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(54) **THREE-DIMENSIONAL PLASTIC RHOMBIC UNIT OF CONSTRUCTION TOY**

(57) A three-dimensional plastic rhombic unit (1000) of a construction toy includes two insertion-connection sleeves (100), each of which comprises a shell (101) and an insertion-connection groove (130) formed in each shell (101). The bottom surface of each shell (101) is provided with an opening. Both the shell (101) and the insertion-connection groove (130) have a smaller upper part and a larger lower part. The bottom edges of the shells (101) of the two insertion-connection sleeves (100) are connected with each other. The openings of the two insertion-connection grooves (130) are on either side of the connected edge. Several three-dimensional plastic rhombic units (1000) can be inserted one into the other to form any pattern.

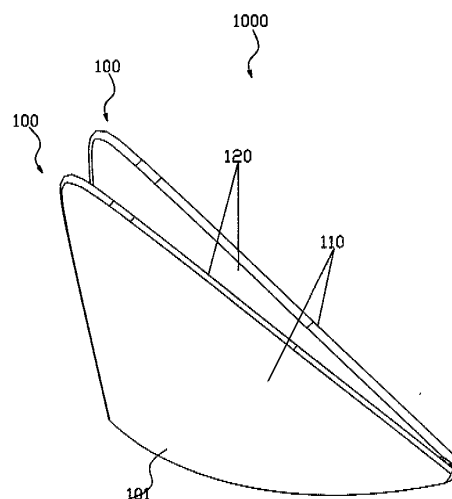


FIG. 1

## Description

### Field of the invention

[0001] The present invention relates to basic plastic component with unique stereoscopic structure for combination toy, especially a basic plastic component with unique stereoscopic structure which can be combined into any shape or any pattern.

### Background of the invention

[0002] Puzzle products have the function of developing intelligence, so they are used in an extensive range. Building block is one kind of puzzle products, but the shapes of the basic component of the conventional building blocks are regular three-dimensional geometry, for example, square, rectangle, semicircle, the conventional building blocks in market have the following shortage: they can only be combined into general outlines of objects, but they can neither be combined into lifelike shapes of objects nor lifelike patterns.

### Summary of the invention

[0003] The purpose of the present invention is to overcome the problem of the conventional technique, which the conventional building blocks can only be combined into general outlines of objects, and to provide a basic plastic component with unique stereoscopic structure for combination toy.

[0004] The technical solution applied by the present invention is:

Basic plastic component with unique stereoscopic structure for combination toy comprises two sets of plastic plug sleeves, and the plug sleeve includes a shell and a plug slot formed in the shell, which is opening downward. The shells of two plastic plug sleeves whose upper part is small and lower part is large, are connected together by joining edges of them.

[0005] In a preferred embodiment, the shape of the shell is similar to that of the plug slot.

[0006] In a preferred embodiment, the shell includes a pair of triangle shaped flakes, and the left edges and the right edges of them are fixed together respectively.

[0007] In a preferred embodiment, the two triangle shaped flakes are classified into an outside triangle shaped flake and an inside triangle shaped flake, and they are similar to each other. Besides the outside triangle shaped flake is larger than the inside triangle shaped flake.

[0008] In a preferred embodiment, the edges of the inside triangle shaped flake in two plug sleeves are connected together.

[0009] In a preferred embodiment, the shell comprises

two connecting flakes whose shapes may be rhombus, semicircle, semi-ellipse, semi-polygon or trapezium, and the left edges and the right edges of the two connecting flakes are fixed together respectively.

[0010] In a preferred embodiment, the two plug sleeves are arranged symmetrically.

[0011] In a preferred embodiment, the plug sleeve is made of plastic.

[0012] In a preferred embodiment, the plug sleeve is made of rubber.

[0013] In a preferred embodiment, the plug sleeve is made of anti-slipping mixture of plastic and rubber.

[0014] Compared with the background technique, in the technical solution applied by the present invention, these basic plastic components with unique stereoscopic structure can be piled compactly and inserted into each other. Besides they can be combined into any shape or any pattern, which is lifelike. Because the basic plastic component with unique stereoscopic structure is made of plastic, it has the following advantages:

1. It can be made by a mould in a high efficiency and be produced in a large scale;
2. The basic plastic component with unique stereoscopic structure can be assembled firmly without glue.
3. It can be reused repeatedly.
4. The basic plastic component with unique stereoscopic structure can be assembled compactly.

[0015] Because the outside triangle flake is similar to the inside triangle flake and the outside triangle flake is larger than the inside triangle flake, the plug slot between the outside triangle flake and the inside triangle flake has more plug space. Because the shapes of the shell and the plug slot of the plug sleeve are both triangle, the shell and the plug slot are corresponding to each other, and the shell of the lower plug sleeve can be inserted into the plug slot of the upper plug sleeve.

### Brief description of the drawings

#### [0016]

Fig.1 is a three-dimension view of the basic plastic component with unique stereoscopic structure in a preferred embodiment.

Fig.2 is a bottom view of the basic plastic component with unique stereoscopic structure in a preferred embodiment.

Fig.3 is a side view of the basic plastic component with unique stereoscopic structure in a preferred embodiment.

Fig.4 is a three-dimension view of an assembly of several basic plastic components with unique stereoscopic structure in a preferred embodiment.

### Description of Specific embodiments

**[0017]** Referring to fig.1, fig.2 and fig.3, a basic plastic component 1000 with unique stereoscopic structure for combination toy comprises two plastic plug sleeves 100 arranged symmetrically. The basic plastic component 1000 with unique stereoscopic structure is made of anti-slipping mixture of plastic and rubber. The plastic plug sleeve 100 includes a shell 101 and a plug slot 130 formed in the shell 101 which is opening downward. The outer surface of the shell 101 of two plastic plug sleeves 100 is smooth curved surface, the shape of basic plastic component 1000 with unique stereoscopic structure is olivary in bottom view.

**[0018]** The shell 101 comprises an outside triangle flake 110 and an inside triangle flake 120, and they are similar to each other. Besides the outside triangle flake 110 is larger than the inside triangle flake 120. The left edge of the outside triangle flake 110 and the left edge of the inside triangle flake 120 are fixed together, and the right edge of the outside triangle flake 110 and the right edge of the inside triangle flake 120 are fixed together, so that the shell forms a triangle and the said plug slot 130, in the shape of a triangle, is formed between the outside triangle flake 110 and the inside triangle flake 120. In the embodiment, the connecting flake is in the shape of a triangle, but the present invention is not limited in this, the connecting flake may be in the shape of rhombus, semicircle, semi-ellipse, semi-polygon or trapezium.

**[0019]** The edges of the two plug sleeves 100 are connected together. Because they are made of anti-slipping mixture of plastic and rubber, the two plug sleeves 100 can rotate around the edge and can be closed or opened.

**[0020]** Fig.4 illustrates that several basic plastic components with unique stereoscopic structure are combined, when they are in use.

**[0021]** All above is just a preferred embodiment of the present invention, so the present invention should not be limited in these embodiments. In a word, it should be understood that according to the scope of the present invention and the content of the description, all the various equivalent modifications and alterations will be covered by the scope and spirit of this invention.

### Industrial applicability

**[0022]** Present invention is to provide basic plastic component with unique stereoscopic structure for combination toy, which is ingenious, rational design, they can be combined into any shape or any pattern, which is life-like, and has good industrial applicability..

### Claims

1. The basic plastic component with unique stereoscopic structure for combination toy comprises two sets of plastic plug sleeves 100, and the plug sleeve

100 includes a shell 101 and a plug slot 130 formed in the shell 101, which is opening downward. The shells 101 of two plastic plug sleeves whose upper part is small and lower part is large, are connected together by joining edges of them.

2. The basic plastic component with unique stereoscopic structure for combination toy according to claim 1, wherein the shape of the shell 101 is similar to that of the plug slot 130; one shell 101 of the basic plastic component 1000 with unique stereoscopic structure can be inserted into one plug slot 130 of another basic plastic component 1000 with unique stereoscopic structure.

3. The basic plastic component with unique stereoscopic structure for combination toy according to claim 2, wherein the shell 101 includes a pair of triangle shaped flakes, and the left edges and the right edges of them are fixed together respectively.

4. The basic plastic component with unique stereoscopic structure for combination toy according to claim 3, wherein the two triangle shaped flakes are classified into an outside triangle shaped flake 110 and an inside triangle shaped flake 120, and they are similar to each other, and the outside triangle shaped flake is 110 larger than the inside triangle shaped flake 120.

5. The basic plastic component with unique stereoscopic structure for combination toy according to claim 4, wherein the edges of the inside triangle shaped flake 120 in two plug sleeves 100 are connected together.

6. The basic plastic component with unique stereoscopic structure for combination toy according to claim 2, wherein the shell 101 comprises two connecting flakes whose shapes may be rhombus, semicircle, semi-ellipse, semi-polygon or trapezium, and the left edges and the right edges of the two connecting flakes are fixed together respectively.

7. The basic plastic component with unique stereoscopic structure for combination toy according to claim 1 or 2 or 3 or 4 or 5 or 6, wherein the two plug sleeves 100 are arranged symmetrically.

8. The basic plastic component with unique stereoscopic structure for combination toy according to claim 1 or 2 or 3 or 4 or 5 or 6, wherein the plug sleeve 100 is made of plastic.

9. The basic plastic component with unique stereoscopic structure for combination toy according to claim 1 or 2 or 3 or 4 or 5 or 6, wherein the plug sleeve 100 is made of rubber.

10. The basic plastic component with unique stereoscopic structure for combination toy according to claim 1 or 2 or 3 or 4 or 5 or 6, wherein the plug sleeve 100 is made of anti-slipping mixture of plastic and rubber.

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11. The basic plastic component with unique stereoscopic structure for combination toy according to claim 4, wherein the outer surface of the shell 101 of two plastic plug sleeves 100 is smooth curved surface, the shape of basic plastic component 1000 with unique stereoscopic structure is olivary in bottom view.

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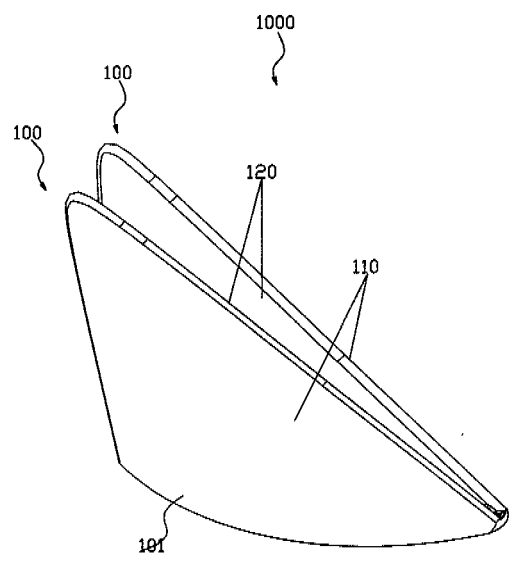


FIG. 1

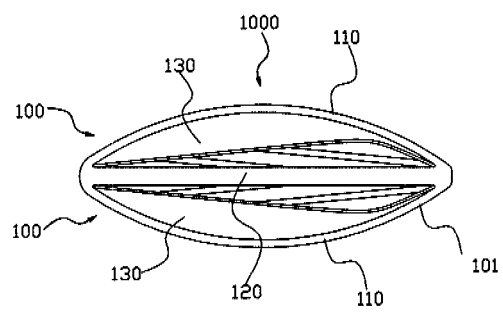


FIG. 2

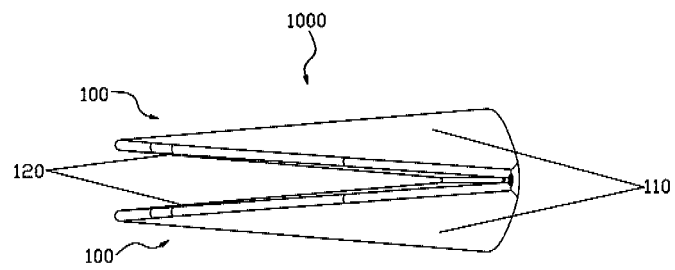


FIG. 3

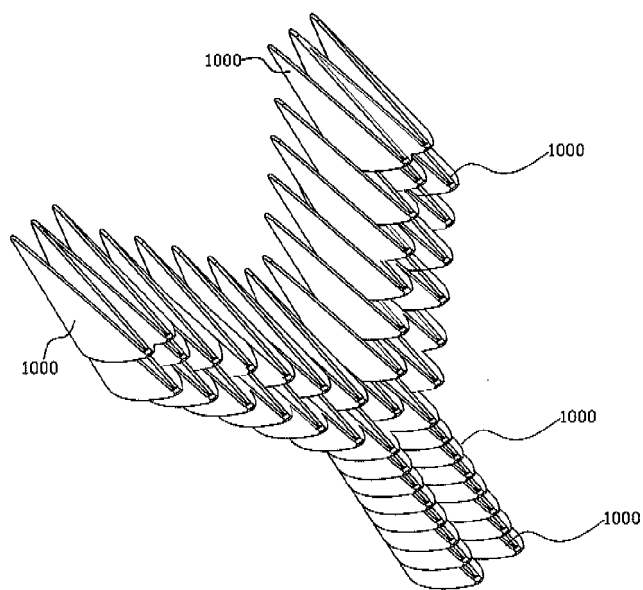


FIG. 4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/073132

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| <b>A. CLASSIFICATION OF SUBJECT MATTER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                         |                                                                                        |
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| According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                         |                                                                                        |
| <b>B. FIELDS SEARCHED</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                         |                                                                                        |
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| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                         |                                                                                        |
| WPI;EPODOC;CNPAT;CNKI: toy, entertainment, fun, insert, connect, hole, groove, open, angle, diamond, lozenge, rhombus, stack, recess, projection, protuberance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                         |                                                                                        |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                         |                                                                                        |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document, with indication, where appropriate, of the relevant passages                                                      | Relevant to claim No.                                                                  |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CN 2164885 Y (CUI,Guoqing ) 18 May 1994 (18.05.1994)<br>See description, page 1, paragraph 5- page 2, paragraph 3, figure 1             | 1-11                                                                                   |
| P, X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CN 201415063 Y (LIN,Hualong et al.) 03 Mar. 2010 (03.03.2010)<br>See description, page 1, paragraph 4- page 3, paragraph 4, figures 1-4 | 1-10                                                                                   |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                         |                                                                                        |
| <p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> <p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&amp;” document member of the same patent family</p> |                                                                                                                                         |                                                                                        |
| Date of the actual completion of the international search<br>15 Aug. 2010 (15.08.2010)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                         | Date of mailing of the international search report<br><b>02 Sep. 2010 (02.09.2010)</b> |
| Name and mailing address of the ISA/CN<br>The State Intellectual Property Office, the P.R.China<br>6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China<br>100088<br>Facsimile No. 86-10-62019451                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                         | Authorized officer<br><b>HOU, Yanpin</b><br>Telephone No. (86-10)62084500              |

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
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| Patent Documents referred<br>in the Report | Publication Date | Patent Family | Publication Date |
|--------------------------------------------|------------------|---------------|------------------|
| CN 2164885 Y                               | 18.05.1994       | None          |                  |
| CN 201415063 Y                             | 03.03.2010       | None          |                  |

Form PCT/ISA/210 (patent family annex) (July 2009)