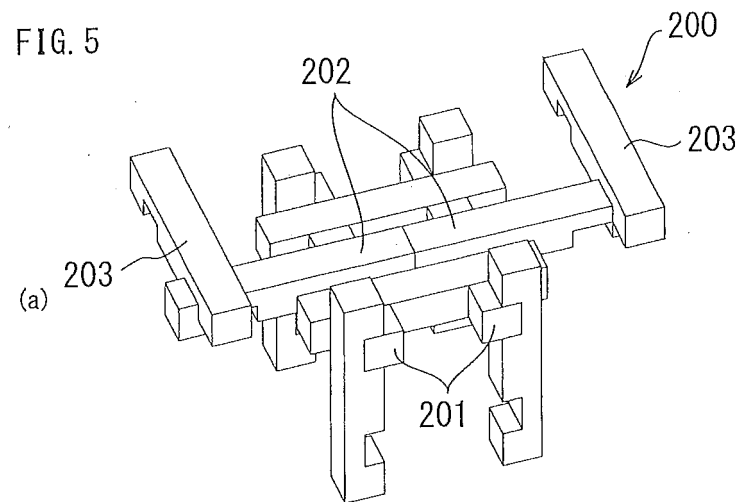
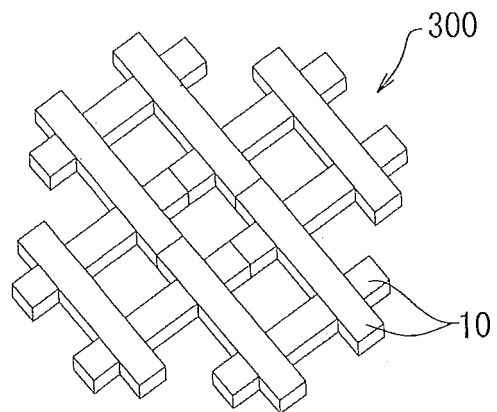
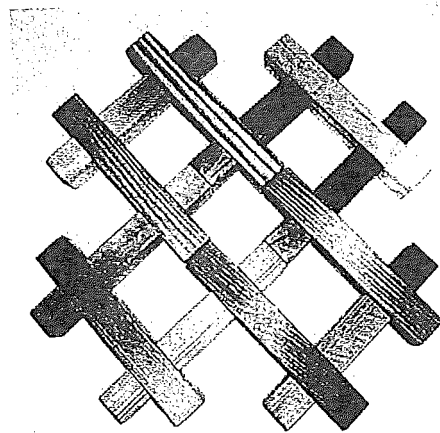


FIG. 6

(a)



(b)



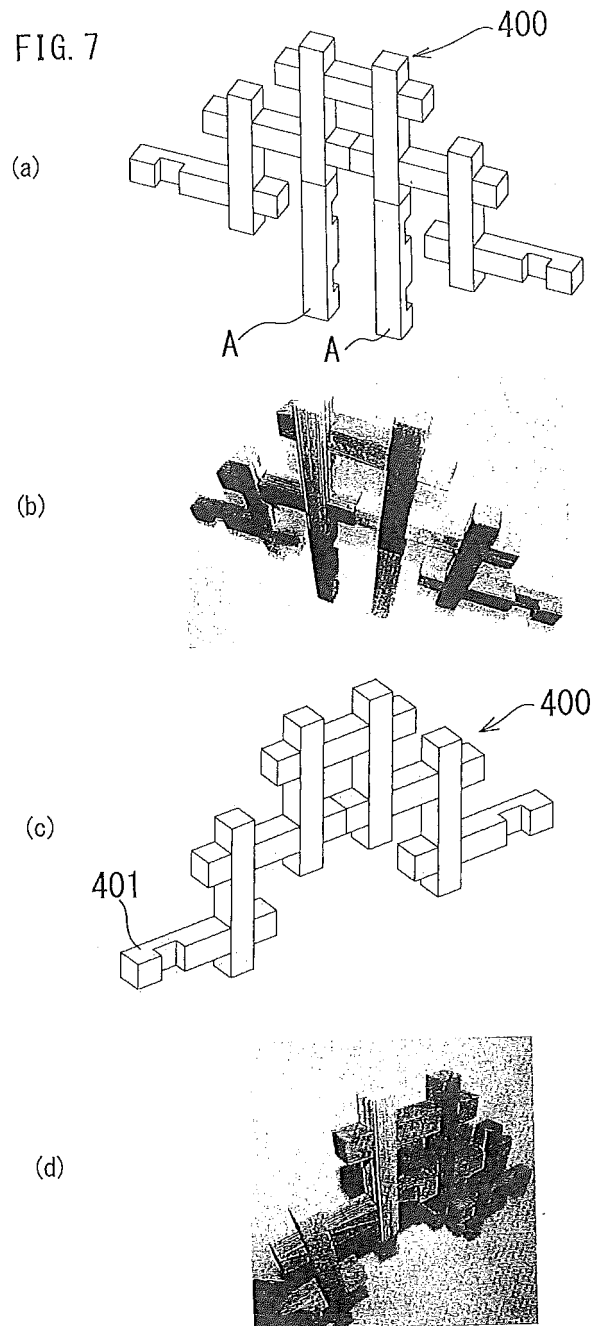


FIG. 8

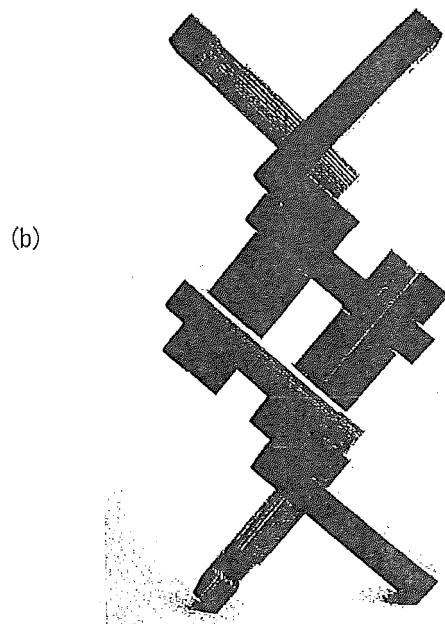
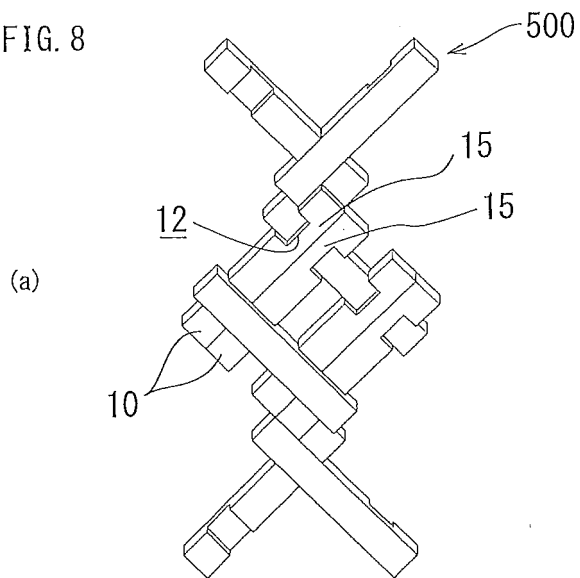
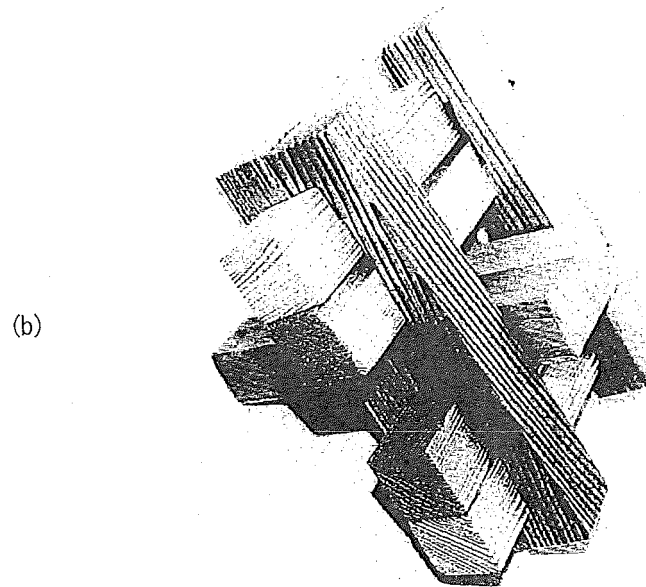
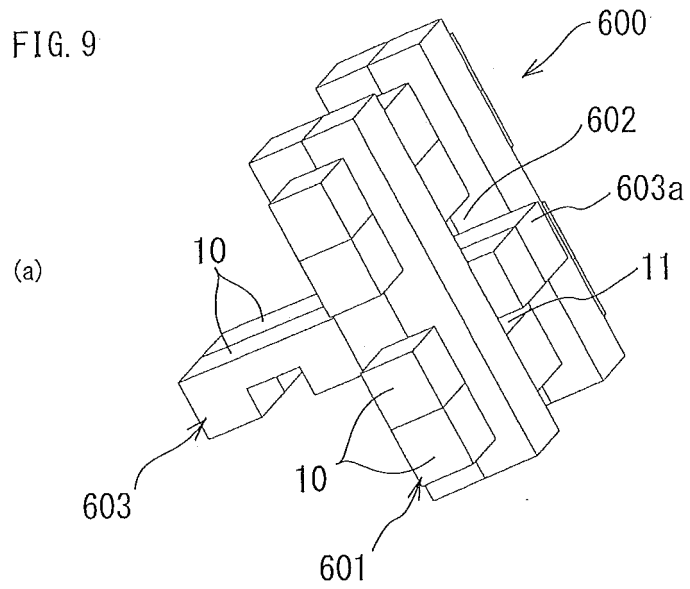
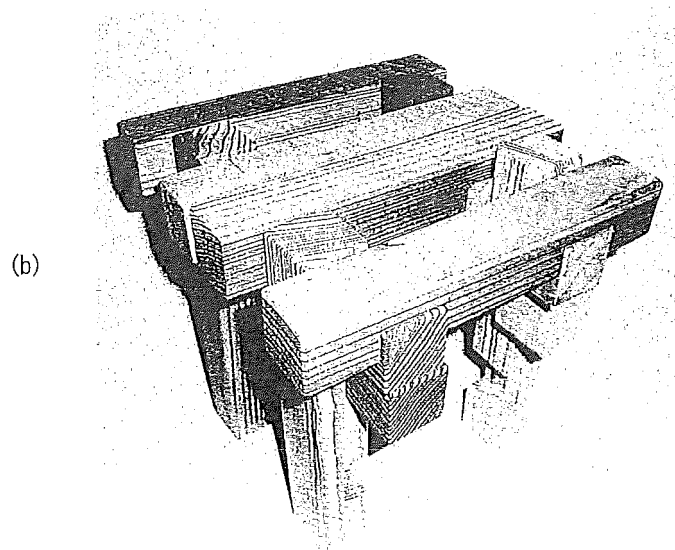
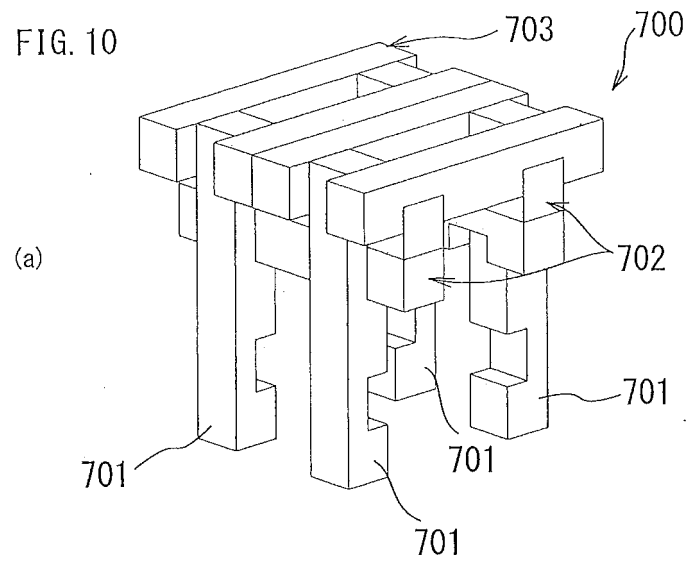


FIG. 9





## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/006742

## A. CLASSIFICATION OF SUBJECT MATTER

A63H33/08(2006.01)i, A47B47/00(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)

A63H33/08, A47B47/00

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2017

Kokai Jitsuyo Shinan Koho 1971-2017 Toroku Jitsuyo Shinan Koho 1994-2017

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. |
|-----------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | JP 2006-68188 A (Toshiaki OZAWA),<br>16 March 2006 (16.03.2006),<br>paragraphs [0038] to [0045]; fig. 1 to 2<br>(Family: none) | 1-4                   |
| A         | WO 2013/078630 A1 (DA FONG INDUSTRIAL LTD.),<br>06 June 2013 (06.06.2013),<br>abstract<br>(Family: none)                       | 1-4                   |
| A         | JP 3181308 U (Manabu FUKUOKA),<br>09 January 2013 (09.01.2013),<br>abstract<br>(Family: none)                                  | 1-4                   |

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 ☐ See patent family annex.

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Date of the actual completion of the international search  
16 May 2017 (16.05.17)Date of mailing of the international search report  
30 May 2017 (30.05.17)Name and mailing address of the ISA/  
Japan Patent Office  
3-4-3, Kasumigaseki, Chiyoda-ku,  
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/006742

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                               | Relevant to claim No. |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 80116/1988 (Laid-open No. 2068/1990) (Toshihiro ISHIZAKI), 09 January 1990 (09.01.1990), fig. 1 to 2 (Family: none) | 1-4                   |

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**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP 3172064 B [0003]