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(54) Title: SECUREMENT DEVICE FOR CABLES

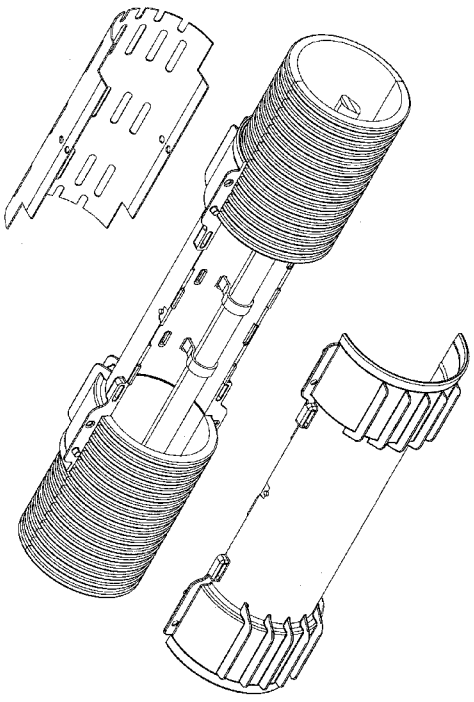

Figure 1

(57) Abstract: This invention relates to a device for the protection of underground cables 12 housed within ducting 14. The device 10 comprises a pair of half-shells 16.1 that are interengaged to make up a hollow sleeve that is flared to receive the conduit ends 14. The cable 12 is installed within the conduit 14 and the securement device 10 is installed in the place of a conventional sleeve conduit connector. Before the body shells 16.1 are mated, the cable 12 is secured to the first body shell 16.1 by means of BAND-IT™ strapping (or U-bolts in a second embodiment of the invention). A cover plate 24 is installed over the securement device body 16. The cover plate 24 also closes off the strapping slots 19 through which the strapping is threaded to secure the cable 12 to the inside of the device body.

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SECUREMENT DEVICE FOR CABLES

Field of the Invention

[0001] This invention relates to a device for the protection of cables, conduits and the like that are housed within ducting, trunking or the like.

[0002] The invention finds particular application in the protection of underground electrical and telecommunications cables and it will be described with reference to to such an application by way of example. It will be appreciated however, that the invention is not limited thereby and it could find application in the securement and protection of any longitudinally extending cable-like conduits, tubes or pipes for instance.

Background

[0003] The total economic cost of cable theft, taking into consideration replacement value and consequential economic impact, is significant.

[0004] International patent application WO2009/019618 - A CABLE THEFT PREVENTION DEVICE (equivalent South African patent – 2008/05186), which is marketed in South Africa by Aberdare Cables (Pty) Ltd under the trade mark

CABLEGUARD™, promises to assist with this problem by providing a ground anchor for underground cables that clamps around the cable to increase the resistance of the buried cable to pulling out of the ground. The CABLEGUARD™ device does not work with cables that are not buried directly in the ground, such as cables housed within trunking and flexible conduits, which are even more susceptible to being freely pulled out of the ducting or conduit, due to the fact that the conduit interior is purposely provided with a low coefficient of friction to facilitate installation of the cable.

[0005] It is an object of this invention to address this problem.

Summary of the invention

[0006] According to the invention a securement device is provided for a cable within a tubular conduit, the securement device comprising a tubular body and cable securement means, the body being adapted and dimensioned to be secured substantially coaxially and co-extensively with the conduit, between spaced apart ends of the conduit in use, the body being adapted to receive the cable with the cable extending axially through the body in use and the securement means being adapted to secure the cable within the body in use.

[0007] The term "cable" should not be interpreted narrowly to refer only to electrical or telecommunications cables and is intended to include any cable-like tube, conduit, pipe, wire or the like.

[0008] The term "conduit" is not intended to refer to a specific type of conduit and should be interpreted to include any hollow, tubular, conduit, trunking, duct or the like within which wires, cables and pipes may be reticulated. In the same vein, the term "tubular" is not necessarily restricted to closed tubular structures or right circular cylindrical tubular structures and could include non-circular tubes and partial tubular structures.

[0009] The securement device body preferably comprises two or more part-tubular shells that are adapted for engagement with one another to constitute the securement device body.

[0010] In this embodiment, the shells are preferably adapted for securement over the spaced apart ends of the conduit and to constitute a continuation of the conduit in use.

[0011] The body shells may be secured to one another in a variety of ways, the preferred securement being constituted by a clamping strap that is adapted to extend circumferentially about the assembled body shells. Any strap-like clamp may be used, such as a hose clamp for instance. For convenience, however, a simple steel strapping and buckle arrangement may be used, such as the well known BAND-IT™ strapping and buckle system supplied by BAND-IT-Idex, Inc, Denver, Colorado, USA.

[0012] The cable securement means may be conveniently also be constituted by a simple strapping arrangement, with BAND-IT™ strapping once again being the preferred strapping arrangement.

[0013] Alternatively the cable securement may be constituted by by one or more curved bolts, such as U-bolts, each adapted to extend from the exterior of at least one body shell, through a hole formed in the shell, the bolt being adapted to extend from the hole and to curve about a cable located axially within the body in use, the bolt being adapted to be secured externally of the body shells by means of a nut, preferably a frangible shear nut, that is interengageable with the bolt.

[0014] The securement device may conveniently be adapted to accept and secure more than one cable.

[0015] The securement device body may be conveniently include a cover plate

that is adapted to extend at least partially about the exterior of the securement device body, the cover plate being adapted to cover at least the point or points of attachment between the cable securement means and the securement device body.

Brief description of the drawings

[0016] The invention will be further described with reference to the accompanying drawings, in which:

Figure 1 is a diagrammatic isometric view (partially exploded) of a securement device according to the invention, in position on a conduit containing a cable (shown only partially);

Figure 2 is a diagrammatic isometric view (partially exploded) of part of a securement device according to a second embodiment of the invention; and

Figure 3 is a side elevation of the securement device of Figure 2.

Description of embodiments of the invention

[0017] The cable securement device 10 illustrated in Figure 1 comprises a substantially tubular body and cable securement means by means of which a cable 12 may be secured within a conduit 14, in this case a ribbed, flexible conduit.

[0018] In conventional installations in which cables 12 are installed within conduits 14, the conduits are supplied in relatively short lengths, the ends of which are joined together by means of sleeve-like connectors. The securement device of the invention is intended to replace all or some of these sleeve connectors in the form of a tubular body to which the cable may be secured.

[0019] In the device 10 of Figure 1, the cable 12 is secured by means of securement means 18 threaded through slots 19 formed in the body wall.

[0020] The securement device body 16 is made up of a pair of half-shells 16.1 that are shaped complementally and adapted to interengage with one another by means of holes and nibs to make up a hollow tubular sleeve, the ends 20 of which are flared to extend over and receive the conduit ends 14. The body shells 16.1 are provided with pierced strapping formations 22 that are adapted to align when the body shells 16.1 are mated.

[0021] A BAND-IT™ strap (not shown) can now be secured about the body shells 16.1 through the holes in the strapping formations 22 to secure the body shells 16.1 into the tubular securement device body 16. In use, this will only be done when the cover plate 24 has been secured on the body 16.

[0022] In use, the cable 12 is installed within the conduit 14 and, instead of the normal sleeve connector that would conventionally be used to secure the ends of the conduits 14 together, the conduit ends 14 are left open and spaced apart sufficiently to permit the installation of the securement device 10.

[0023] This is done by arranging the body shells 16.1 around the cable 12 and conduit ends 14.

[0024] Before the body shells 16.1 are mated, the cable 12 is secured to the first body shell 16.1 (shown attached to the conduit ends 14 in the drawing) by means of BAND-IT™ strapping.

[0025] The preferred method of securement is to thread a BAND-IT™ strap 18 through each of the strapping slots 19 in the first body shell 16.1 and then to loop the strap 18 around the cable 12 at least once (in the fashion of a hitch). Each strap end is then threaded back through its strapping slot 19. On the outside of the first body shell 16.1, the ends of each strap are secured to one

another with a BAND-IT™ strap buckle (not shown). The buckles are located on the outside of the first body shell 16.1.

[0026] The second body shell 16.1 (illustrated exploded away in the drawing) is then mated with the first body shell 16.1 by inserting the nibs of the one body shell 16.1 into the mating holes of the other body shell 16.1.

[0027] The cover plate 24 is then installed over the securement device body 16, which is provided with projecting nibs 26 on each body shell 16.1. The nibs 26 serve to locate the cover plate 24. In turn, the cover plate 24 holds the body shells 16.1 together by means of the nibs 26.

[0028] The cover plate 24 also serves to close off the strapping slots 19 in the first body shell 16.1 through which the BAND-IT™ strapping is threaded to secure the cable 12 to the inside of the first body shell 16.1. In this manner, the BAND-IT™ strap buckles located on the outside of the first body shell 16.1 are secured against casual tampering.

[0029] The cover plate 24 is notched (24.1) on all four corners thereof, the notches 24.1 being adapted to permit the strap securement formations 22 to protrude through the cover plate 24.

[0030] Once the cover plate 24 has been secured in place, and, with the body shells 16.1 mated, the body 16 and cover plate 24 can be strapped together with BAND-IT™ strapping and buckles (not shown). The straps extend through the aligned holes or channels in the strapping formations 22, circumferentially about the securement device body 16 and hold the cover plate 24 in place over the body 16.

[0031] The flared ends 20 of the securement device body 16 are formed with protruding fins 30 on either end. The fins 30 serve to increase the anchoring effect of the securement device 16 within the ground once the conduit 14 with

the securement device 10 in position thereon has been buried within the ground.

[0032] The ribbed exterior conduit 14 has a high co-efficient of friction. This combines with the ground anchor effect of the securement devices 10 secured to the conduit 14 to ensure that the conduit and securement device combination cannot be pulled out of the ground without unearthing the entire conduit.

[0033] It is possible, using extremely large tension forces, to envisage one conduit 14 being drawn away from the other. For this reason, the cover plate 24 is dimensioned such that the ends 32 thereof butt up against the flared ends 20 of the securement device to maintain the integrity of the securement device 10.

[0034] The cable securement device 100 illustrated in Figures 2 and 3 is substantially similar to the cable securement device 10 of Figure 1 and only the major differences in the two devices will be described.

[0035] In the cable securement device 100 of Figures 2 and 3, the cable securement means is constituted by cable clamps constituted by curved bolts, preferably U-bolts 102, arranged in pairs, with a clamp body 104 extending between the two U-bolts 102 in the set. The threaded U-bolt legs or shanks are adapted to extend from the exterior of one of the cable securement device body shells 106, through bolt holes 108 formed in the shell wall. The curved part of each U-bolt 102 is adapted to extend into the interior of the device body away from the hole 108 and to curve about a cable located axially within the device body in use. The curved portions of the U-bolts (the bases of the U) support a clamp body 104 that, in use, will be drawn into clamping engagement with a cable located axially within the device body in use when complemental nuts, preferably shear nuts (not shown), are tightened onto the threaded bolt shanks from the outside of the device body, the nuts being adapted to be secured externally of the body shell 106. Shear nuts are preferred since they provide

additional security, the nuts each including a hex nut head that is adapted to shear off and leave a small and difficult to remove cone shaped nut secured to the body shell 106.

[0036] Figure 3 shows a pair of BAND-IT™ straps 110 secured about the body shells 106 by means of buckles 112 to secure the body shells 106 into a tubular securement device body. In use, this will only be done when pair of metal half shells, making up a cover plate 114, has been secured on the device body.

[0037] Figure 3 also illustrates the threaded ends 102.1 of the U-bolts 102 projecting from the bolt holes (not visible in Figure 3) that are formed in the body shells 106 and from the correspondingly placed holes 116 formed in the cover plate 114.

[0038] In use, a cable (not shown) is installed within the conduit 118 and the conduit ends 118 are left open and spaced apart sufficiently to permit the installation of the securement device 100.

[0039] Before the body shells 106 are mated, the cable is secured to the first body shell 106 by means of the U-bolts 102 and cable clamps 104.

[0040] The second body shell is then mated with the first body shell and the cover plate 114 is installed over the securement device body. Instead of closing off the securement means (the U-bolts 102), the cover plate 114 serves to support the shear nuts fastened onto the threaded ends of the U-bolts 102.

[0041] Once the cover plate shells have been has been secured in place to constitute the cover plate 114 and with the body shells 106 mated, the device body and cover plate 114 can be strapped together with BAND-IT™ strapping 110 and buckles 112. The straps 110 extend circumferentially about the securement device body and hold the cover plate 114 in place over the device body.

[0042] The securement device 10, 100 can be made from any suitable material that has the necessary strength, but the preferred materials are injection moulded plastics for the device body and galvanised steel for the cover plate, with the BAND-IT™ strapping being of stainless steel.

Claims

1. A securement device for a cable within a tubular conduit, the securement device comprising a tubular body and cable securement means, the body being adapted and dimensioned to be secured substantially coaxially and co-extensively with the conduit, between spaced apart ends of the conduit in use, the body being adapted to receive the cable with the cable extending axially through the body in use and the securement means being adapted to secure the cable within the body in use.

2. The cable securement device of claim 1 in which the body comprises two or more part-tubular shells that are adapted for engagement with one another to constitute the securement device body.

3. The cable securement device of claim 2 in which the shells are adapted for securement over the spaced apart ends of the conduit and to constitute a continuation of the conduit in use.

4. The cable securement device of of any one of the preceding claims in which the body shells are secured to one another by at least one metallic strap that is adapted to extend circumferentially about the assembled body shells, the strap being adapted to be secured about the body shells by means of a buckle that is interengageable with the strap ends.

5. The cable securement device of any one of the preceding claims in which the cable securement means is constituted by at least one metallic strap that is adapted to extend from the exterior of a body shell, through a hole formed in the shell, the strap being adapted to extend internally from the hole and about a cable located axially within the body in use, the strap being adapted to extend back out of the body shell through a hole in the body shell and the strap being adapted to be secured externally of the body shells by means of a buckle that is interengageable with the strap.

6. The cable securement device of any one of the preceding claims in which the cable securement means is constituted by by one or more curved bolts, each adapted to extend from the exterior of at least one body shell, through a hole formed in the shell, the curved part of the bolt being adapted to extend from the hole and to curve about a cable located axially within the body in use, the bolt being adapted to be secured externally of the body shells by means of a nut that is interengageable with the bolt.

7. The cable securement device of claim 6 in which the nut to be secured externally of the body shells to the bolt, is a shear nut.

8. The cable securement device of either of claims 6 or 7 in which the curved part of the bolt includes a clamp plate that is adapted to bear against a cable located axially within the body in use.

9. The cable securement device of any one of the preceding claims that is adapted to accept and secure more than one cable.

10. The cable securement device of any one of the preceding claims which includes a cover plate that is adapted to extend at least partially about the exterior of the securement device body, the cover plate being adapted to cover at least the point of emergence of the cable securement means on the exterior of the securement device body when, in use the cable securement means have been secured about the cable.

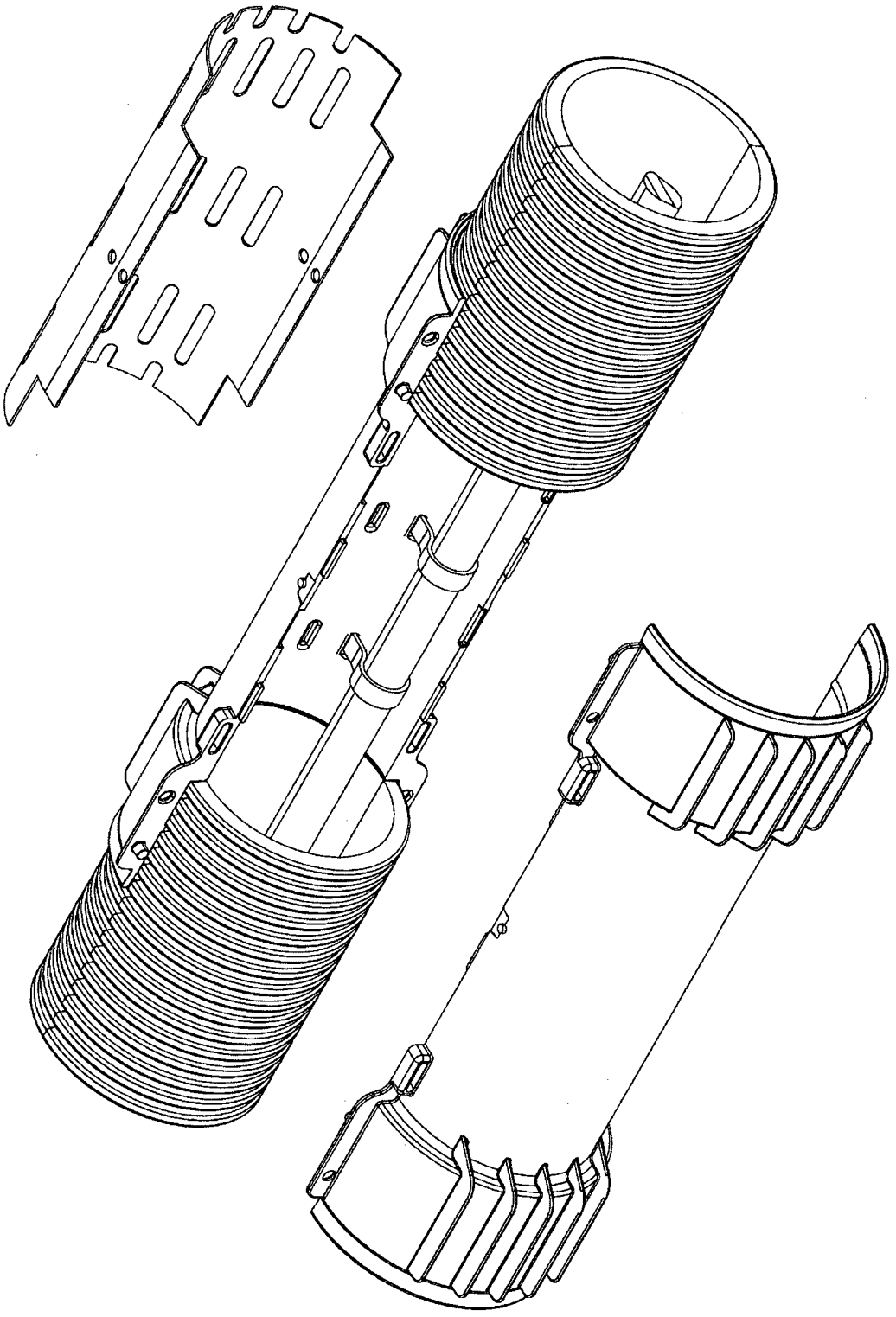

Figure 1

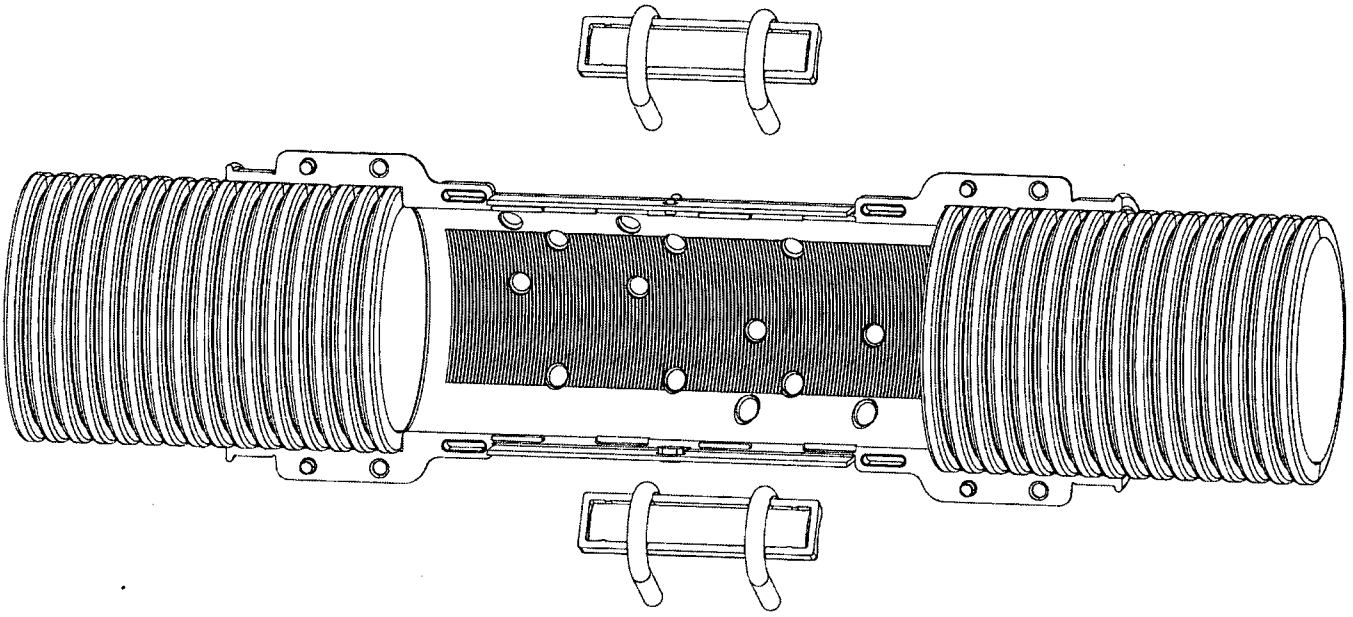

Figure 2

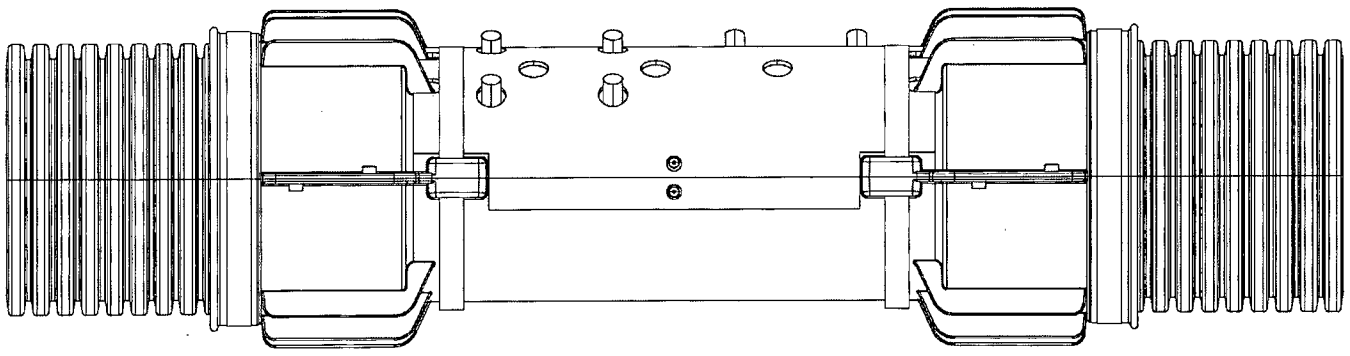

Figure 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2011/000032

A. CLASSIFICATION OF SUBJECT MATTER

IPC: ***H02G3/06*** (2006.01); ***F16L25/00*** (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)

H02G, F16L

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)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 201054479 Y (XIA YANE) 30 April 2008 (30.04.2008) Abstract Fig 1	1-3,9,10
Y	ditto	4
Y	US 2008142243 A1 (BIRD, RODGER ET AL.) 19 June 2008 (19.06.2008) Fig 5 and description	4
A	EP 0780618 A1 (C.I.S. SUD S.R.L) 25 June 1997 (25.06.1997) Fig and description	1-10
A	WO 2004051815 A1 (SARL FRANCOIS INGLESE) 17 June 2004 (17.06.2004) Fig 1 and description	1-10

☐ 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

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"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	Date of mailing of the international search report
11 October 2011 (11.10.2011)	20 October 2011 (20.10.2011)
Name and mailing address of the ISA/AT Austrian Patent Office Dresdner Straße 87, A-1200 Vienna Facsimile No. +43 / 1 / 534 24-535	Authorized officer SCHLECHTER B. Telephone No. +43 / 1 / 534 24-448

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT / ZA 2011/000032

Patent document cited in search report			Patent family member(s)			Publication date
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