

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
21 December 2007 (21.12.2007)

PCT

(10) International Publication Number
WO 2007/144904 A1

(51) International Patent Classification:

E04G 23/02 (2006.01)

(21) International Application Number:

PCT/IS2007/000010

(22) International Filing Date: 2 May 2007 (02.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

8566 3 November 2006 (03.11.2006) IS

(71) Applicant and

(72) Inventor: **GUDRUNARDOTTIR, Gudrun Sigridur**
[IS/IS]; Lindasmara 41, IS-201 Kopavogur (IS).

(74) Agent: **ARNASON FAKTOR**; Gudridarstig 2-4, IS-113
Reykjavik (IS).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,

CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

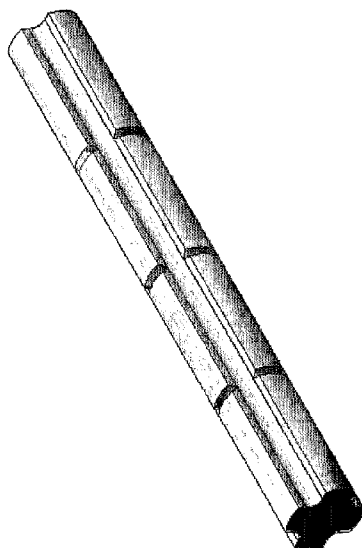
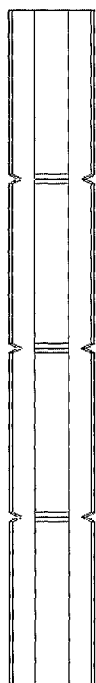
— of inventorship (Rule 4.17(iv))

Published:

— with international search report

[Continued on next page]

(54) Title: PLUG FOR PLASTERBOARD REPAIR



(57) Abstract: A repair plug (1) for sealing holes in plasterboards, said repair plug comprising gypsum plaster or the like material and having substantially a cylindrical shape with a longitudinal axis extending between a front end (3) and a back end (4), and having a cylindrical side wall (2) and a substantially circular cross-section across the longitudinal axis, the plug further having recesses (5) on the side wall which recesses are either longitudinal or spiral around the cylindrical side walls.

WO 2007/144904 A1



-
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*
 - *upon request of the applicant, before the expiration of the time limit referred to in Article 21(2)(a)*
- 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.*

Plug for plasterboard repair

TECHNICAL BACKGROUND

- 5 Plasterboard, also referred to as drywall, gypsum board or sheetrock (proprietary name of United States Gypsum Company) has become a common standard material for interior walls and ceilings in modern buildings. Plasterboard is made primarily from gypsum plaster, the semi-hydrous form of calcium sulphate ($\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$), typically mixed with additives such as fiber and mildew and fire resistance agents, which is sandwiched
- 10 between two sheets of heavy paper or fiberglass mats. When the core sets and is dried, the sandwich becomes rigid and strong.
- It is easy to cut the plasterboards and make holes through them, e.g. for cords and pipes that have to cross the walls or ceilings being formed by the boards.
- Methods for repairing plasterboard constructions, e.g. closing off holes made for pipes or
- 15 cords that are no longer used or holes from accidental impact, typically involve use of a joint compound (sometimes referred to as "mud") which is supplied as a powder for mixing with water or ready-to-use wet paste. Such compound is also used for sealing and finishing joints between adjacent plasterboards in a wall structure. Larger holes require cutting even edges around the hole and fastening therein a suitably cut-out plasterboard piece.
- 20 However, using joint material for filling cracks or holes can often be tedious as the material shrinks upon drying and several layers are often required which must be allowed to dry in between applications.
- Alternative simple and time-saving methods for repairing plasterboards would therefore be appreciated.

25

SUMMARY OF INVENTION

- The invention provides a plug for repairing plasterboards, and particularly for sealing holes. The plug has a substantially cylindrical shape with a longitudinal axis extending between a
- 30 front end and a back end, and having a cylindrical side wall and a substantially circular cross-section across the longitudinal axis, the plug further having recesses on the side wall which recesses are either longitudinal or spiral around the cylindrical side walls.

35 BRIEF DESCRIPTION OF FIGURES

Figure 1 shows a plug with longitudinal recesses.

- Figures 1b, 1c and 1d show the cross-section of plugs with a different number of recesses
- 40 and differently dimensioned recesses.

Figure 2 a and b show repair plugs with spiraling recesses with a different pitch (different number of recesses per unit length of the plug).

Figure 3 shows repair plugs with vertical recesses dividing the plugs into segments.

5

Figure 4 shows a perspective view, side view and end view of one embodiment of the plug of the invention, with four longitudinal recesses and three vertical recesses dividing the plug into four segments.

10 Figure 5 shows end views of different sizes of plugs such as shown in Figure 3.

DETAILED DESCRIPTION

15 The plug of the invention comprises gypsum plaster or materially similar material (chalk or chalk-like material including in particular conventional gypsum plaster (hydrated calcium sulfate) but can also be from calcium carbonate, magnesium carbonate, magnesium silicate, etc.). The term 'chalk-like material' is used herein to describe solid, typically porous or semi-porous material, which can be readily filed or sanded down. Accordingly,
20 the term also encompasses other material that fulfils this functional criterion, including but not limited to polymeric material, e.g. PVC-based polymer clay, cement material, and any mixtures of the above-mentioned materials.

The plug has a substantially cylindrical shape with a longitudinal axis extending between a
25 front end 3 and a back end 4, and a cylindrical side wall 2 and a substantially circular cross-section across the longitudinal axis. The plug further has recesses 5 on the side wall 2 which recesses are either longitudinal or spiral around the cylindrical side wall. These recesses 5 provide a filling space for joint material which is used for fastening the plug in the hole to be closed. Since the plug is made from a relatively soft chalk material, the
30 recesses also aid in the insertion of a plug into a hole which is slightly smaller than the plug, as the plug can be twisted or screwed in the hole, thereby peeling off some of the outermost material in between the recesses is peeled/polished off and the plug sits snugly in the hole.

35 When the recesses on the side wall are longitudinal these are typically at least four and can also be in the range of about 6 to 10. This can however depend on the diameter of the plug; wider plugs (e.g. in the range of 20 to 40 mm) can have a higher number of recesses, e.g. 2-4 recesses per cm of the outer circumference of the plug, forming a longitudinally striped pattern on the sidewall. Wider plugs can however as well have
40 relatively few recesses, such as four, five or six. The invention is not limited to certain particular dimensions of the recesses, the width of the recesses may typically depend to some extent on the diameter of the plug and typically the recesses have an outermost

width 7 in the range of about 2 to 5 mm. In certain plugs, particularly the larger plugs, the recesses can lie relatively close to each other such that the section 8 of the circumference of the plug (in between adjacent recesses) can be about as wide as the recess width 7, or the section 8 can be slightly shorter than the recess width 7, or substantially wider than the recess width, as in the embodiments shown in Figure 5. Examples of a few possible
5 embodiments are illustrated in Figures 1b-d which show cross-sections of a few
embodiments of the plug, with varying density of the recesses as well as varying depth 9, both as absolute depth and as relative depth compared to the recess width. Figure 5 shows different embodiments of the longitudinal recesses. In these embodiments the recesses are
10 relatively deep, thus forming a cross-shaped or star-shaped cross-section, depending on the number of recesses.

In other useful embodiments, the plug has spiraling recesses, which spiral around the sidewall of the plug much like the thread of a screw. Similar to the longitudinal recesses
15 described above, spiraling recesses can have varying depth and width, and can be arranged with varying pitch, i.e. how closely spaced the recesses are to each other. Figure 3 illustrates two examples of different pitch 11 on two different plugs of this type.

In certain embodiments, the repair plug described herein is shaped such that the depth of
20 each recess is in the range of about 5-20% of the diameter of the plug, such as, e.g., in the range of about 5-15% or the range of 5-10%, including about 5% or about 7% or about 10% but also any value in the range of about 10-20% of the diameter of the plug, such as in the range of about 12-20%, for example, 12%, 15% or 17%.

The plug of the present invention is not limited to certain dimensions. It follows however,
25 that it is most useful for holes that are larger than can be readily closed and finished with a single layer of joint material. Consequently, the plugs can be relatively small, having a diameter in the range of about 4-10 mm, and preferably in the range of 5-10 mm, such as about 5 mm, 6 mm, 7 mm, 8 mm or 10 mm. Plugs with a larger diameter can be even
30 more useful, such as with a diameter in the range of about 10-40 mm, such as in the range of about 10-25 mm, including the range of about 10-20 mm.

In a particular embodiments the plugs are made even bigger, such as having a maximum cross section in the range of about 50-85 mm, e.g. havign a width of about 54, 74 or 84
35 mm. Such plugs are however typically shorter and not segmented with vertical recesses, as their large width would make them difficult to break. These large plugs are useful for closing of unused holes in walls intended for electrical cicuitry, switches and the like. Thes extra wide plugs can have a length of about e.g. 1 cm, 2 cm, 3 cm or 4 cm or another suitable length.

40 The plugs can be suitably offered in lengths roughly corresponding to the thickness of the boards to be repaired. Plasterboards manufactured in accordance with the metric system

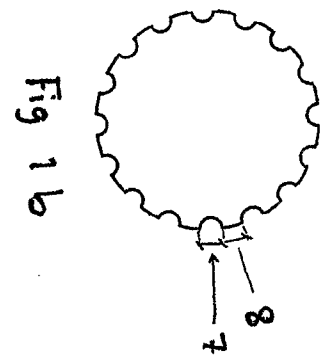
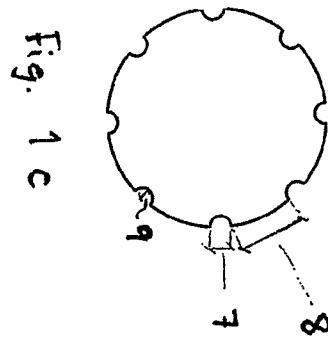
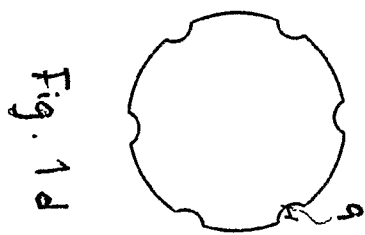
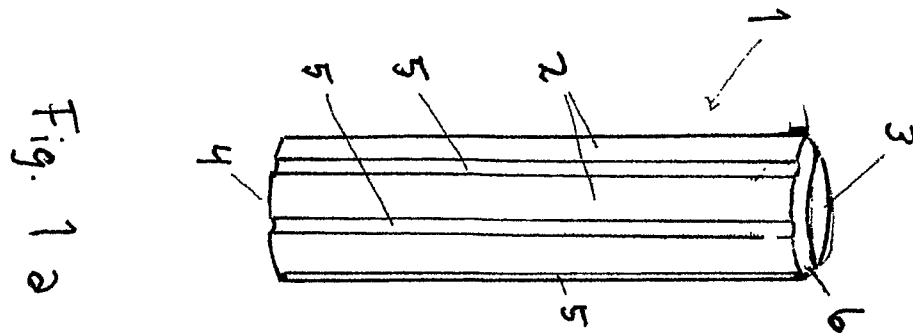
can have a thickness such as 10, 12 or 15 mm, and frequently walls are made from two layers of board. Consequently, in certain embodiments the plugs have a length such as 10, 12, 14, 18, 20, 24 or 30 mm. It should be noted that generally, interior walls have a hollow space and thus when a hole is being repaired, the plug does not have to be flush with the inner surface of the plasterboard, as it is in those cases only the outer, visible surface of the board that should be flat, such that after the repaired area has been finished and painted, the spot is preferably nearly invisible.

In the embodiments depicted in the accompanying figures, the front end 3 is intended to be inserted first and is the end facing the inside of the wall after location of the plug, while the back end 4 is the end facing the outer, visible surface of the board. The front end 3 preferably has a chamfer 6 to ease insertion of the plug.

In a useful embodiment the plug has one or more vertical recesses 10 that circumscribe the plug, dividing the plug into two or more segments 12, such as, e.g., 3, 4, 5 or 6 segments. By means of the recesses, the segments can be broken off the remaining plug, one by one, or more than one segment at a time. The length of each segment is consequently preferably such as any of the length values mentioned above, whereas the overall length of the plug in this embodiment is more, depending on the number of segments. If, for example, the segment length is 12 mm, one segment can be broken off for a suitable length to repair a single 12 mm plasterboard whereas two segments provide a plug of 24 mm, suitable for repair of a double-layered wall of two 12 mm plasterboards.

CLAIMS

1. A repair plug (1) for sealing holes in plasterboards, said repair plug comprising gypsum plaster or other chalk-like material and having substantially a cylindrical shape with a longitudinal axis extending between a front end (3) and a back end (4), and having a cylindrical side wall (2) and a substantially circular cross-section across the longitudinal axis, the plug further having recesses (5) on the side wall (2) which recesses are either longitudinal or spiral around the cylindrical side walls.
2. The repair plug of claim 1, having at least four longitudinal recesses (5) along the cylindrical side wall (2).
3. The repair plug of claim 2, having in the range of about six to ten longitudinal recesses (5) along the cylindrical side wall.
4. The repair plug of claim 1, having spiraling recesses (5) with a pitch (11) in the range of about 5 to 15 mm.
5. The repair plug of any of the aforementioned claims where the depth (9) of each recess is in the range of about 5-20% of the outer diameter of the plug.
6. The repair plug of any of the aforementioned claims having a diameter in the range of about 5 to 10 mm.
7. The repair plug of any of the aforementioned claims having a diameter in the range of about 10 to 40 mm.
8. The repair plug of any of the aforementioned claims having a length in the range of about 8 to 24 mm.
9. The repair plug of any of claims 1 to 7, having one or more vertical recesses (10) circumscribing the plug dividing the plug into two or more segments (12).
10. The repair plug of claim 9, having a segment length in the range of about 8 to 24 mm.
11. The repair plug of any of claim 1 to 5, having a diameter in the range of 40-80 mm.



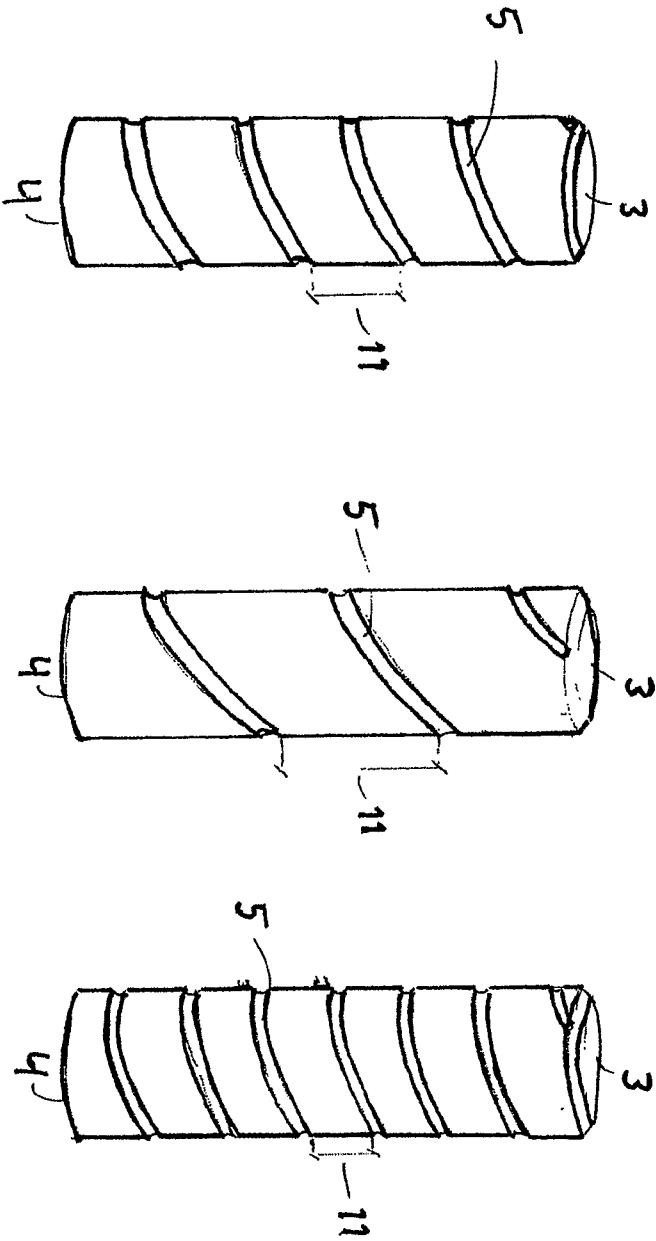
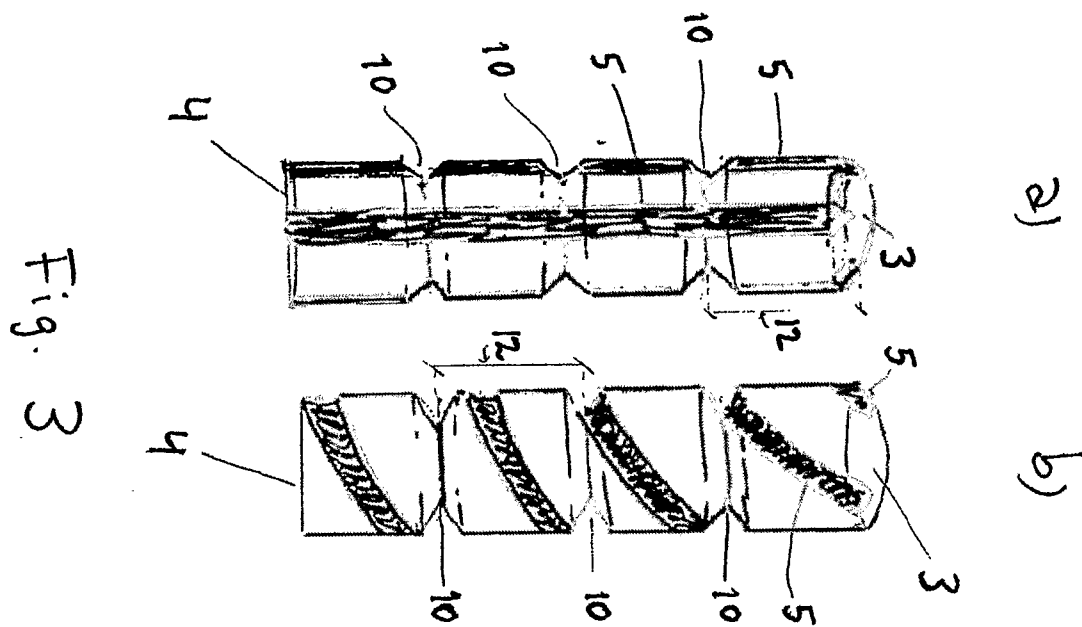


Fig. 2



3.5.11

4/5

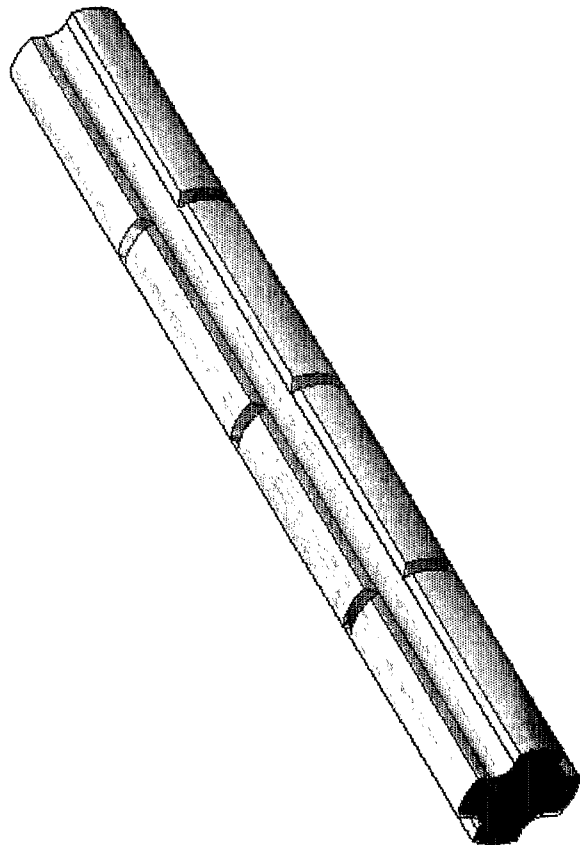
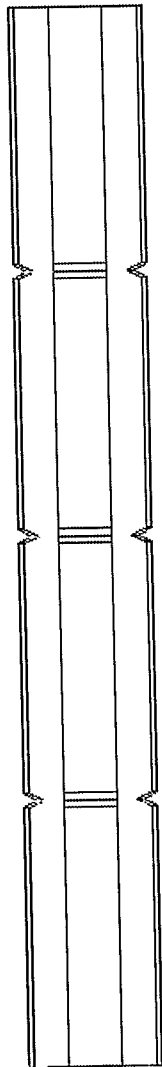
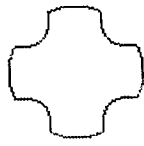


Figure 4

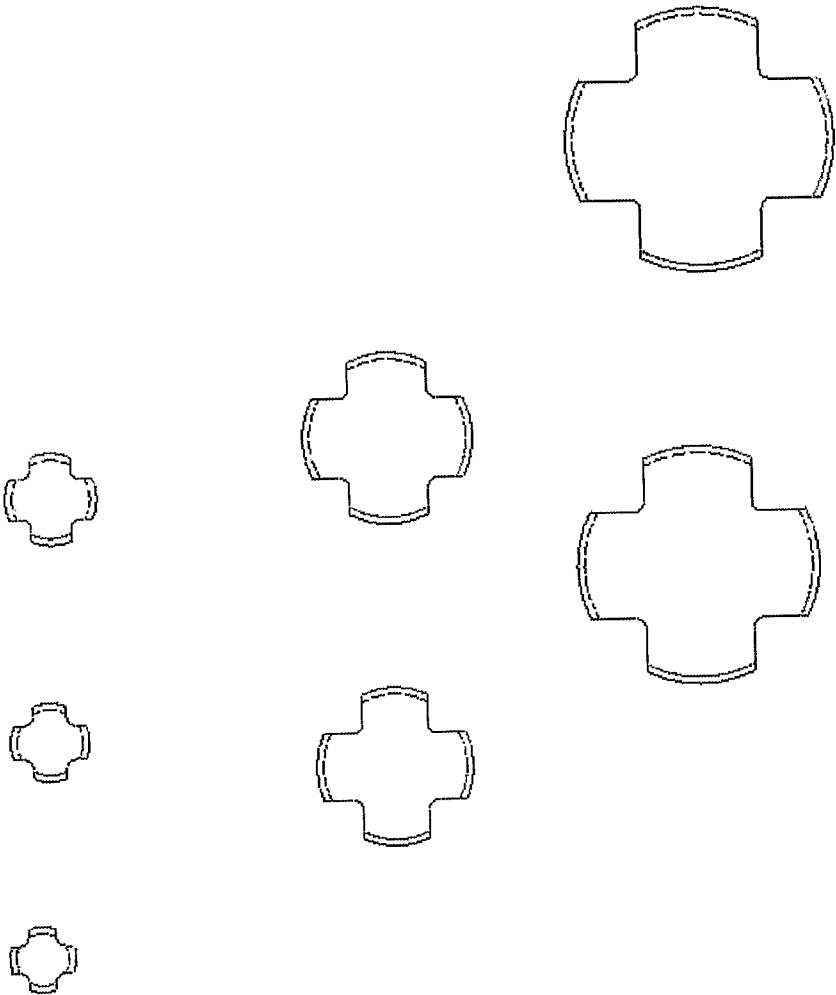


Figure 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/IS2007/000010

A. CLASSIFICATION OF SUBJECT MATTER

INV. E04G23/02

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)
E04G

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 practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 196 47 083 A1 (HUETTNER TORALF [DE]; STEIN GEORG [DE]; REITEL KLAUS [DE]; KLINGSPORN) 28 May 1998 (1998-05-28)	1,4,9
Y	column 1, lines 3-21 column 1, line 61 - column 2, line 20 column 3, lines 60-65; figure 1	1,2
Y	FR 678 231 A (POGGIOLI PIETRO) 20 March 1930 (1930-03-20) page 1, lines 1-6 page 1, lines 23-28 figures 1,2	1,2

-/--

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *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)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *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
- *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
- *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.
- * & * document member of the same patent family

Date of the actual completion of the international search

26 July 2007

Date of mailing of the International search report

02/08/2007

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Scharl, Willibald

INTERNATIONAL SEARCH REPORT

International application No
PCT/IS2007/000010

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 555 691 A (NGUYEN THANH T [US]) 17 September 1996 (1996-09-17) abstract column 2, lines 5-16 column 2, lines 35-44; claim 6; figures 1-5	1
A	US 4 620 407 A (SCHMID ROY [US]) 4 November 1986 (1986-11-04) abstract column 4, lines 25-39; figures 4,5	1
A	GB 1 037 089 A (WILLIAM TAWES LTD) 27 July 1966 (1966-07-27) claim 1; figures 1-3	1,4
A	US 4 062 165 A (MARKS RONALD A ET AL) 13 December 1977 (1977-12-13) abstract figures 1-5	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IS2007/000010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19647083	A1	28-05-1998	NONE	
FR 678231	A	20-03-1930	NONE	
US 5555691	A	17-09-1996	NONE	
US 4620407	A	04-11-1986	NONE	
GB 1037089	A	27-07-1966	NONE	
US 4062165	A	13-12-1977	NONE	