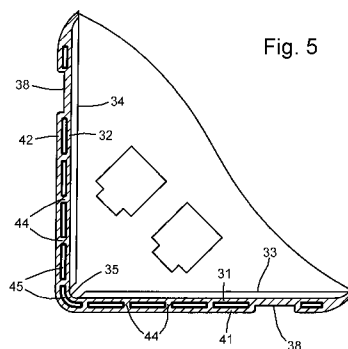




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- (71) Applicant (for all designated States except US): **ARMORED (UK) LIMITED** [GB/GB]; 215 Wimbledon Park Road, Southfields, London, Greater London SW18 5RH (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **MURDOCH, Thomas** [GB/GB]; Armored (UK) Limited, 215 Wimbledon Park Road, Southfields, London, Greater London SW18 5RH (GB).
- (74) Agent: **CRASKE, Stephen**; CRASKE & Co., Patent Law Chambers, 15 Queens Terrace, Exeter, Devon EX4 4HR (GB).
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- Published:
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(54) Title: IMPROVED CORNER PROTECTOR



(57) Abstract: A pair of opposing side walls (23, 24) are joined by substantially perpendicular bridging walls (31, 32) provided with an outer wall (41, 42) which is spaced from the bridging wall by a longitudinal connecting wall (43) and spaced transverse connecting walls (44). The outer wall (41, 42) is intended to be crushed under the force of a heavy impact. The longitudinal wall (43) is offset from the centre line so that even in the event of a square-on impact the outer wall can still deform inwardly on one side. The inner faces of the bridging walls (31, 32) include a longitudinally-extending support surface bounded by side channels (36, 37) having side faces which are coplanar with the inner faces of the side walls (23, 24). Such an arrangement allows the side walls to flex outwardly within the depth of the channels and provides an improved grip and improved tolerance with respect to the thickness of the protected article.



IMPROVED CORNER PROTECTOR

TECHNICAL FIELD OF THE INVENTION

This invention relates to an improved form of the corner protector disclosed in **WO 2007 045 822 A1**.

BACKGROUND

The corner protector disclosed in the abovementioned document is moulded from plastics material and has a pair of opposing side walls connected by a pair of substantially perpendicular bridging walls. In order to reduce the risk of damage to a protected article, internal channels extend along the junction between the side walls and the bridging walls. However, damage may still occur in the event of a very heavy impact such as may occur when a sheet of glass or marble is dropped onto a protected corner. Furthermore, the earlier corner protector may be difficult to fit due to low tolerance in the dimensions of the protected article combined with a tendency to distortion during cooling of the plastic.

The present invention seeks to provide an improved form of

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corner protector which can be fitted to articles with a wider thickness range and which provides significantly improved protection in the event of a major impact.

SUMMARY OF THE INVENTION

The present invention proposes a corner protector which is moulded from plastics material and includes a pair of opposing side walls connected by a pair of substantially perpendicular bridging walls,

characterised in that, for at least part of their length, the bridging walls are provided with an outer crush zone including an outer wall which is spaced from the bridging wall by an intermediate connecting structure.

The outer wall is intended to be crushed under the force of a heavy impact so that it may deform or even break to absorb the force of the impact and protect the inner bridging wall from damage.

The connecting structure preferably includes a plurality of mutually spaced connecting walls which extend transverse to the longitudinal direction of the bridging wall. The transverse connecting walls may provide sufficient stability to bear the weight of the protected article in normal use whilst allowing the outer wall to be crushed during an impact.

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The connecting structure preferably also includes a longitudinal connecting wall which extends along the length of each bridging wall. A single longitudinal wall located intermediate between the edges of the outer wall has particular advantages. Firstly, the connecting wall provides additional support during normal use, but on the other hand the outer wall can still deform during impacts since the majority of impacts occur to one side of the centre line. In fact, it is preferable for the single longitudinal wall to be offset from the centre line so that even in the event of a square-on impact the outer wall can still deform inwardly on one side.

An additional advantage of the preferred form of crush zone relates to the injection moulding process. The corner protector is simple to mould, and the design of the crush zone allows the corner protector to cool uniformly without distortion.

The invention further provides a corner protector which is moulded from a resiliently deformable plastics material and includes a pair of opposing side walls connected by a pair of substantially perpendicular bridging walls,

characterised in that the inner faces of the bridging walls include a longitudinally-extending support surface bounded by side channels having side faces which are coplanar with the inner faces of the aforesaid side walls, and in which the depth of the side channels is greater than their width.

Such a side channel arrangement allows the side walls to flex

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outwardly within the depth of the channels and provides an improved grip and much greater tolerance with respect to the thickness of the protected article.

The support surface may include at least one longitudinally-extending intermediate channel between the side channels, which further reduces distortion of the plastic during cooling.

BRIEF DESCRIPTION OF THE DRAWINGS

The following description and the accompanying drawings referred to therein are included by way of non-limiting example in order to illustrate how the invention may be put into practice. In the drawings:

Figure 1 is a side view of an improved corner protector in accordance with the invention;

Figure 2 is an edge view of the corner protector, looking from the right in Fig. 1;

Figure 3 is a top plan view of the corner protector;

Figure 4 is a section through the corner protector at position A-A of Fig. 1;

Figure 5 is a section through the corner protector at

position B-B of Fig. 2; and

Figure 6 is a similar section to Fig. 4 but showing the corner protector applied to an article.

DETAILED DESCRIPTION OF THE DRAWINGS

The corner protector is intended to protect the corners of sheets of glass, metal sheets, furniture, pictures, marble, masonry, etc. Toughened glass is acutely sensitive to light impacts at the corners, for example. As well as protecting a corner from impacts during handling, transportation and storage, the device also reduces the risk of damage to floors, walls, ceilings, furniture etc. caused by accidental contact with such corners during handling, and may also protect transport vehicles from damage.

Referring to **Fig.s 1 to 3**, the corner protector comprises an injection moulded plastic component 21 having two substantially parallel side walls 23 and 24 connected by a pair of mutually perpendicular bridging walls 31 and 32. The side walls 23 and 24 are both of generally triangular shape, having a pair of mutually perpendicular edges 25 and 26 joined by a curved third edge 27. The junction between the perpendicular edges 25 and 26 is curved at 28, and the opposite end of each perpendicular edge is curved at 29 and 30 to meet the edge 27. The two side walls 23 and 24 are both formed with aligned substantially T-

shaped through-apertures 40 to receive an adhesively-coated pad of cork or other soft resilient material.

Referring to **Fig.s 4 and 5**, each of the bridging walls 31, 32 extends between the perpendicular edges 25 and 26 of the side walls 23 and 24. In addition, an outer wall 41, 42 extends parallel to each bridging wall, being spaced from the bridging wall by a longitudinally-extending connecting wall 43. This connecting wall is asymmetrically offset from the centre line of the bridging wall (**Fig. 4**). The inner and outer walls 31, 32 and 41, 42 are also joined at intervals by mutually spaced transversely-extending connecting walls 44, forming a series of blind-ending slot-shaped holes 45 (see **Fig. 1** also) extending along both of the perpendicular edges 25 and 26 on both sides of the corner protector. The outer walls 41 and 42 may be interrupted by shallow flat-bottomed recesses 38 to receive strapping bands which are often placed around sheets of glass in transit.

The internal support faces 33 and 34 of the two bridging walls are flat and substantially perpendicular, and are formed with an internal recess 35 where the two walls meet. In addition, the support surface is bounded by side channels 36 and 37 having side faces which are formed coplanar with the inner faces of the two side walls 23 and 24. It will be noted that the depth d of the side channels is greater than their width w . If the distance between the side walls 23 and 24 is sufficient, additional intermediate channels 38 may be formed in between the side

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channels 36 and 37 to further reduce shrinkage during cooling of the plastic.

To protect a sheet of toughened glass of an appropriate thickness, for example, one of the corner protectors is applied to each of its corners. The corner protector is slid onto the glass until the internal faces 33 and 34 make contact with the adjacent straight edges of the glass sheet. As shown in **Fig. 6**, The configuration of the side channels 36 and 37 is important since it allows the side walls 23 and 24 to deform angularly within the depth of the side channels whilst still maintaining a tight grip on the glass sheet. The corner protector is therefore more tolerant of variations in the thickness of the sheet, which are quite common. For example, 12 mm toughened glass is nominally 12 mm thick, but 12 mm laminated glass is nominally 12.8 mm thick. This is because the laminated glass is formed from two sheets of 6 mm float glass joined by an intermediate layer of resin.

An adhesive pad can be inserted through one or more of the apertures 40 and stuck to the glass to hold the corner protector in position.

The outer walls 41 and 42, the longitudinal connecting wall 43 and the transverse connecting walls 44 form an outer crush zone which is intended to be crushed under the force of a heavy impact, e.g. if the glass sheet is dropped on its protected corner. The walls 42 to 44 may deform or even break to absorb the

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force of the impact. However, the inner bridging wall will generally remain intact and protect the vulnerable edge of the glass sheet from damage.

The corner protectors can be manufactured in various widths in order to protect sheets of various thickness.

Whilst the above description places emphasis on the areas which are believed to be new and addresses specific problems which have been identified, it is intended that the features disclosed herein may be used in any combination which is capable of providing a new and useful advance in the art.

CLAIMS

1. A corner protector which is moulded from plastics material and includes a pair of opposing side walls (23, 24) connected by a pair of substantially perpendicular bridging walls (31, 32),

characterised in that, for at least part of their length, the bridging walls (31, 32) are provided with an outer crush zone including an outer wall (41, 42) which is spaced from the bridging wall by an intermediate connecting structure (43, 44).

2. A corner protector according to Claim 1 in which the connecting structure includes a plurality of mutually spaced connecting walls (44) which extend transverse to the longitudinal direction of the respective bridging wall (31, 32).

3. A corner protector according to Claim 1 or 2 in which the connecting structure includes a longitudinal connecting wall (43) which extends along the length of each bridging wall (31, 32).

4. A corner protector according to Claim 3 in which the longitudinal wall (44) is offset from the centre line of the respective bridging wall (31, 32).

5. A corner protector according to any preceding claim in which the inner faces of the bridging walls (31, 32) include a

longitudinally-extending support surface (33, 34) bounded by side channels (36, 37) having side faces which are coplanar with the inner faces of the aforesaid side walls (23, 24), and in which the depth of the side channels is greater than their width.

6. A corner protector according to Claim 5 in which the support surface (33, 34) includes at least one longitudinally-extending intermediate channel (35) between the side channels (36, 37).

7. A corner protector which is moulded from plastics material and includes a pair of opposing side walls (23, 24) connected by a pair of substantially perpendicular bridging walls (31, 32),

characterised in that the inner faces of the bridging walls (31, 32) include a longitudinally-extending support surface (33, 34) bounded by side channels (36, 37) having side faces which are coplanar with the inner faces of the aforesaid side walls (23, 24), and in which the depth of the side channels is greater than their width.

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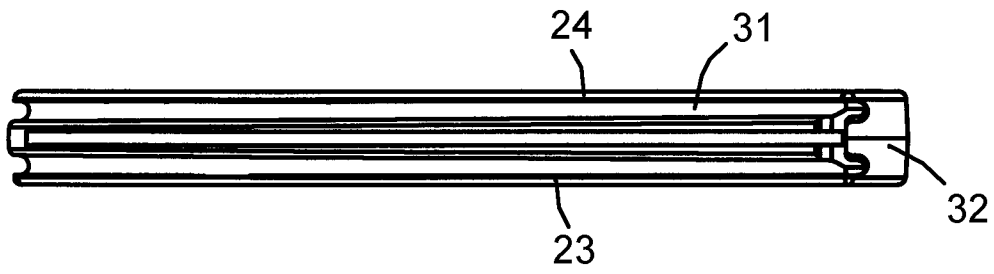


Fig. 3

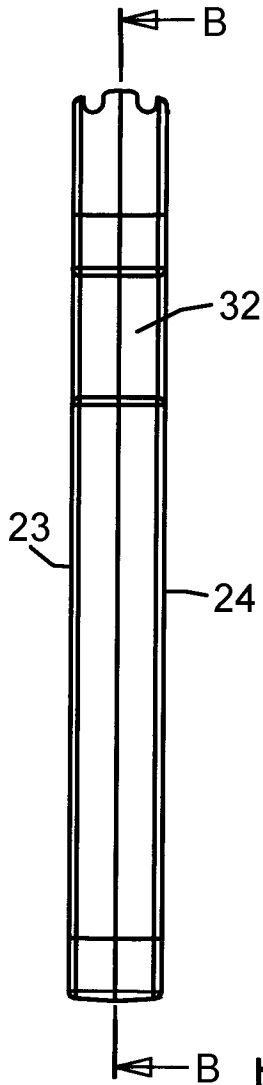


Fig. 2

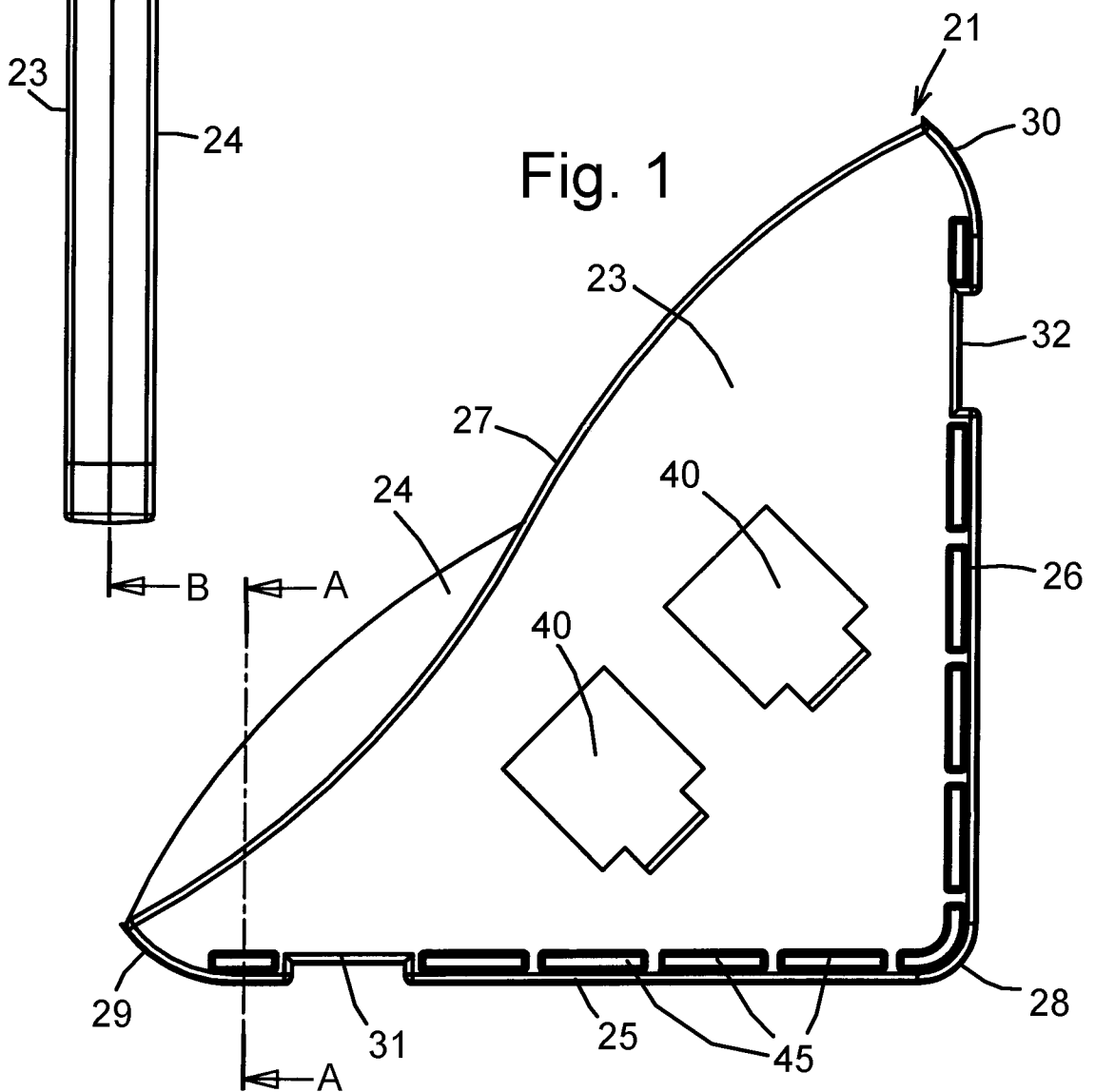


Fig. 1

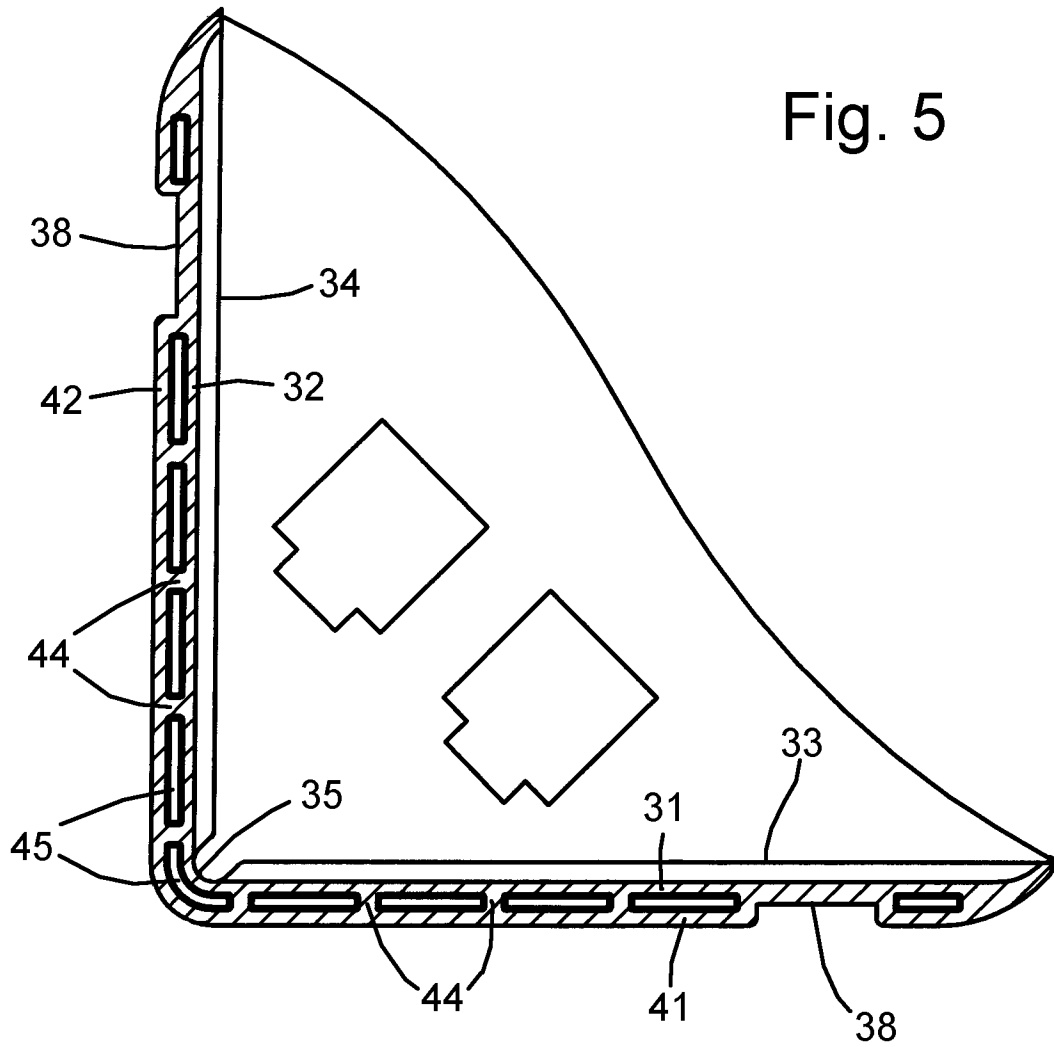


Fig. 5

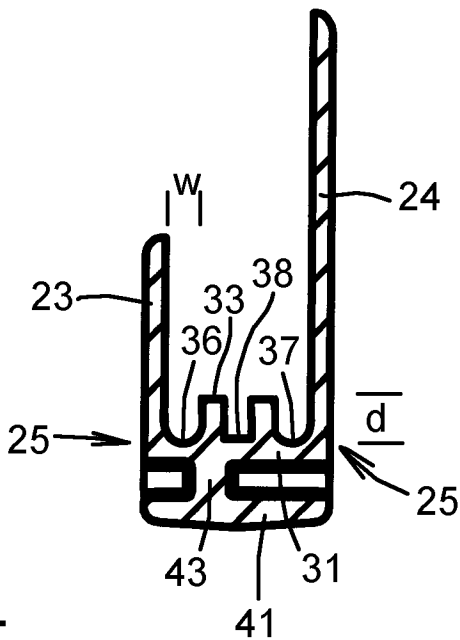


Fig. 4

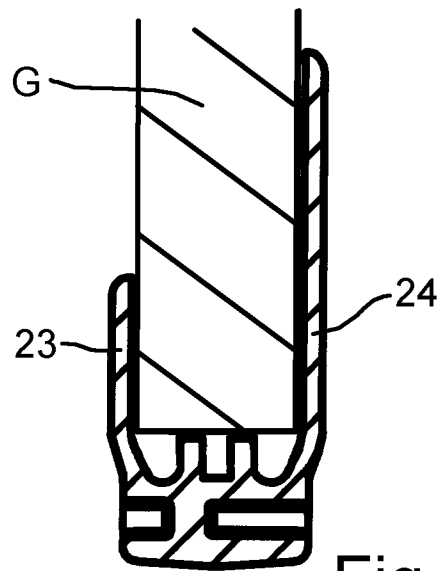


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2010/052036

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D81/05
ADD.
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)
B65D

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2008/087370 A2 (MURDOCH THOMAS [GB]; GONZALEZ GREG [GB]) 24 July 2008 (2008-07-24) pages 4-5; figures 1-2 -----	1-6
Y	DE 20 2010 007207 U1 (KUO SHENG HSI [TW]) 9 September 2010 (2010-09-09) figures 31-39 -----	1-6
X	DE 29 51 402 A1 (TOLGES KUNSTSTOFFVERARBEITUNG [DE]) 25 June 1981 (1981-06-25) figure 7 -----	7
Y		5,6
X	DE 28 27 846 B1 (HEINER MUELLER FA) 27 September 1979 (1979-09-27) column 2, lines 1-3; figures 1-2 -----	7
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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 24 August 2011	Date of mailing of the international search report 01/09/2011
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Jervelund, Niels
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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2010/052036

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2007/045822 A1 (MURDOCH THOMAS [GB]; GONZALEZ GREG [GB]) 26 April 2007 (2007-04-26) cited in the application abstract -----	1-7

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2010/052036

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008087370 A2	24-07-2008	GB 2458078 A	09-09-2009
DE 202010007207 U1	09-09-2010	NONE	
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