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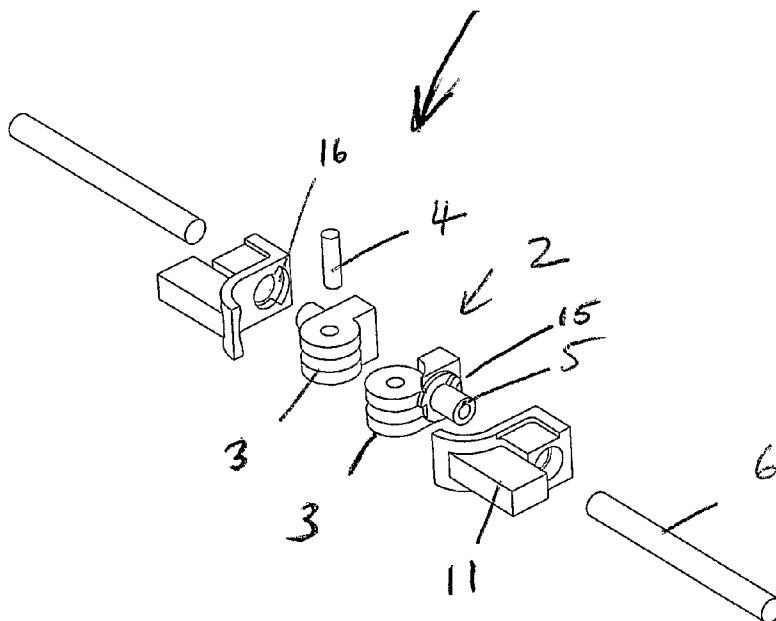
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HINGE



(57) Abstract: A hinge comprising two pivoting elements adapted to hingedly join two articles, each pivoting element including attachment means for attaching to an article; wherein when attached to the two articles the hinge is rotatable with respect to the articles.

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HINGE**FIELD OF THE DISCLOSURE**

5 The disclosure relates to a hinge.

SUMMARY OF THE DISCLOSURE

Disclosed is a hinge comprising two pivoting elements adapted to hingedly join two
10 articles, each pivoting element including attachment means for attaching to an article;
wherein when attached to the two articles the hinge is rotatable with respect to the
articles.

In one form the hinge is rotatable with respect to the articles such that the direction of
15 freedom of movement of the hinge is changed

In one form the hinge further comprises a hinge pin.

In one form the attachment means comprises a hinge collar adapted to be attached to
20 one of the two articles, wherein the hinge is rotatable with respect to the hinge collar.

In one form the axis of rotation of the pivoting elements and the axis of rotation of the
hinge are perpendicular to one another.

25 In one form the hinge is rotatable between a locked position and an unlocked position

BRIEF DESCRIPTION OF THE DRAWINGS

To facilitate an understanding of the disclosure, reference is made in the description to
30 the accompanying drawings illustrating a preferred embodiment of the hinge used in a
folding chess board. It is to be understood that the hinge is not limited to the preferred
embodiment as illustrated in the drawings.

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In the drawings:

Figure 1 is an exploded perspective view of the hinge of one embodiment of the present invention;

Figure 2 is a front view of the hinge of Figure 1 without attachment means;

5 Figure 3 is a top view of the hinge of Figure 2;

Figure 4 is a side elevation view of the hinge of Figure 2;

Figure 5 is a perspective view of the hinge of Figure 2;

Figure 6 is a perspective view of the hinge of Figure 2 with the hinge element in a second position;

10 Figure 7 is a perspective view of the hinge of Figure 2 with the collar in a second position;

Figure 8 is an exploded perspective view of the hinge of Figure 1;

Figure 9 is a perspective view of the hinge of Figure 8 in a first position;

Figure 10 is a perspective view of the hinge of Figure 8 in a second position;

15 Figure 11 is a side exploded view of the hinge of Figure 8;

Figure 12 is a side view of the hinge of Figure 8 in a first position;

Figure 13 is a side view of the hinge of Figure 8 in a second position;

Figure 14 is a cross-sectional exploded side view of a hinge element of a second embodiment of the invention;

20 Figure 15 is a cross-sectional side view of the hinge of Figure 14;

Figure 16 is an exploded front view of the hinge of Figure 14;

Figure 17 is a front view of the hinge of Figure 14;

Figure 18 is an exploded perspective view of the hinge of Figure 14;

Figure 19 is an exploded perspective view of the hinge of Figure 14;

25 Figure 20 is a perspective view of the hinge of Figure 14;

Figure 21 is a perspective view of the hinge of Figure 14;

Figure 22 is a perspective view of the hinge of one embodiment of the present invention in use;

Figure 23 is a perspective view of the hinge of Figure 22 in use in a second position;

30 Figure 24 is a perspective view of the hinge of Figure 22 in use in a third position;

Figure 25 is a perspective view of the hinge of Figure 22 in use in a fourth position;

Figure 26 is a cross-sectional top view of an embodiment of the hinge in locked position in use; and

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Figure 27 is a cross sectional bottom view of the hinge of Figure 26.

DETAILED DESCRIPTION OF THE EMBODIMENTS

5 Referring to the figures, there is shown a hinge 1 for allowing a relative motion between two solid articles. In the embodiment shown in the figures the solid articles are in the form of two chess board halves 30.

The hinge 1 comprises two pivoting elements 3. Each of the two independent pivoting
10 elements 3 is attached to a hinge pin 4 such that at least one of the two independent pivoting elements is rotatable about the hinge pin 4. The two independent pivoting elements 3 are therefore rotatable in respect of one another.

Each of the two pivoting elements 3 further comprise a rotatable attachment means
15 including connector 5, shaft 6 and collar 11.

The two pivoting elements 3 are moveable with respect to one another. As a result
articles 30 attached with the pivoting elements 3 are moveable with respect to one
another.

20 The connectors 5 are adapted to be fitted into the two solid articles 30, such that the two solid articles 30 extend outwardly from the connectors 5. As seen in Figures 22 through 25, in this form movement of the pivoting elements 3 brings the two solid articles 30 from a parallel and adjacent position as shown in Figure 22 to a colinear position as
25 shown in Figure 25.

The shaft 6 adds strength and length to the hinge 1 to bear the load of the solid articles 30 beyond the pivoting elements 3.

30 Each hinge collar 11 is adapted to be rotatably attached with connector 5. Shaft 6 is provided with a screw thread or other means to engage with connector 5. Hinge collar 11 is positioned about shaft 6 or connector 5. The hinge 1 and connectors 5 can thus

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rotate with respect to the collars 11. The collars 11 are shaped to curve over the hinge element but can be any shape.

As shown in figures 26 and 27, the hinge collar 11 is attached to the solid articles 30 by way of set screws or other attachment means 26 and 27. Each shaft 6 sits in a bearing tube 7 inset into each solid article 30. Shaft 6 is able to rotate in bearing tube 7. The hinge 1 and the connectors 5 are thus rotatable with respect to the solid articles 30 about the axis of the shafts 6.

10 The hinge 1 is rotatable such that the direction of freedom of movement of the pivoting elements 3 with respect to the solid articles 30 is changed. This change in the direction of freedom of movement of the pivoting elements 3 with respect to the solid articles 30 allows the solid articles 30 to move in varying planes with respect to one another.

15 In effect, the pivoting elements 3 move such that the hinge pin 4 acts as an axis of rotation. When the hinge 1 is rotated through 90 degrees, the hinge pin 4 and the pivoting elements' 3 axis of rotation is rotated through 90 degrees. As a result the freedom of movement of the hinge is shifted through 90 degrees. Depending upon the size and shape of the solid articles 30 this results in the solid articles being moveable
20 with respect to one another in a different plane or, in certain circumstances means the hinge 1 and pivoting elements 3 are locked so that the solid articles 30 cannot move with respect to one another. That is the hinge 1 is in a locked position.

The locked and unlocked hinge positions are best shown in use in a flat solid article
25 such as two chess board halves. This is best shown in figures 22 through 25.

In the locked position shown in Figure 25, the orientation of the hinge 1 with respect to the solid articles 30 restricts the movement of the pivoting elements 3 with respect to one another. In the locked position the axis of rotation of the pivoting elements 3 is
30 perpendicular to the only available axis of rotation of the solid articles 30. As a result the solid articles 30 are fixed in position in relation to one another.

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The collar 10 is attached to or set into the articles 30 being hinged. Each collar piece 11 is inset on one side of the hinge joint 15 extending between the articles 30. Because the collar 10 is set into the two articles 30 the hinge 1 can be flush with the articles 30.

- 5 In use, in order to unlock the hinge 1, a user rotates the hinge 1 with respect to the articles 30. This rotates the connectors 5 and connecting shafts 6 in relation to the articles 30. The collar 11, on the other hand, is fixed with respect to the articles 30. The hinge element 2 can be rotated with respect to the articles 30.
- 10 The hinge can be rotated 90 degrees. A ridge 15 associated with the connectors 5 and an inset portion 16 associated with the collar interact to stop the hinge 1 from rotating an angle greater than 90 degrees.

In other forms the hinge can be rotated through up to 360 degrees by incorporating a
15 ridge which interacts to stop the hinge from rotating more than 180 degrees, 270 degrees or any angle. When no ridge is incorporated the hinge can be rotated 360 degrees. When the hinge can be rotated through 360 degrees the direction of freedom of movement can be rotated through 360 degrees, allowing the solid articles 30 to move in varying planes with respect to one another.

20 In use, the position of the hinge 1 in the hinged article and the opening movement of the hinge 1 prevents the meeting of the articles 30 joined by the hinge 1 along the hinge joint 15. There is therefore no crunching or grinding or opportunity of wear between chess board halves along the hinge joint 15.

25 Further, the hinge 1 allows for no hyperextension beyond the position determined as the home position. When the connectors 5 are collinear to one another the pivoting elements 3 meet to prevent hyperextension of the hinge 1.

30 The collar 11 and hinge element 2 allows for staged fitting, whereby the collar 11 is attached to the hinged article. Subsequently the hinge element is attached.

The hinge element 2 is composed of metal, plastic or any other rigid durable substance.

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In another embodiment, the centre of gravity of the hinge element is positioned such that gravity is utilised to automate the rotation of the hinge element 2 within the collar.

5 In another form the rotation of the hinge is actuated automatically by a motor, spring, magnet or other external means.

In the embodiment described above, the two solid articles 30 comprise chess board halves. In other embodiments the two solid articles 30 may comprise any two solid articles requiring movement in respect to one another, for example scaffolding, flooring,
10 two panels of an articulated dividing screen, a board game board, cupboard doors, and advertising panels.

CLAIMS:

1. A hinge comprising two pivoting elements, each pivoting element including an attachment means for attaching the pivoting element to an article such that when the pivoting elements is attached to the article the hinge is rotatable with respect to the article.
2. A hinge as defined in claim 1 wherein the hinge is rotatable with respect to the article such that the direction of freedom of movement of the hinge is changed.
3. A hinge as defined in claim 1 or 2, wherein the hinge further comprises a hinge pin.
4. A hinge as defined in any of the preceding claims, wherein the attachment means comprises a hinge collar adapted to be attached to one of the two articles and the hinge is rotatable with respect to the hinge collar.
5. A hinge as defined in claim 4, wherein each rotatable attachment means comprises a hinge collar.
6. A hinge as defined in any of the preceding claims, wherein the axis of rotation of the pivoting elements with respect to one another and the axis of rotation of the hinge with respect to the articles are perpendicular to one another.
7. A hinge as defined in any of the preceding claims wherein the rotatable attachment means further comprises a shaft extending from each pivoting element.
8. A hinge as defined in any of the preceding claims wherein rotation of the hinge moves the hinge between a locked position and an unlocked position.

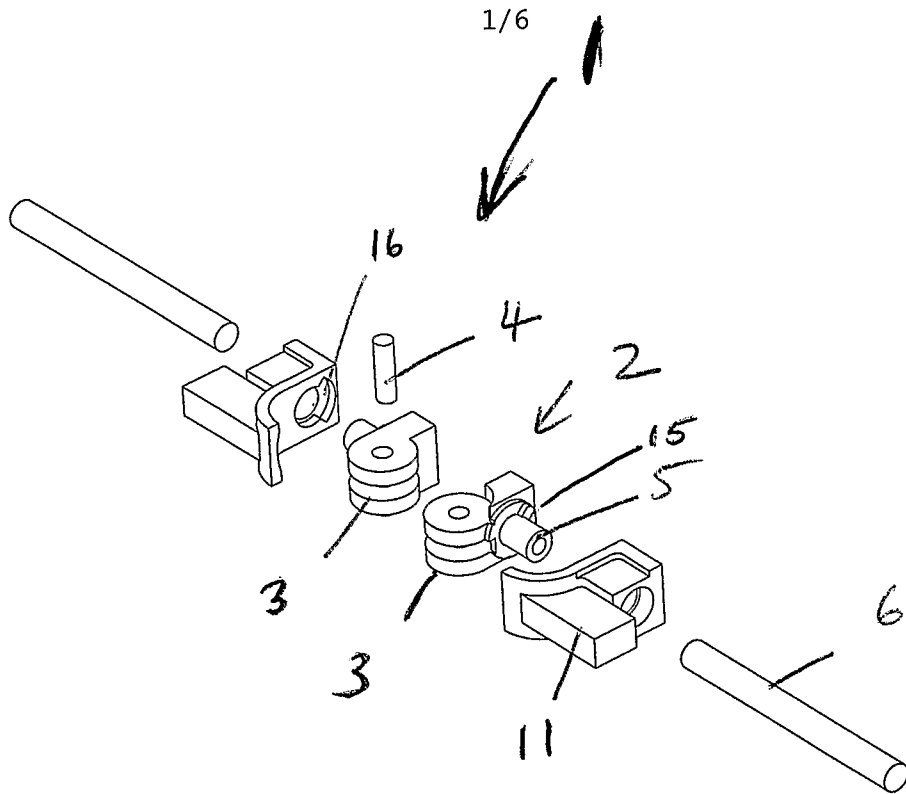


Figure 1

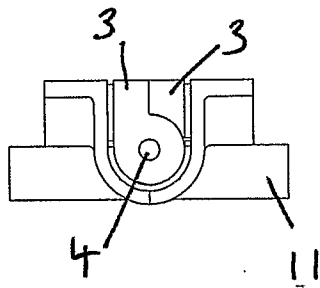


Figure 2

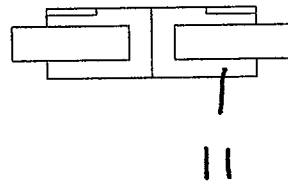


Figure 3

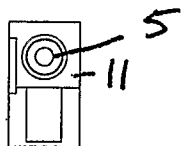


Figure 4

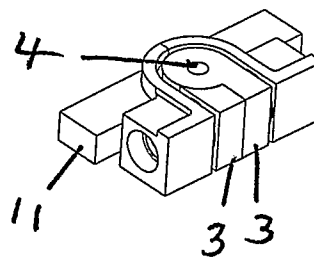


Figure 5

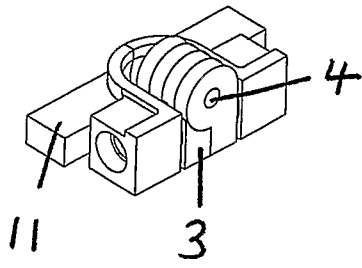


Figure 6

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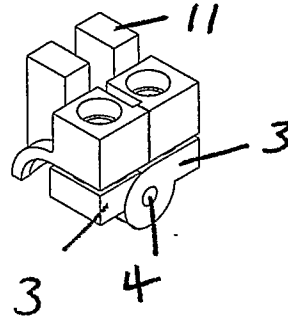


Figure 7

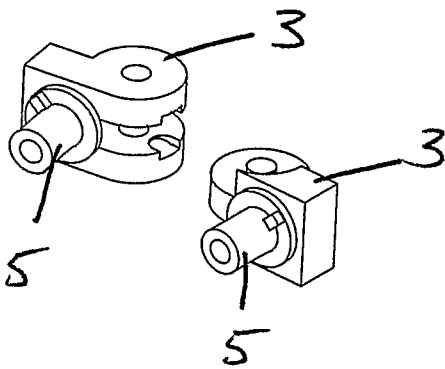


Figure 8

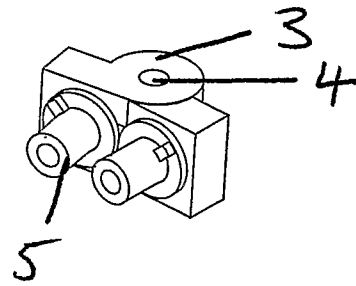


Figure 9

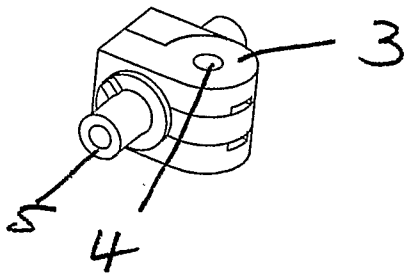


Figure 10

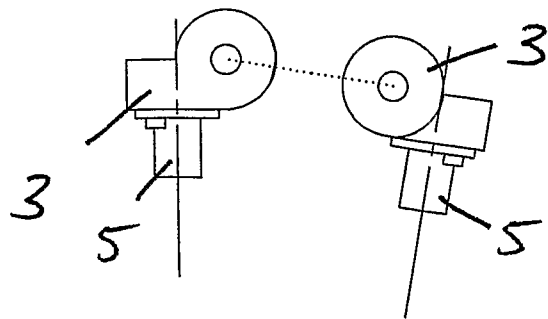


Figure 11

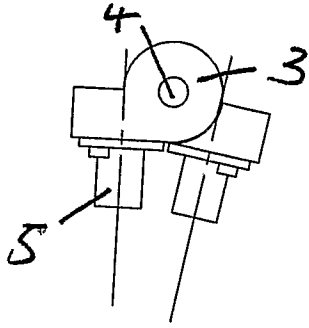


Figure 12

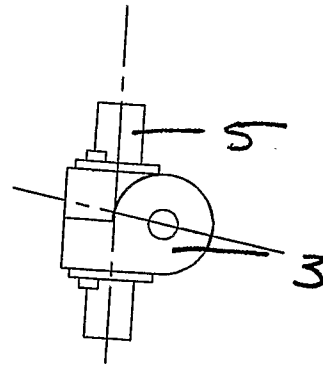


Figure 13

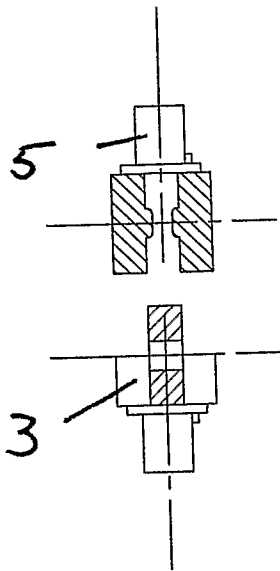


Figure 14

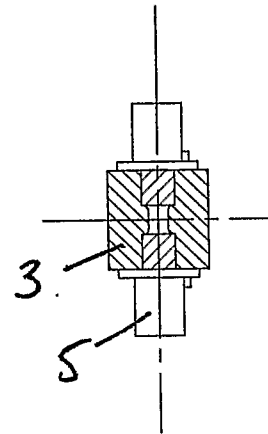


Figure 15

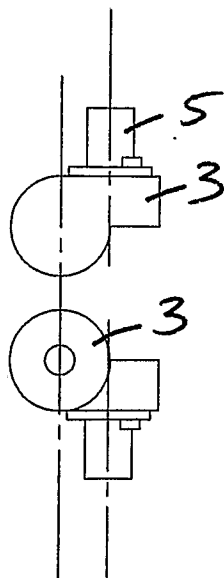


Figure 16

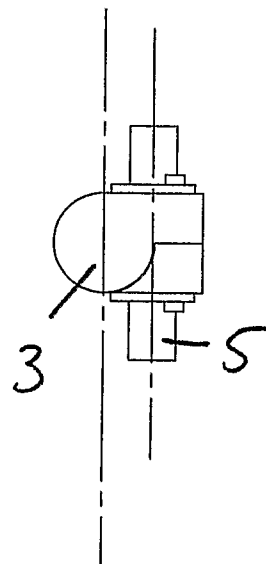


Figure 17

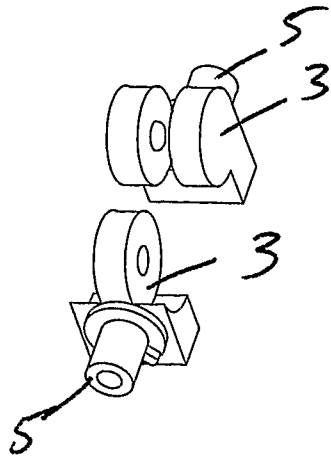


Figure 18

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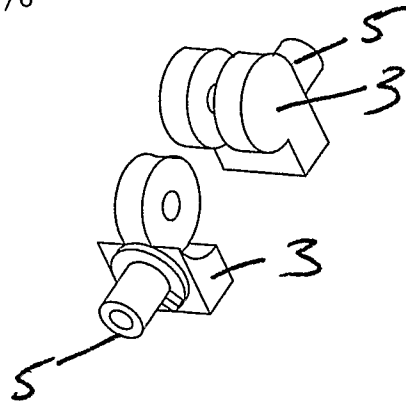


Figure 19

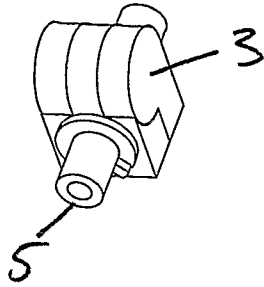


Figure 20

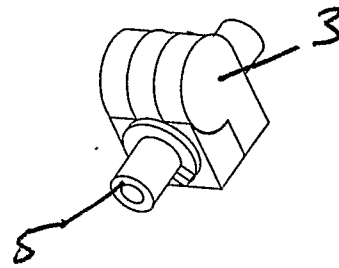


Figure 21

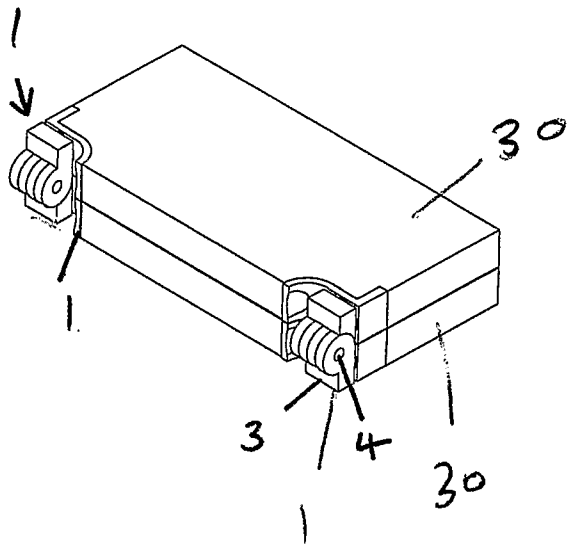


Figure 22

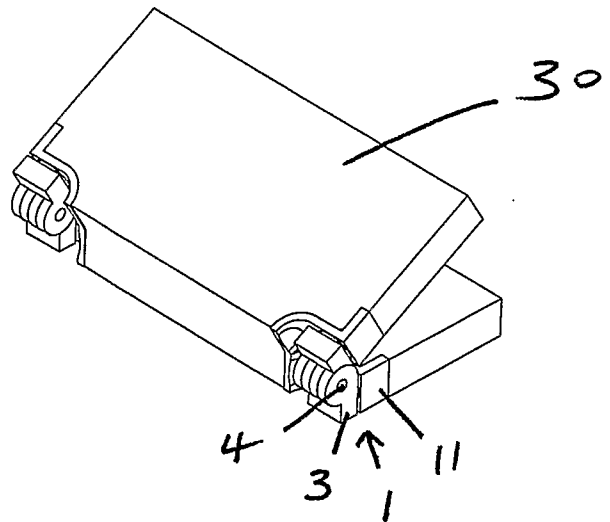


Figure 23

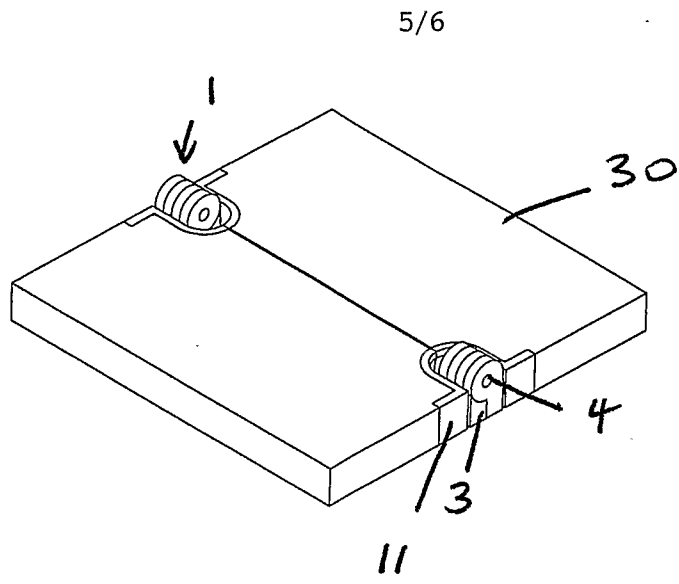


Figure 24

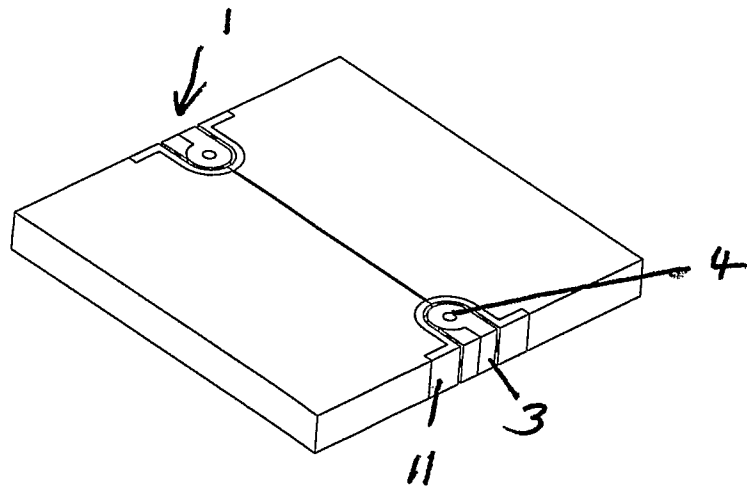


Figure 25

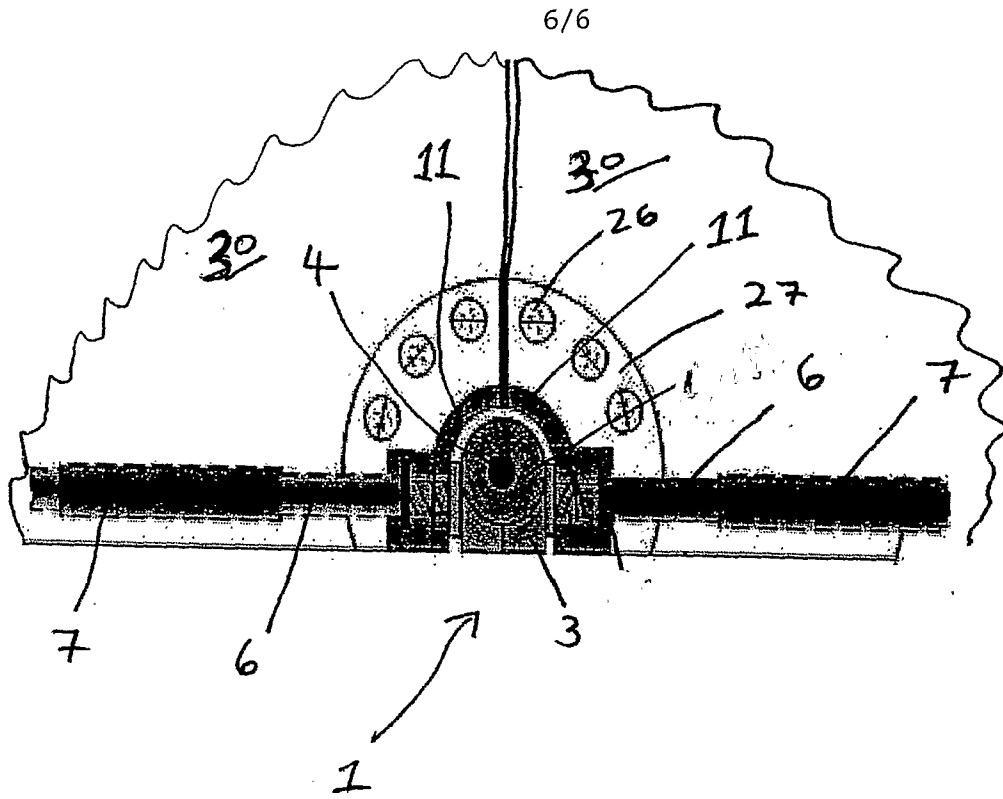


Figure 26

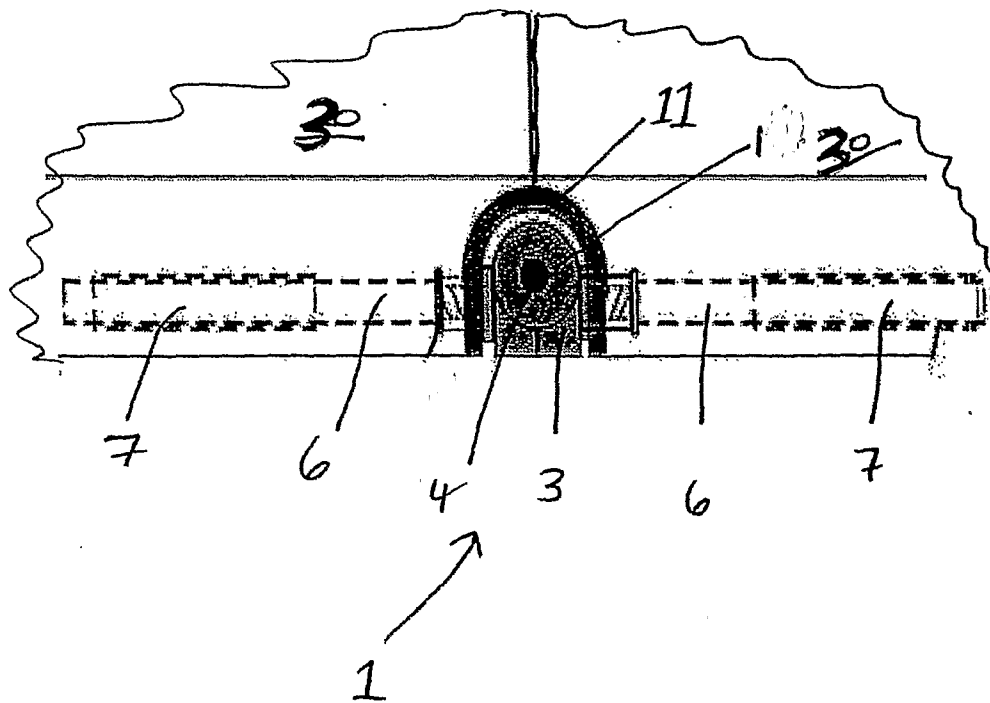


Figure 27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2006/000929

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A63F 3/02 (2006.01) *E05D 3/06* (2006.01) *E05D 3/10* (2006.01)

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)

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

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

WPAT (Above IPC marks and keywords: hinge, pivot, board, perpendicular and like terms)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 1441350 A (HERRMAN) 19 March 1919 Figures 1 and 7	1 - 8
A	US 2004/0168591 A (LYNTON) 2 September 2004 Figures 4	1 - 8
A	US 5362063 A (CUMMINGS) 8 November 1994 Abstract	1 - 8
A	GB 313495 A (FRAISSE) 3 April 1930 Figure 5	1 - 8

 Further documents are listed in the continuation of Box C See patent family annex

* Special categories of cited documents:		
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"E" earlier application or patent but published on or after the international filing date	"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	
"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)	"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	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
14 August 2006Date of mailing of the international search report
21 AUG 2006Name and mailing address of the ISA/AU
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2006/000929

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member
US 1441350	
US 2004168591	US 6877425
US 5362063	
GB 313495	

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX