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(11)

EP 1 629 872 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
01.03.2006 Bulletin 2006/09

(51) Int Cl.:
A63H 33/04 (2006.01)

(21) Application number: 05016512.5

(22) Date of filing: 29.07.2005

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: 31.08.2004 IT TO20040578

(71) Applicant: Pro-Cord S.P.A.
40129 Bologna (IT)

(72) Inventors:
• Piretti, Giancarlo
40137 Bologna (IT)
• Pallottino, Marco
00188 Roma (IT)

(74) Representative: Marchitelli, Mauro
c/o Buzzi, Notaro & Antonielli d'Oulx Srl
Via Maria Vittoria 18
10123 Torino (IT)

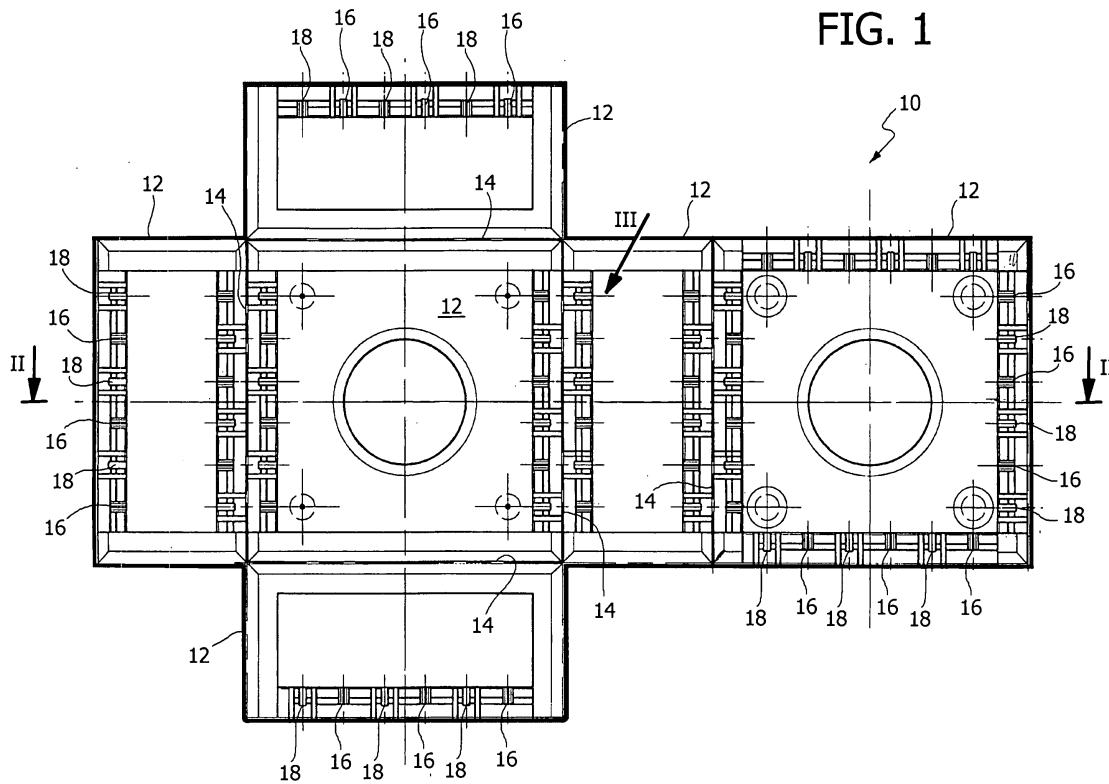
(54) Toy building block

(57) Toy building block comprising a hollow three-dimensional structure with a plurality of faces (12) and provided on at least one of said faces with engagement means (28,36,38,40,42) able to co-operate with complementary engagement means of another block.

The three-dimensional structure is formed by a pli-

able element (10) with a perimeter whose shape corresponds to the planar development of the block. The pliable element (10) is provided with hinges (14) between adjacent portions (12) forming the faces of the three-dimensional structure. Snap-in fastening means (16, 18) are provided for fastening each of said faces (12) to an adjacent face (12) of the three-dimensional structure.

FIG. 1



Description

[0001] The present invention relates to a toy building block.

[0002] Widely known are toy building blocks formed by a parallelepiped structure provided with engagement means able to co-operate with complementary engagement means of another block, to obtain the mutual connection of a plurality of blocks whose shape and dimensions are the same or different, to build complex constructions.

[0003] Also known are building blocks in which the parallelepiped structure is internally hollow and the retaining means are provided on some of the faces of the structure. An example of toy block of this kind is described in Belgian patent no. 900609, which illustrates a toy block using permanent magnets to connect the blocks to each other.

[0004] The present invention was developed to provide building blocks with large dimensions, e.g. prismatic blocks in which each side has a length of several centimetres. For example, without limiting in any way the field of application, the present invention could be used to obtain prismatic building blocks whose dimensions are multiples of 40 mm, e.g. 80x80x40 mm or 80x160x40 mm.

[0005] Building blocks of such dimensions would have the drawback of a very large size of the package to be sold, with consequent high transportation costs and the need for very extensive exhibiting spaces.

[0006] To overcome said drawback, the object of the present invention is a toy building block having the characteristics set out in the claims.

[0007] The characteristics and the advantages of the present invention shall become readily apparent in the detailed description that follows, provided purely by way of non limiting example, with reference to the accompanying drawings, in which:

- Figure 1 is a plan view of an element for forming a building block according to the present invention,
- Figure 2 is a section according to the line II-II of Figure 1,
- Figure 3 is plan view of the part indicated by the arrow III in Figure 1,
- Figure 4 is a section according to the line IV-IV of Figure 3,
- Figure 5 is a view according to the arrow V of Figure 4,
- Figure 6 is a section corresponding to Figure 4, showing the bending region in closed configuration,
- Figure 7 is a plan view of a first embodiment of a building block according to the invention,
- Figure 8 is an elevation view according to the arrow VIII of Figure 7,
- Figure 9 is a section according to the line IX-IX of Figure 7,
- Figures 10, 11 and 12 are views corresponding to Figures 7, 8 and 9, showing a dimensional variant

of the block according to the invention,

- Figure 13 is a plan view of a second embodiment of a building block according to the invention,
- Figure 14 is a section according to the line XIV-XIV of Figure 13, and
- Figure 15 is a section according to the line XIV-XIV of Figures 13 and 14 coupled to a block of the same kind.

[0008] With reference to Figures 1 and 2, Figure 1 is a plan view of an element for forming a building block according to the present invention. The pliable element 10 is constituted by mouldable plastic material and it is obtained by injection or compression moulding. The pliable element 10 has a perimeter whose shape corresponds to the planar development of the building block.

The element 10 comprises a plurality of portions 12, each of which is connected to the adjacent portions by means of a hinge 14. Each portion 12 is to form a face of the building block. The hinges 14 are formed by substantially V shaped grooves which extend along the junction line between two adjacent sides of the portions 12.

[0009] In the example illustrated in the figures, the pliable element 10 forms a hollow parallelepiped structure and it is thus provided with six portions 12 intended to form the six faces of the parallelepiped structure. The present invention however, could be used to obtain building blocks with different shapes from the parallelepiped shape, e.g. pyramidal, pentagonal, etc. The number, the shape and the arrangement of the portions 12 of the pliable element 10 varies according to the shape of the building block. Each portion 12 will in any case have the shape of one of the faces of the block.

[0010] The element 10 is provided planar, substantially in the form of a plate, with the portions 12 substantially coplanar to each other. After purchasing the toy package, the user assembles the building blocks by folding the portions 12 along the respective hinges 14 and mutually fastening the portions 12 in the manner described below.

[0011] Each pliable portion 12 is provided with fastening means that allow to fasten at least one side of a portion 12 to at least one corresponding side of a portion 12 which forms an adjacent face in the three-dimensional structure.

[0012] With reference to Figures 3 through 6, according to a preferred embodiment of the present invention the fastening means comprise a plurality of teeth 16 able to be inserted in snap-in fashion into complementary grooves 18. The fastening means are provided on at least one side of a portion 12 and they comprise a rectilinear back formed by alternating teeth 16 and grooves 18.

[0013] Each tooth 16 is preferably provided with a widened head 20 with a triangular profile able to be inserted in snap-in fashion into a groove 18 of the complementary fastening means. As shown in Figure 5, each groove 18 is formed in a substantially fork-shaped element, delimited by two lateral cuts 22 which allow the outwards deformation of the walls delimiting the groove 18. The array

of fastening means 18, 20 preferably extends along an edge of a portion 12. The edges of the portions 12 are preferably provided with inclined bearing surfaces 24 (Figure 4) which bear against complementary bearing portions of a portion 12 which forms an adjacent face in the three-dimensional structure.

[0014] As shown in Figure 6, after the rotation of a pliable portion 12 about a respective hinge 14, the inclined surfaces 24 of two adjacent sides come in contact with each other and the head 20 of each tooth 16 engages in snap-in fashion the complementary groove 18 provided on the adjacent side of the other portion 12.

[0015] Figures 7, 8 and 9 show a building block 26 obtained after the relative fastening of the initially coplanar pliable portions 12 of the element 10. The building block 26 comprises a hollow three-dimensional structure that, in the example illustrated in Figures 7 through 9, has a parallelepiped shape with square base. In the variant illustrated in Figures 10 through 12, the hollow three-dimensional structure of the building block 26 has a parallelepiped shape with rectangular base. Purely by way of indication, the dimensions of the building blocks illustrated in Figures 8 through 9 and 10 through 12 may be multiples of the length of the smaller side of the structure. For example, hypothesising that the blocks 26 have a height of 40 mm, the dimensions of the block illustrated in Figures 7 through 9 could be 80x80x40 mm, whilst the dimensions of the block illustrated in Figures 10 through 12 could be 80x160x40 mm. Naturally, these measurements are provided purely by way of example and they in no way exclude the application of the invention to blocks with different dimensions.

[0016] Each building block 26 is provided with engagement means able to co-operate with corresponding engagement means of another block to connect the blocks to each other in stable, disengageable fashion.

[0017] In the variant illustrated in Figures 8 through 12, the engagement means comprise permanent magnets 28 positioned on at least one face of the block. In the illustrated example, the permanent magnets 28 are positioned on the two main opposite faces 30 of the block. In the version illustrated in Figures 7 through 9, a single permanent magnet 28 is provided on each main face 30 of the block 26 whilst in the version illustrated in Figures 10 through 12 two permanent magnets 28 are provided on each main face 30. The permanent magnets 28 can have substantially disk shape and they are preferably housed in lowered seats, so that the outer surface of the magnets 28 is substantially flush with the outer surface of the respective face. Preferably, in addition to the engagement means constituted by the permanent magnets 28, positioning means can be provided, constituted by projecting portions 32 on one of the main faces 30 and recessed seats 34 whose shape corresponds to the projections 32 formed on the other main face 30. The projections 32 and the recessed seats 34 may have hemispherical shape.

[0018] In the embodiment illustrated in Figures 13

through 16, the engagement means achieve a mechanical type of engagement. In this case, on one of the main faces 30 are provided projections 36 with cylindrical shape and on the other main face 30 are provided recessed seats 38 whose shape and dimensions are complementary to those of the projecting portions 36. The projecting portions 36 have an annular rib 40 whilst the recessed seats 38 are provided with annular grooves 42 with complementary shape relative to the ribs 40. As

5 shown in Figure 15, when the projections 36 of a first block 26 are inserted into the recessed seats 38 of a second block 26, the ribs 40 of the first block engage in snap-in fashion the grooves 42 of the second block.

[0019] Naturally, without altering the principle of the 10 invention, the construction details and the embodiments 15 may be widely varied from what is described and illustrated herein, without thereby departing from the scope of the invention, as defined by the appended claims.

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Claims

1. A toy building block comprising a hollow three-dimensional structure with a plurality of faces (12) and provided on at least one of said faces with engagement means (28,36,38,40,42) able to co-operate with complementary engagement means of another block, **characterised in that** the three-dimensional structure is formed by a pliable element (10) with a perimeter whose shape corresponds to the planar development of the block, the pliable element (10) being provided with hinges (14) between adjacent portions (12) forming the faces of the three-dimensional structure, snap-in fastening means (16, 18) being provided for fastening each of said faces (12) to an adjacent face (12) of the three-dimensional structure.
2. Building block as claimed in claim 1, **characterised in that** said snap in fastening means (16, 18) extend along the sides of respective faces (12).
3. Building block as claimed in claim 2, **characterised in that** said fastening means comprise alternating teeth (16) and grooves (18).
4. Building block as claimed in claim 1, **characterised in that** said fastening means for connection to another block comprise permanent magnets (28).
5. Building block as claimed in claim 1, **characterised in that** said engagement means for connection to another block comprise projecting portions (36) and recessed seats (38) whose shape is complementary to said projecting portions (36) and snap-in engagement portions (40, 42) provided on said projecting portions (36) and recessed seats (38).

FIG. 1

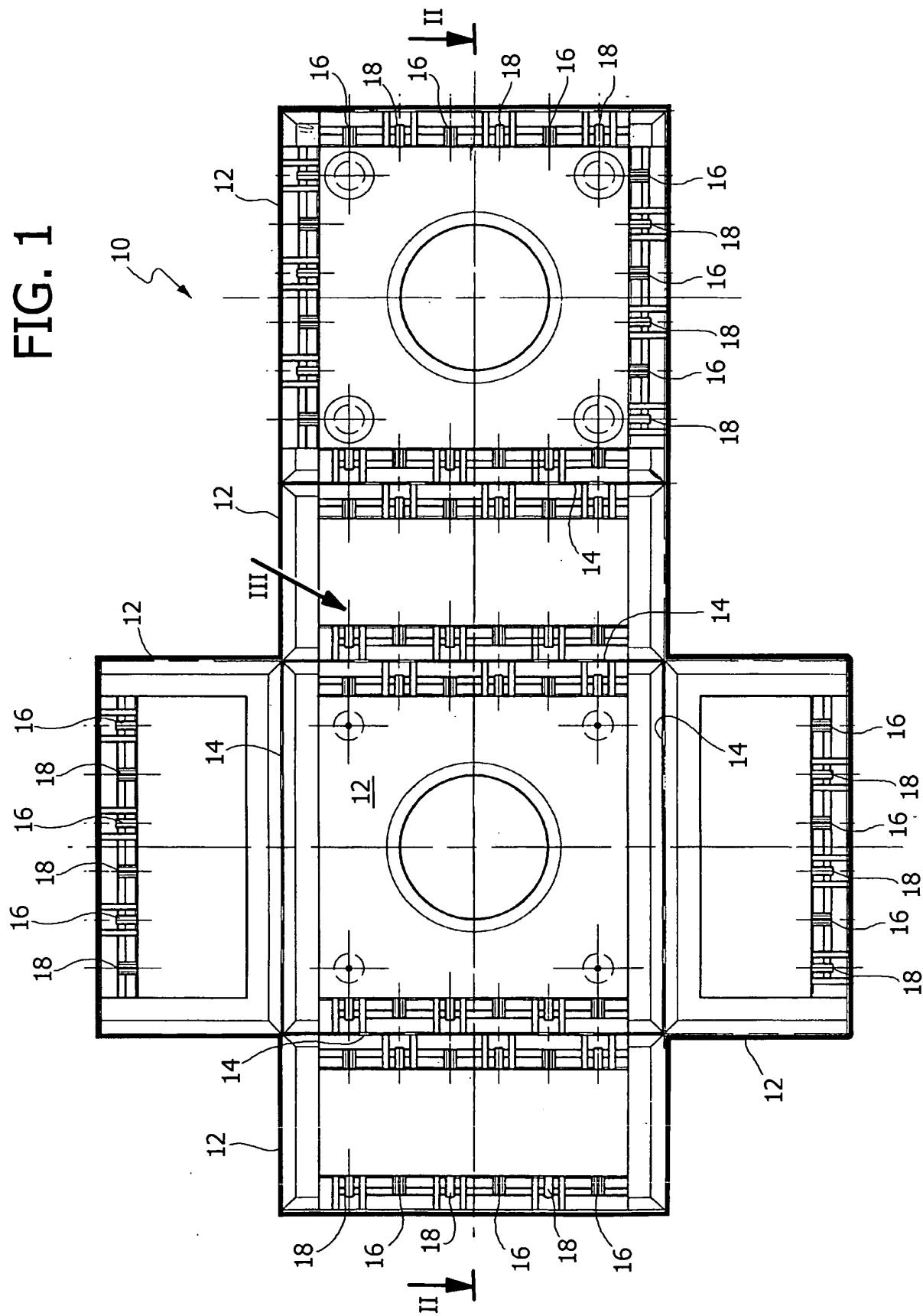


FIG. 2

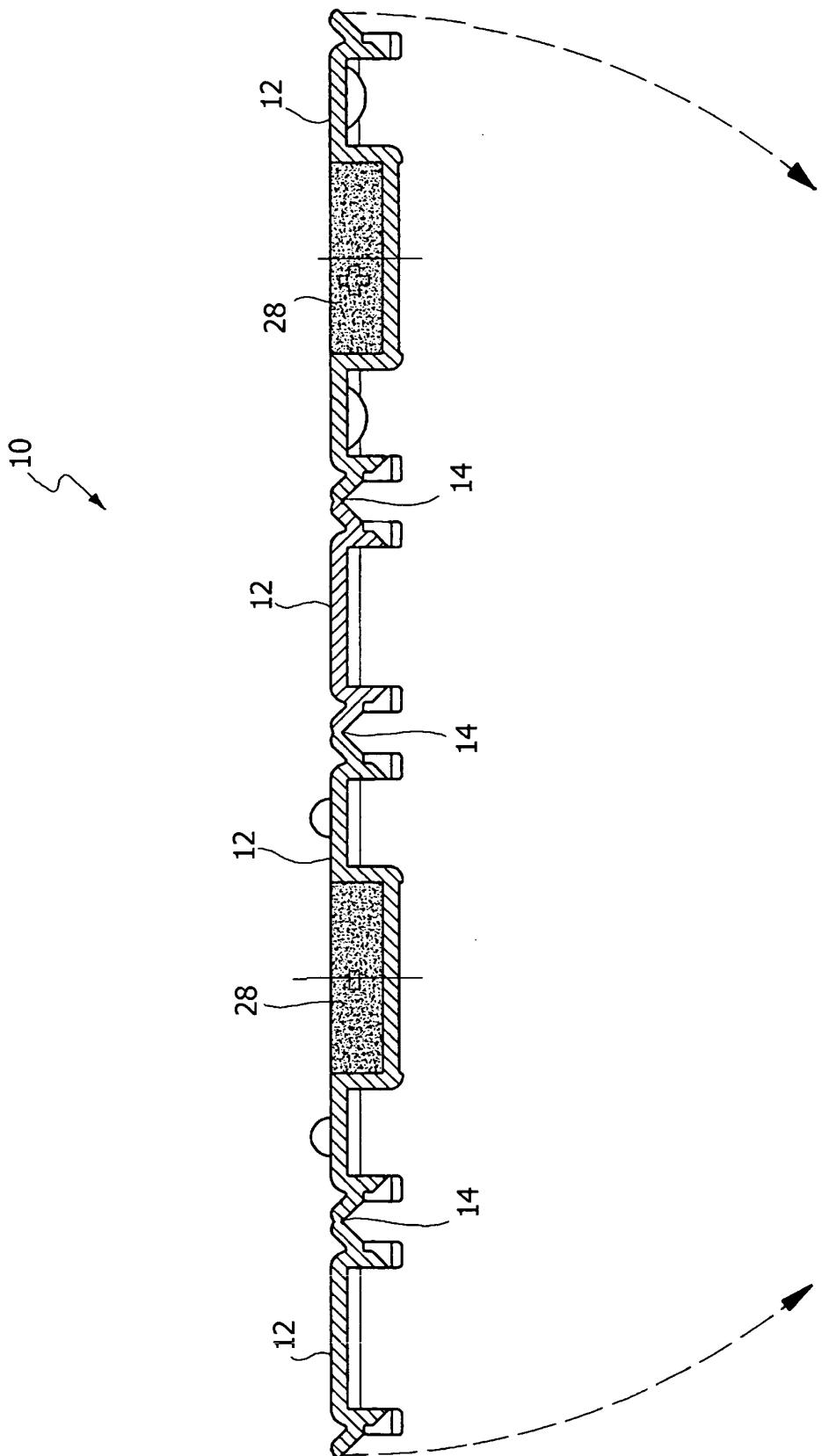


FIG. 3

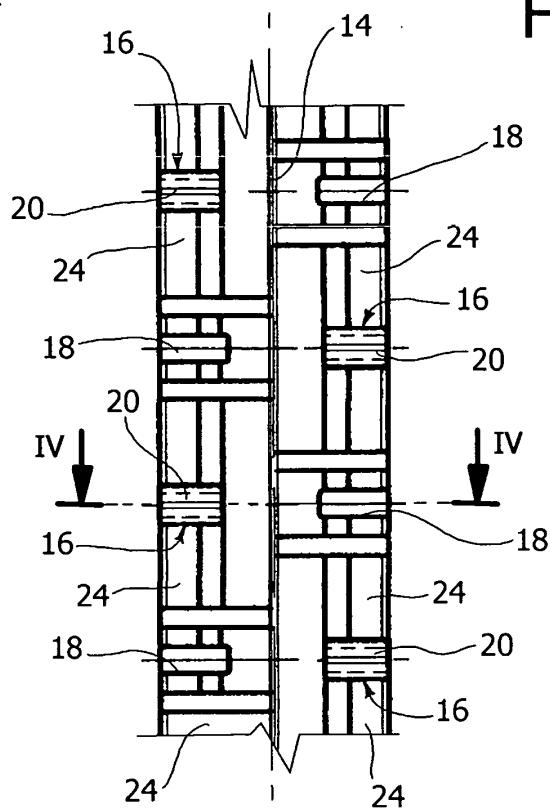


FIG. 4

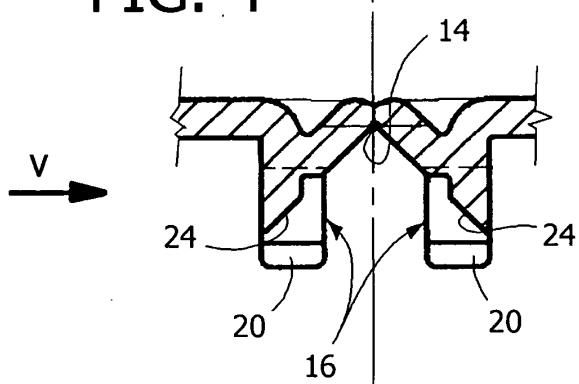


FIG. 5

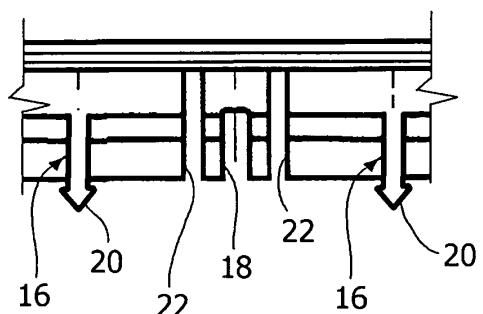


FIG. 6

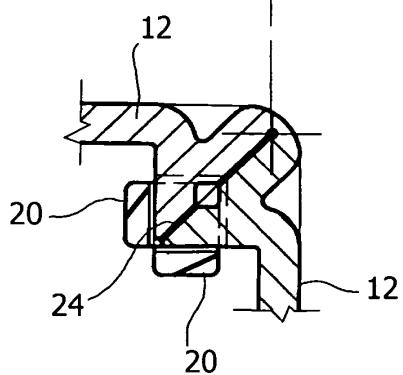


FIG. 8

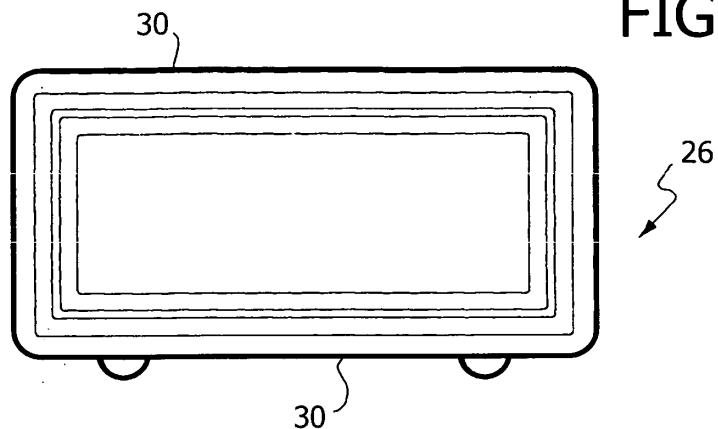


FIG. 7

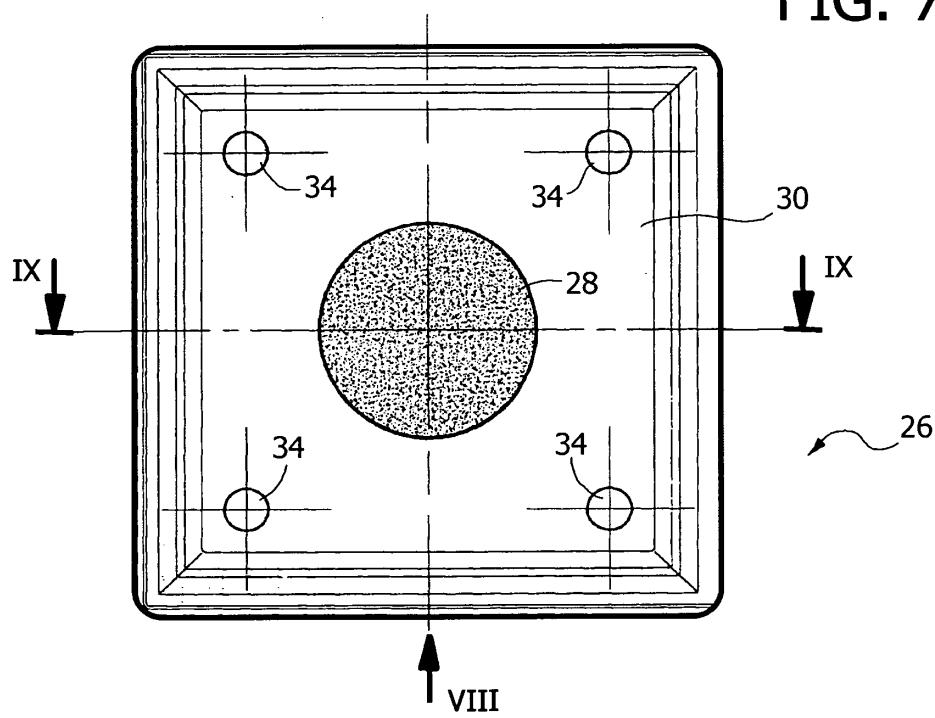


FIG. 9

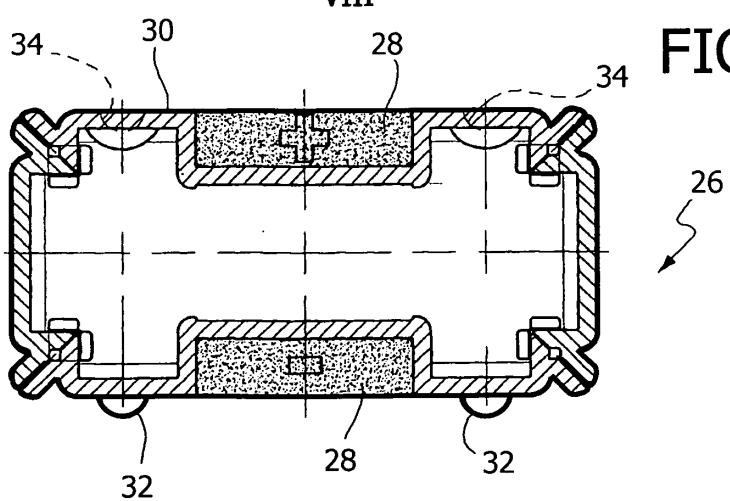


FIG. 11

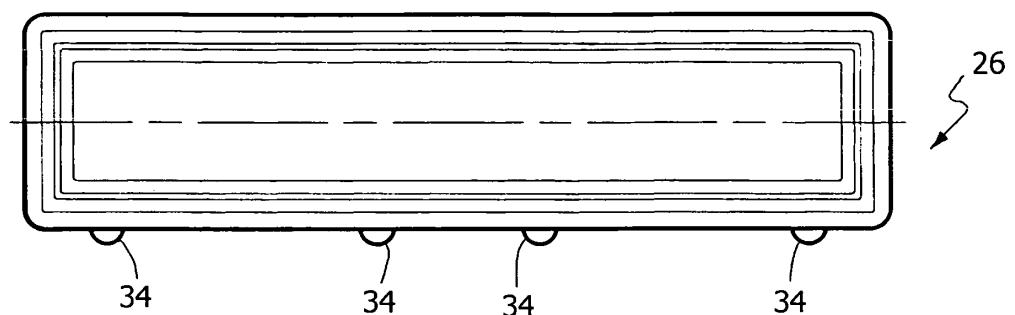


FIG. 10

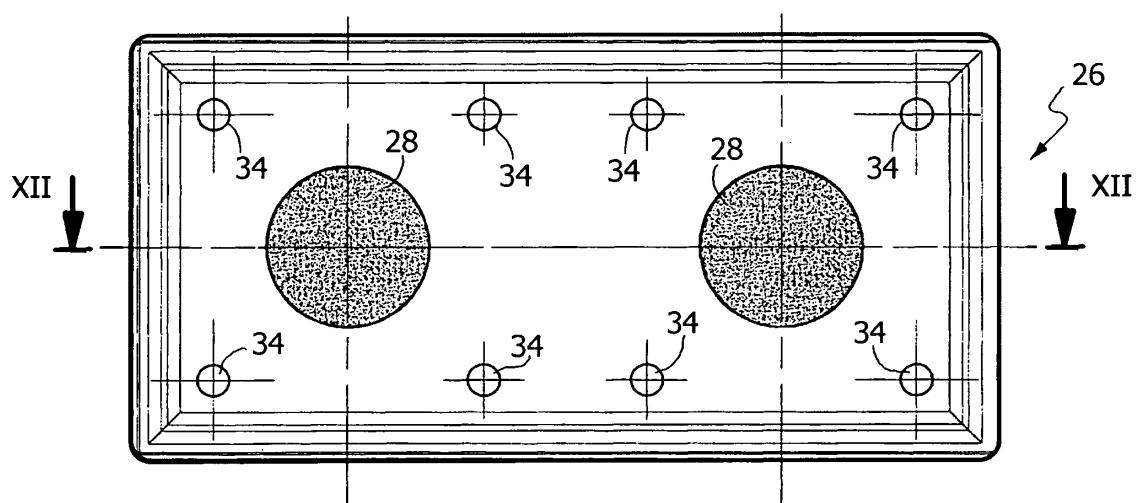


FIG. 12

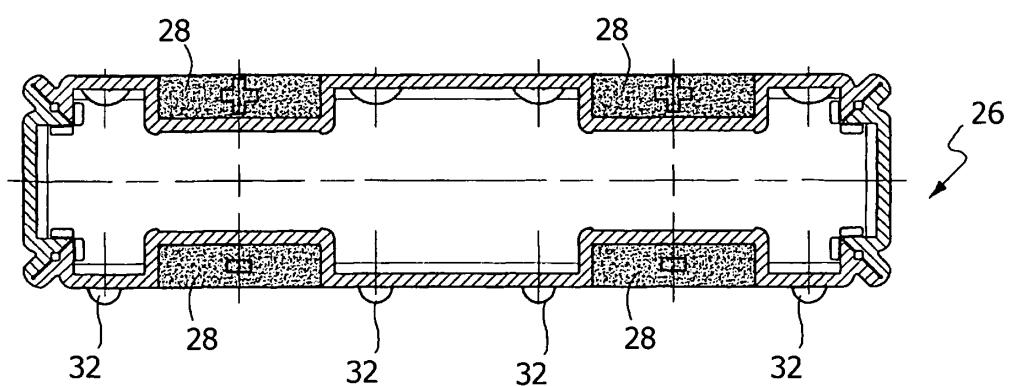


FIG. 13

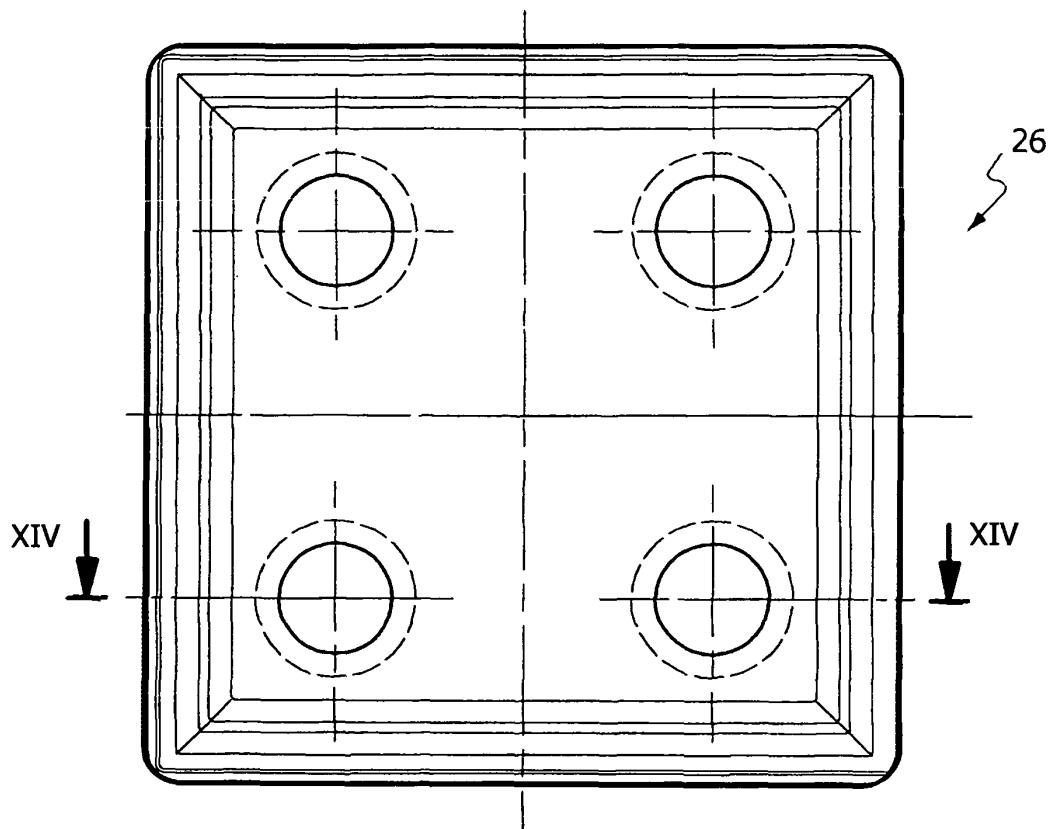


FIG. 14

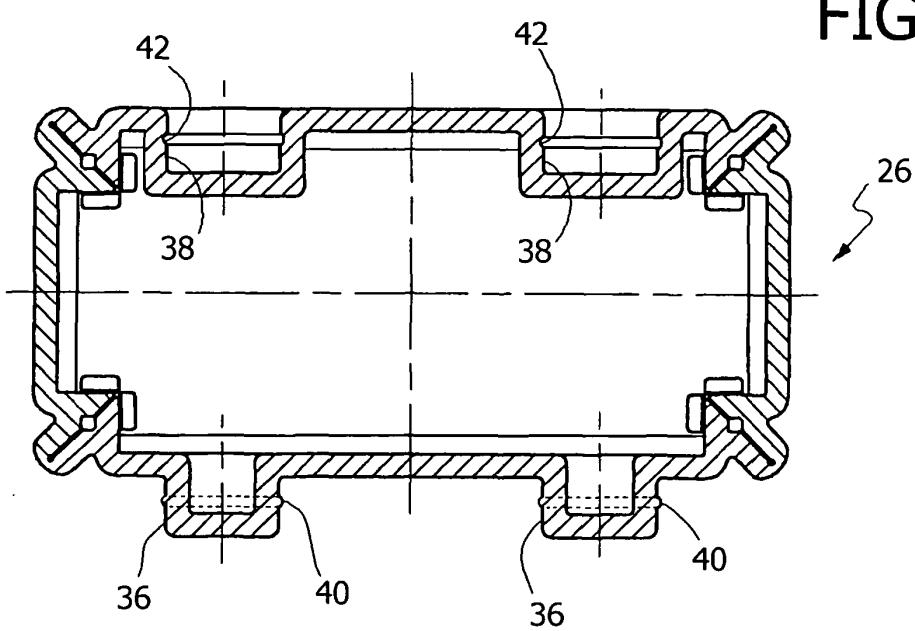
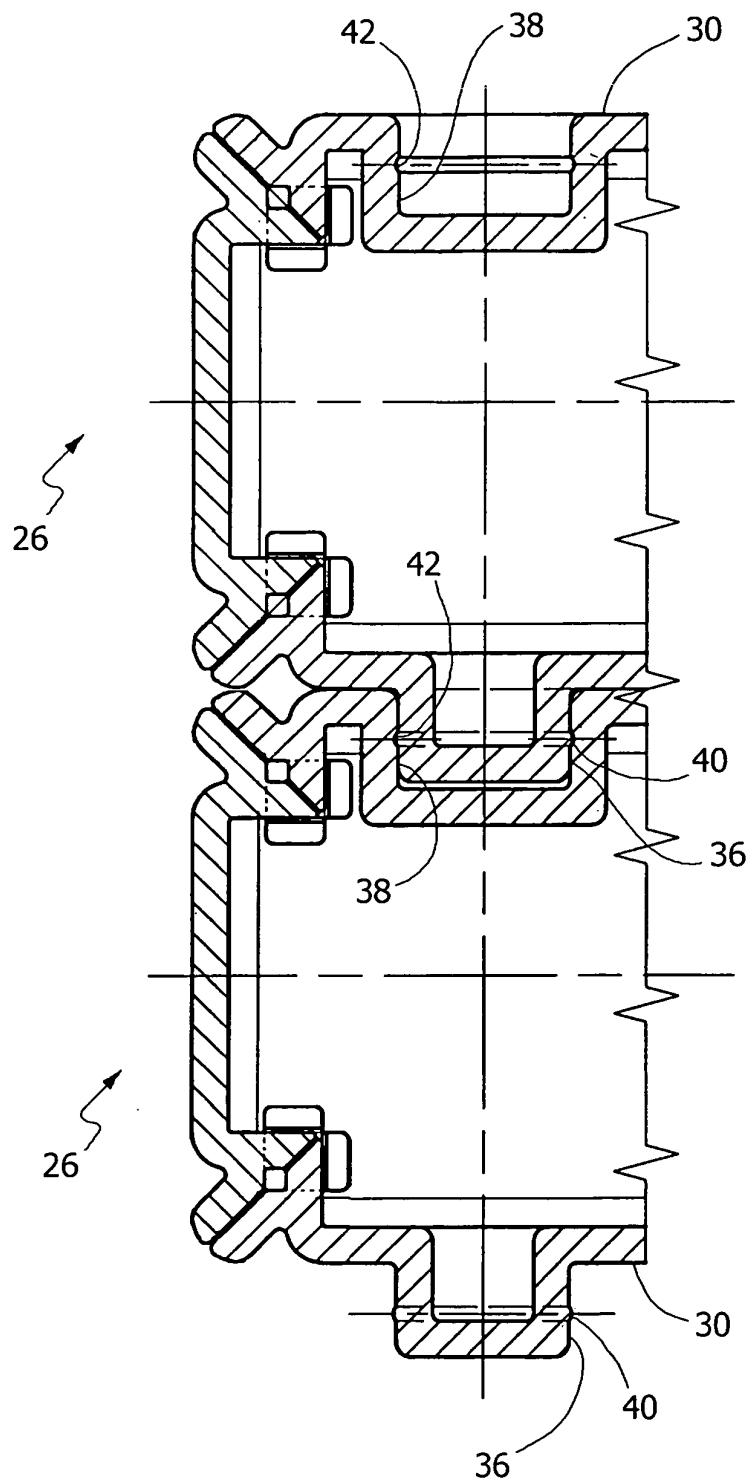


FIG. 15





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 224 664 A (* PHILIP & TACEY LIMITED) 16 May 1990 (1990-05-16) * page 6, lines 3-6; figures 1-10 * -----	1,2,5 4	A63H33/04
X	US 3 670 449 A (JACK L. LEMKIN ET AL) 20 June 1972 (1972-06-20)	1-3	
Y	* column 6, line 1 - line 70; figures 1-9 * -----	4	
X	US 5 545 070 A (LIU ET AL) 13 August 1996 (1996-08-13) * abstract; figures 1-20 *	1-3,5 4	
Y	US 3 254 440 A (DUGGAR ROBERT G) 7 June 1966 (1966-06-07) * the whole document *	4 -----	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63H
The present search report has been drawn up for all claims			
3	Place of search	Date of completion of the search	Examiner
	Munich	21 November 2005	Shmonin, V
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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			

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EP 05 01 6512

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21-11-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2224664	A	16-05-1990	NONE	
US 3670449	A	20-06-1972	NONE	
US 5545070	A	13-08-1996	NONE	
US 3254440	A	07-06-1966	NONE	