

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 783 908 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.07.1997 Bulletin 1997/29

(51) Int. Cl.⁶: **A63H 33/08**, A63H 33/10

(21) Application number: **96300188.8**

(22) Date of filing: **10.01.1996**

(84) Designated Contracting States:
CH DE ES FR GB IT LI NL

(72) Inventor: **Yao, Li-ho**
Taipei (TW)

(71) Applicant: **Yao, Li-ho**
Taipei (TW)

(74) Representative: **Jennings, Nigel Robin et al**
KILBURN & STRODE
30 John Street
London WC1N 2DD (GB)

(54) Toy building block puzzle

(57) A toy building block puzzle includes a first plurality of differently shaped tall hollow blocks (5, 10, 15, 20, 25, 30, 35) which include lugs (52, 102, 152, 252, 302, 352) and slots (5, 10, 15, 20, 25, 30, 35) on side walls thereof and protrusions (58, 108, 158, 258, 308, 358) and recesses on respective upper and lower sides thereof by which blocks of same or different shapes may be detachably interconnected to each other in vertical and horizontal planes. A second plurality of building elements comprises of adapters (40, 45, 50) shaped as rods to increase permutations of interconnection between the blocks of the first group.

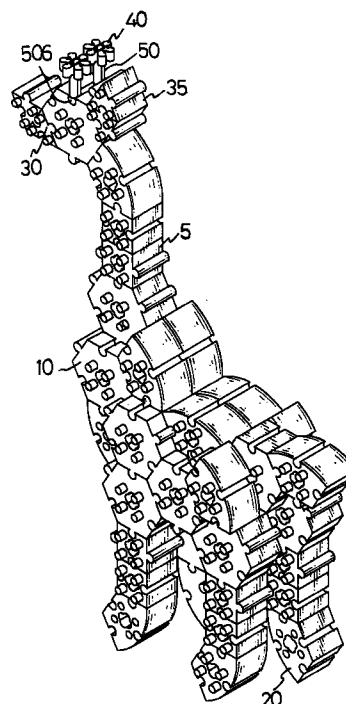


Fig.12

EP 0 783 908 A1

Description

This invention relates to a toy building block puzzle comprising different shapes and sizes such as triangles and squares, which may have interlocking means on each face and further have a central bore extending therethrough. Furthermore, a variety of adapters are provided to increase permutations of interlocking ability between the blocks.

The prior art toy building blocks have many sizes and shapes but substantially have interlocking means extending only from two opposite faces thereof which limits the possibilities of designs ultimately constructible with the blocks.

Furthermore, the simple interlocking means of prior art toy building blocks is usually a longitudinal press fit between protrusions of an upper face of a first block and corresponding recesses of a lower face in a second block. Such an interconnection is weak, particularly when subjected to a force perpendicular to a longitudinal force used to combine the blocks. Thus, a user may experience considerable frustration when, after having spent a lot of time constructing a model, e.g., an airplane, from the blocks, the model starts to disintegrate when played with as a toy.

Thus, it is found there is a long and unfulfilled need for a toy building element which has interlocking means provided on each face thereof and that interlocking means has a high resistance to impact yet can be simply overcome when desired.

One object of the present invention is to provide a set of toy building blocks which can be build either longitudinally or interconnected laterally.

Another object of the present invention is to provide a set of toy building blocks such that a structure constructed with the blocks cannot be separated by opposite lateral forces being applied respectively thereto and has considerable resistance to potentially destructive impact, yet can easily be disassembled when required.

In order to achieve the above objects, the present invention provides a toy building elements set wherein each element comprises a block, substantially hollow and having an open lower end, a closed upper end, a peripheral wall extending between the upper and lower ends, first interconnecting means disposed in the peripheral wall, second interconnecting means disposed in the upper end, third interconnecting means disposed in the lower end, and a passage extending between the upper and lower ends and within the peripheral wall whereby the elements can interlock with each other in a horizontal plane via the first interlocking means and a vertical plane via the second and the third interlocking means.

In accordance with one aspect of the present invention, the first interconnecting means comprises a plurality of 'C'-shaped lugs each having an arc greater than 180° extending perpendicularly and outwardly from a mediate point of the peripheral wall.

In accordance with another aspect of the present

invention, the first interconnecting means comprises a plurality of 'C'-shaped slots inwardly defined in the peripheral wall.

The second interconnecting means comprises a plurality of cylindrical protrusions extending perpendicularly and upwardly from the upper end.

The third interconnecting means comprises a plurality of recesses sized, spaced and shaped to receive, and corresponding in plurality to the second interconnecting means.

The passage is defined by a tubular wall extending integrally from an inner face of the upper end to the lower end.

The peripheral wall comprises at least three side walls and each side wall is straight and of a length, identical to straight walls of other elements of a same size series.

In accordance with a further aspect of the present invention, the toy building elements further comprises a second plurality of elements each sized and configured to interlock with the first plurality of toy building elements to increase permutations of engagement therebetween.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in accompaniment with the drawings.

In the drawings:

Fig. 1 is a top end view of a first element of the present invention;

Fig. 1A is a perspective view of the first element shown in Fig. 1;

Fig. 2 is an end view of a second element of the present invention;

Fig. 2A is a perspective view of the second element shown in Fig. 2;

Fig. 3 is an end view of a third element of the present invention;

Fig. 3A is a perspective view of the third element shown in Fig. 1;

Fig. 4 is an end view of a fourth element of the present invention;

Fig. 4A is a perspective view of the fourth element shown in Fig. 4;

Fig. 5 is an end view of a fifth element of the present invention;

Fig. 5A is a perspective view of the fifth element shown in Fig. 5;

Fig. 6 is an isometric view of a sixth element of the present invention;

Fig. 7 is an isometric view of a seventh element of the present invention;

Fig. 8 is an isometric view of an eighth element of the present invention;

Fig. 9 is an isometric view of a ninth element of the present invention;

Fig. 10 is an isometric view of a tenth element of the present invention;

Fig. 11 is a second end view of the fifth element of

the present invention; and

Fig. 12 shows an assembly example of building blocks and adapters in accordance with the present invention.

Referring to the drawings, a toy building block puzzle includes at least a first group of different toy building elements [hereinafter the first group of elements are individually referred to as blocks] and a second group of elements preferably having three adapters. Each block of the first group is substantially hollow with an open bottom, a closed top wall, the top wall having a generally planar upper surface and a plurality of side walls extending downwardly from the top wall. Preferably, each block may have a plurality of 'C'-shaped lugs and 'C'-shaped slots which are sized and shaped to laterally and slidingly engage with each other when two blocks are mated. Each lug and slot is disposed at a mediate point of a respective sidewall and extends along a height thereof. Furthermore, each straight sidewall of a block has a same height and width as a respectively sized block although it may have a configuration different thereto. Each block has a plurality of protrusions extending integrally and upwardly from the top wall thereof and a corresponding plurality of recesses defined in the open bottom thereof, the protrusions and recesses sized and configured such that a top face of one block may be longitudinally engaged to a bottom of another block. The engagement is due to an interference fit between the recesses and protrusions which requires a predetermined force to engage and disengage two blocks.

Preferably, a block of a different size but of a same shape as another block may have protrusions and recesses of a size different to the other block.

Advantageously, when a block having at least four sidewalls has both lugs and slots, each lug and each slot is alternately disposed in respective sidewalls so that the lugs and slots alternate in sequence in a periphery of the block.

Referring to Figs. 1 and 1A, a first block 5 is square in cross-section, having a top wall, an open bottom, four straight sides extending between the top wall and the bottom, two lugs 52, two slots 54, four projections 58, four recesses (not numbered) and a central passage 56 also extending between the top wall and the bottom and defined by a tubular portion.

Referring to Figs. 2 and 2A, a second block 10 is hexagonal in cross-section, having a top wall, an open bottom, six straight sides, three lugs 102, three slots 104, four upper projections 108, four lower recesses (not numbered) and a central passage 106 defined by a tubular portion extending between the top wall and the bottom.

Referring to Figs. 3 and 3A, a third block 15 is circular in cross-section, having a top wall, an open bottom, a circular side wall, four lugs 152, four slots 154, four upper projections 158, four lower recesses (not numbered) and a central passage 156 defined by a tubular

portion extending integrally from the top wall to the bottom. Preferably, each lug and each slot are alternately and equidistantly disposed in the circular periphery.

Referring to Figs. 4 and 4A, a fourth block 20 has a cross-section which is a truncated sector of a circle having a top wall, an open bottom, three straight side walls and an arcuate side wall, four slots 204, four upper protrusions 208, four lower recesses (not numbered) and a central passage 206 defined by a tubular portion extending integrally from the top wall to the bottom.

Referring to Figs. 5, 5A and 11, a fifth block 25 has a cross-section which is a truncated sector of a circle having a top wall, an open bottom, three straight side walls and an arcuate side wall, two slots 254, two lugs 252, four upper protrusions 258, four lower recesses (not numbered) and a central passage 256 defined by a tubular portion extending integrally from the top wall to the bottom. Preferably, each recess is defined in the arcuate sidewall and a straight side wall opposite thereto and each lug is formed in the remaining two straight sidewalls.

Referring to Fig. 6, a sixth block 30 is triangular in cross-section, having a top wall, an open bottom, three side walls, one lug 302, two slots 304, three upper projections 308, and three lower recesses (not numbered). Preferably, the triangular shape is an isosceles triangle.

Referring to Fig. 7, a seventh block 35 is triangular in cross-section, having a top wall, an open bottom, three side walls, two lugs 352, one slot 354 three upper projections 358, and three lower recesses (not numbered). Preferably, the triangular shape is an isosceles triangle.

Referring to Fig. 8, a first adapter element 40 of the present invention is tri-lobic in cross-section wherein three lobes are preferably sized and configured to be each equal to a lug of the blocks and integrally formed in an arc to define a central slot sized and configured to receive a lug of a corresponding block.

Referring to Fig. 9, a second adapter element 45 of the present invention includes a hollow rod, '8'-shaped in cross-section, thereby defining a first lug-like portion 452 integrally and longitudinally formed to a second lug-like portion 454, each lug-like portion being sized and configured to be receivable in a slot of a corresponding block.

Referring to Fig. 10, a third adapter element 50 of the present invention is a hollow rod, '8'-shaped in cross-section, thereby defining a first lug-like portion 502 integrally and longitudinally formed to a second lug-like portion 504 with a third short lug-like portion 506 integrally and perpendicularly formed at one end of the first and second lug-like portions 502, 504. Each of the first, second and third lug-like portions 502, 504, 506 is sized and configured to be receivable in a slot of a corresponding block.

Furthermore, the blocks are preferably made of plastics material which is suitable for injection moulding.

It is to be further noted that building blocks of the present invention may have different heights yet still be

engageable together.

Building blocks and adapters of the present invention provide novelty in the construction of geometric and alphabetic shapes as shown in Fig. 12.

Although the present invention has been explained in relation to its preferred embodiments, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and the scope of the invention as hereinafter claimed.

Claims

1. A toy building elements set wherein each element comprises:

a block, substantially hollow and having an open lower end, a closed upper end, a peripheral wall extending between the upper and lower ends, first interconnecting means disposed in the peripheral wall, second interconnecting means disposed in the upper end, third interconnecting means disposed in the lower end, and a passage extending between the upper and lower ends and within the peripheral wall whereby the elements can interlock with each other in a horizontal plane via the first interlocking means and a vertical plane via the second and the third interlocking means.

2. A toy building elements set as claimed in claim 1 wherein, the first interconnecting means comprises a plurality of 'C'-shaped lugs each having an arc greater than 180° extending outwardly from a mediate point of the peripheral wall.

3. A toy building elements set as claimed in claims 1 wherein the first interconnecting means comprises a plurality of 'C'-shaped slots inwardly defined in the peripheral wall.

4. A toy building elements set as claimed in claim 1 wherein:

the second interconnecting means comprises a plurality of protrusions extending upwardly from the upper end.

5. A toy building elements set as claimed in claim 1 wherein:

the third interconnecting means comprises a plurality of recesses sized, spaced and shaped to receive, and corresponding in plurality to the second interconnecting means.

6. A toy building elements set as claimed in claim 1 wherein:

the passage is defined by a tubular wall extend-

ing integrally from an inner face of the upper end to the lower end.

7. A toy building elements set as claimed in claim 1 wherein:

the peripheral wall comprises at least three side walls and each side wall is straight and of a length, identical to straight walls of other elements of a same size series.

8. A toy building elements set as claimed in claim 1 wherein:

the peripheral wall is square in cross-section having four straight sidewalls and the first interlocking means comprises two lugs each being disposed oppositely in two respective sidewalls and two slots each oppositely disposed in respective sidewalls adjacent to the sidewalls in which the lugs are formed.

9. A toy building elements set as claimed in claim 1 wherein:

the peripheral wall is hexagonal in cross-section having six straight sidewalls and the first interlocking means comprises three lugs each disposed on respective alternate straight side walls and three slots each disposed on respective straight side walls adjacent to the straight side walls on which the lugs are disposed.

10. A toy building elements set as claimed in claim 1, wherein:

the peripheral sidewall is circular in cross-section and the first interlocking means comprises four equi-spaced lugs disposed thereon and four equi-spaced slots defined therein, the slots alternately sequenced between the respective lugs.

11. A toy building elements set as claimed in claim 1 wherein:

the peripheral wall has a cross-section shaped as a truncated sector of a circle, having two opposite first straight side walls, an arcuate sidewall and a second straight sidewall opposite the arcuate sidewall and the first interlocking means comprises four slots each defined in a respective sidewalls.

12. A toy building elements set as claimed in claim 1 wherein:

the peripheral sidewall has a cross-section shaped as a truncated sector of a circle, having

two opposite first straight side walls, an arcuate side wall and a second straight sidewall opposite to the arcuate sidewall and the first interlocking means comprises two slots each defined in the respective arcuate sidewall and the second straight side wall, two lugs each disposed in respective first straight side wall.

13. A toy building elements set as claimed in claim 1 further comprising a second plurality of elements each sized and configured to interlock with the first plurality of toy building elements to increase permutations of engagement therebetween.
14. A toy building elements set as claimed in claim 13, wherein the second plurality of elements comprising a first adapter having a periphery '8'-shaped in cross-section defining two integrally formed longitudinal lugs.
15. A toy building elements set as claimed in claim 13, wherein the second plurality of elements comprising a second adapter having a periphery '8'-shaped in cross-section defining two integrally formed longitudinal lugs and a short lug integrally and perpendicularly formed at one end thereof.
16. A toy building elements set as claimed in claim 13, wherein the second plurality of elements comprising a third adapter having a periphery tri-lobic in cross-section wherein a lug cluster defines a slot therebetween.

35

40

45

50

55

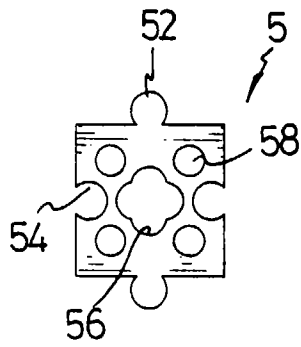


Fig.1

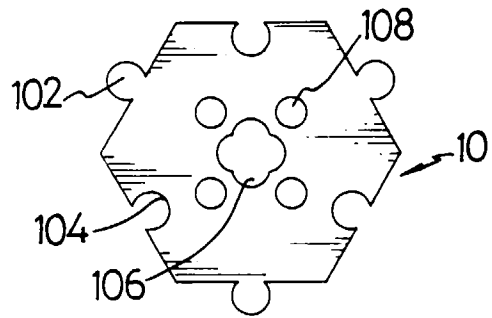


Fig.2

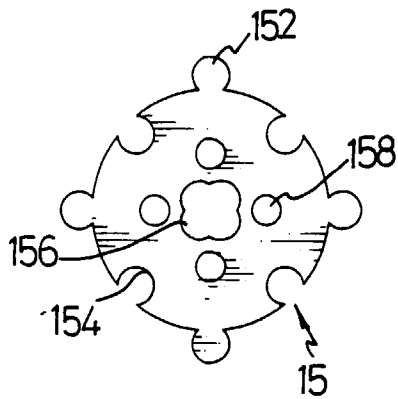


Fig.3

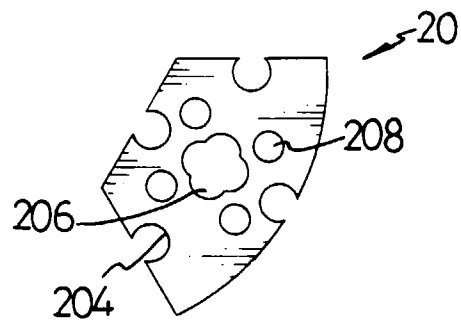


Fig.4

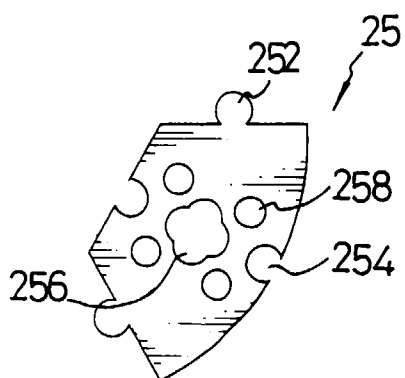


Fig.5

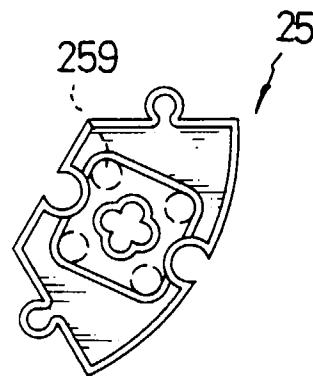


Fig.11

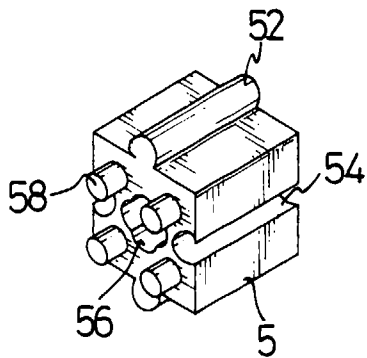


Fig.1 A

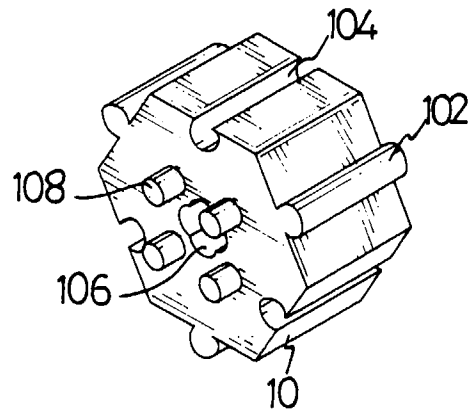


Fig.2 A

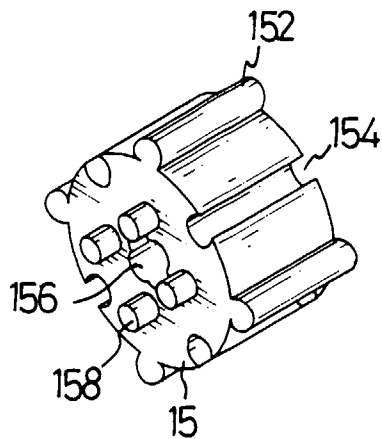


Fig.3 A

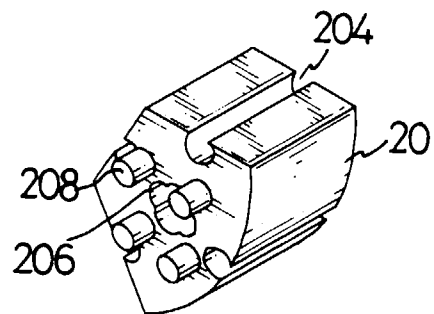


Fig.4 A

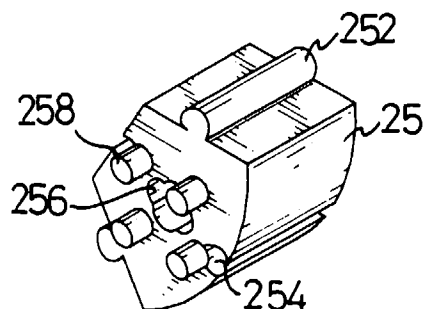


Fig.5 A

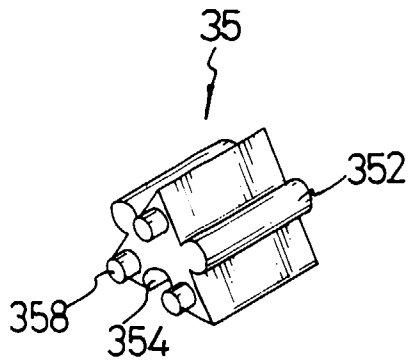


Fig. 7

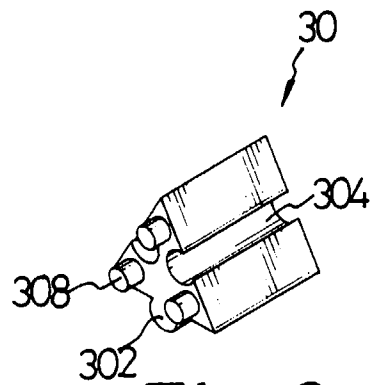


Fig. 6

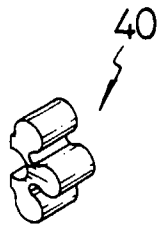


Fig. 8

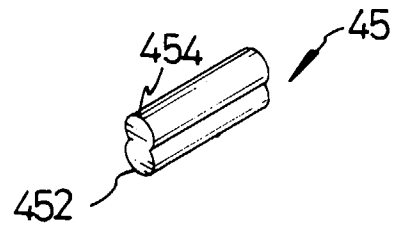


Fig. 9

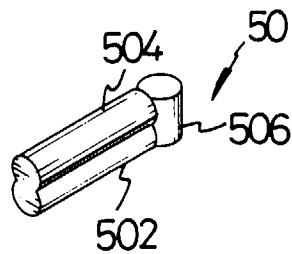


Fig. 10

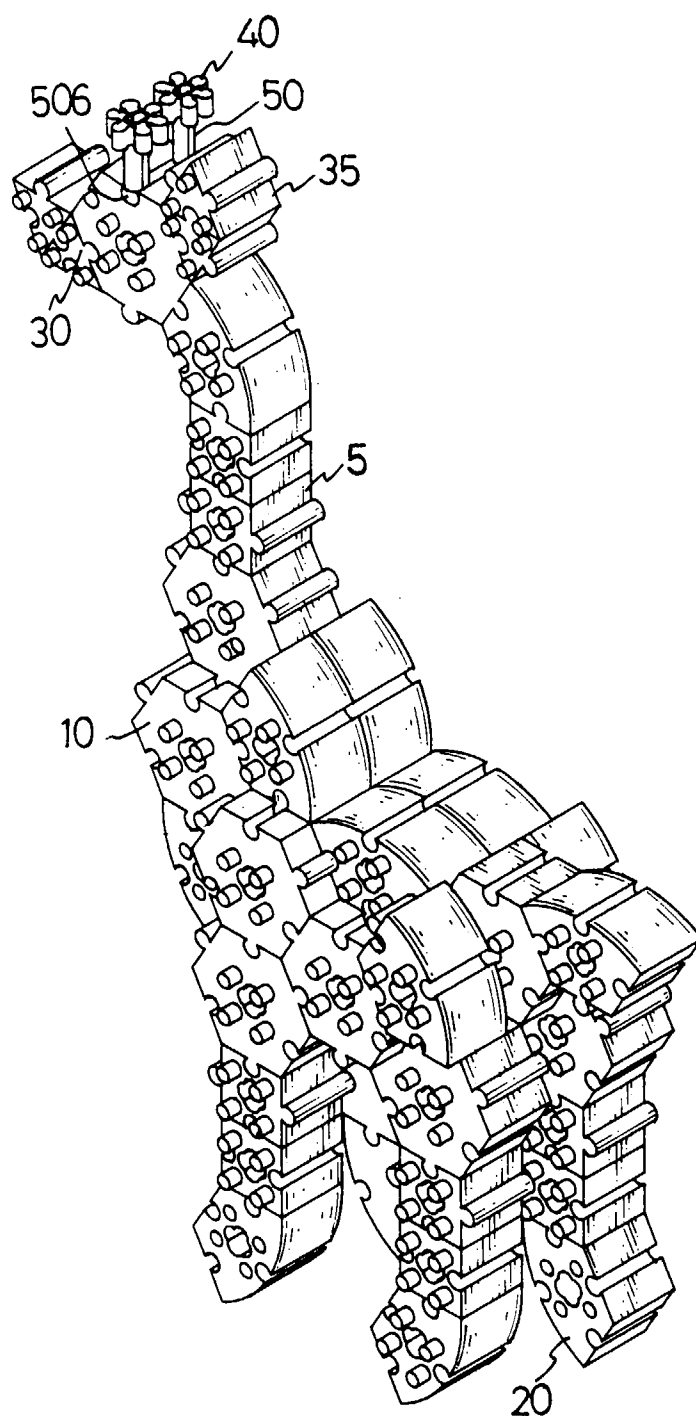


Fig.12



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 30 0188

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	WO-A-86 01738 (SHIN) * the whole document *	1,3-5,7, 8,13,14	A63H33/08 A63H33/10
A	US-A-3 558 138 (LEMELSON) * figures *	1-15	
A	FR-A-2 563 746 (ALBERT) * figure 5 *	1-16	
A	GB-A-1 127 168 (FISCHER) * figures *	8-10	
A	EP-A-0 058 126 (MOQUIN & BREUIL S.A.) * figures *	6-14	
A	EP-A-0 027 840 (VON DÄNIKEN) * figures *		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A63H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 June 1996	Examiner Lasson, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 01.82 (P04C01)