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(71) Applicant: **Claxton Engineering Services Limited**
Great Yarmouth NR30 1TE (GB)

(72) Inventors:
- **Patterson, Rowan Warwick**
  Beccles, NR34 0EA (GB)
- **Searle, Glenn**
  Stowmarket, IP14 6RT (GB)

(74) Representative: **Dummett Copp LLP**
25 The Square
Martlesham Heath
Ipswich IP5 3SL (GB)

(54) Centralizer

(57) This invention relates to centralizers for use in maintaining a tubular member such a conductor or string in a substantially co-axial arrangement within a bore, for example a platform guide or an outer tubular member or conductor. In particular, this invention relates to a centralizer for use in an oil or gas-drilling or production installation. A centralizer (1) for centralising a tubular member (5) within a bore (7) comprises a main body (2) connectable around a tubular member to be centralised, the main body defining a longitudinal axis (4) of the centralizer, and a plurality of longitudinally extending abutments (18) spaced apart around the main body (2) that extend radially outwards from the main body to abut the bore. At least one of the abutments has an adjustment mechanism (3, 34, 36, 42) for making a radially adjustable abutting contact with the bore. This mechanism comprises a radially movable outer blade (34), a longitudinally movable wedging member (36) located between the outer blade and the main body (2) for moving the blade radially into the abutting contact, at least one guiding mount (3) for guiding the radial movement of the blade, and at least one longitudinally extending ramp surface (42) that is inclined with respect to the axis (4). The outer blade (34) is constrained to move in a substantially radial direction by the at least one guiding mount. The wedging member (36) is constrained between the outer blade and the main body (2) to move in a substantially longitudinal direction, The wedging member and the at least one ramp surface are configured to engage with one another such that as the wedging member moves longitudinally, the wedging member causes the outer blade to move radially. The arrangement of the wedging member and the outer blade is such that when the longitudinal axis (4) is substantially vertical, the weight of the wedging member (36) automatically causes the wedging member to drop, thereby moving the outer blade (34) in the radially outwards direction.

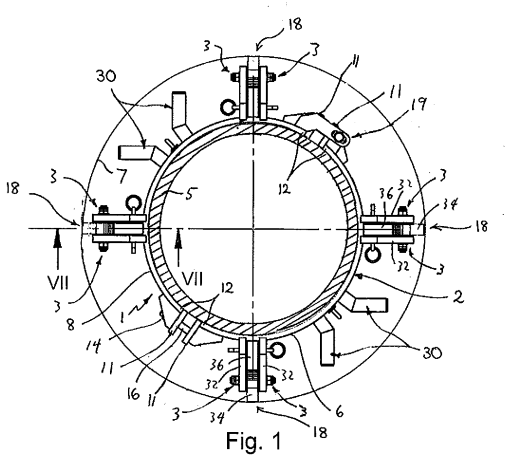

Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 12 18 5143

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 2 391 570 A (PARAMODE LTD [GB]) 11 February 2004 (2004-02-11) * page 10, lines 20-24; figures 3, 4 *	16	INV. E21B17/10
X	GB 2 277 336 A (UWG LTD [GB]) 26 October 1994 (1994-10-26) * figure 3 *	16	
A	GB 2 417 505 A (U W G LTD [GB]) 1 March 2006 (2006-03-01) * figure 2 *	1-11,15, 16	
A,D	GB 2 381 280 A (UWG LTD [GB]) 30 April 2003 (2003-04-30) * figure 1 *	1-11,15, 16	
A	US 2005/224227 A1 (HENDRIE CRAIG [US]) 13 October 2005 (2005-10-13) * figure 1 *	1-11,15, 16	
A	US 6 513 223 B1 (ANGMAN PER G [CA] ET AL) 4 February 2003 (2003-02-04) * figure 1 *	1-11,15, 16	TECHNICAL FIELDS SEARCHED (IPC) E21B

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	18 June 2015	Georgescu, Mihnea

CATEGORY OF CITED DOCUMENTS

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

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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Application Number
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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

"see additional sheet(s)"

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 12 18 5143

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11, 16(completely); 15(partially)

A centralizer (1, 101) suitable for centralising a tubular member (5) within a bore (7), the centralizer comprising a main body (2, 102) adapted to be connectable around a tubular member (5) to be centralised, the main body defining a longitudinal axis (4) of the centralizer, and a plurality of longitudinally extending abutments (18, 118) spaced apart around the main body (2, 102), each abutment extending radially outwards from the main body for making abutting contact with said bore and at least one of said abutments having an adjustment mechanism (3, 103, 34, 134, 36, 136, 42) for making a radially adjustable abutting contact with said bore, said adjustment mechanism comprising a radially movable outer blade (34, 134) for making said abutting contact, a longitudinally movable wedging member (36, 136) located between the outer blade and the main body (2, 102) for moving the outer blade radially into said abutting contact, at least one guiding mount (3, 103) for guiding said radial movement of the outer blade, and at least one longitudinally extending ramp surface (42), said ramp surface being inclined with respect to said axis (4), wherein:- the outer blade (34, 134) is constrained to move in a substantially radial direction by said at least one guiding mount (3, 103); and- the wedging member is constrained between the outer blade and the main body (2, 102) to move in a substantially longitudinal direction, the wedging member and said at least one ramp surface being configured to engage with one another such that as the wedging member moves longitudinally, the wedging member causes the outer blade to move radially, characterized in that the arrangement of the wedging member (36, 136) and the outer blade (34, 134) is such that when the longitudinal axis (4) is substantially vertical, the weight of the wedging member automatically causes the wedging member to drop, thereby moving the outer blade in said radially outwards direction.
Technical problem: how to avoid external actuation interaction.

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2. claims: 12-14, 17(completely); 15(partially)

A deployment collar (10) for temporary mounting to a substantially cylindrical centralizer (101) for centralising a tubular member (5) within a bore (7), the deployment collar comprising a ring-like main body (27) defining a longitudinal axis (104) of the deployment collar and having mounted to the collar main body (27) a latching mechanism (70, 73, 77, 79, 90) and an activating mechanism (40, 61, 63), wherein:- the latching mechanism is provided around the

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 12 18 5143

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

collar main body (27) for latching to and de-latching from an upper end (26) of a centralizer so that, in use, the deployment collar may be temporarily mounted to said centralizer (101); and- the activating mechanism includes at least one actuator (40), said actuator being configured, in use, to applying a force in an axial direction for activating a radial adjustment mechanism of said centralizer (101).
Technical problem: how to radially adjust a centralizer.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 18 5143

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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18-06-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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GB 2277336 A	26-10-1994	NONE	
GB 2417505 A	01-03-2006	NONE	
GB 2381280 A	30-04-2003	NONE	
US 2005224227 A1	13-10-2005	US 2005224227 A1 WO 2005100735 A2	13-10-2005 27-10-2005
US 6513223 B1	04-02-2003	US 6513223 B1 US 2003024707 A1	04-02-2003 06-02-2003

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82