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(54) Title: CONNECTOR

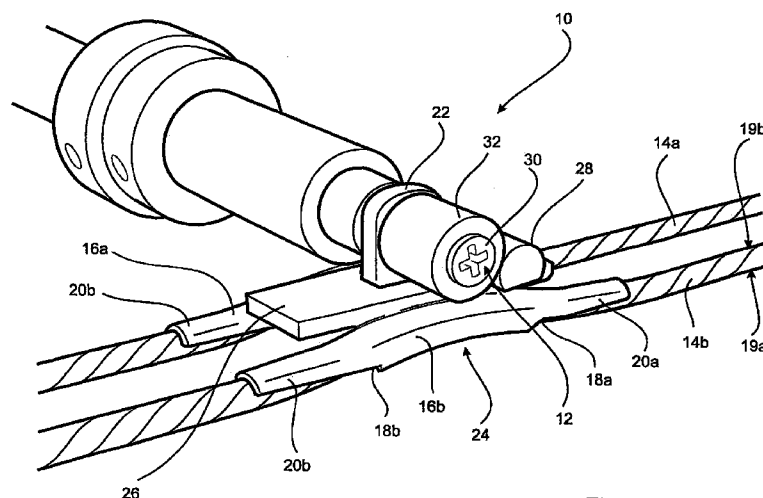


Figure 1

(57) Abstract: A connector for fixing a shaft to at least one endless cable that passes around a wheel, the connector comprising: a coupling element which is configured to surround at least a portion of the or each cable, the coupling element having extensions which extend along the cable on a side remote to said wheel when the cable passes around the wheel; and a lug coupled to the coupling element, the lug being configured to accept the shaft, wherein the coupling element is arcuate between the extensions to prevent contact between the coupling element and the wheel.

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CONNECTOR

FIELD OF THE INVENTION

- 5 The present invention relates to a connector. More particularly, but not exclusively, the invention relates to a connector which allows a rotating shaft to be coupled to at least one cable.

BACKGROUND OF THE INVENTION

10

It can be desirable to use a connector to rotatably fix a shaft to a cable. Previous connectors can interfere with a cable as it passes over a drive member, leading to noise and unwanted vibrations. Previous connectors can also be complicated and ineffective.

- 15 Examples of the invention seek to solve, or at least ameliorate, one or more disadvantages of previous cable connectors.

SUMMARY OF THE INVENTION

- 20 According to the present invention, there is provided a connector for fixing a shaft to at least one endless cable that passes around a wheel, the connector comprising: a coupling element which is configured to surround at least a portion of the or each cable, the coupling element having extensions which extend along the cable on a side remote to said wheel when the cable passes around the wheel; and a lug coupled to the coupling element,
- 25 the lug being configured to accept the shaft, wherein the coupling element is arcuate between the extensions to prevent contact between the coupling element and the wheel.

Preferably, a radius of the arc of the coupling element is smaller than that of the wheel.

- 30 Preferably, the extensions are configured to urge the cable into an arc so as to raise the coupling element from the wheel.

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Preferably, the at least one cable is a pair of cables which are offset from each other, the cables being coupled by a coupling member from which the lug extends.

- 5 Preferably, the coupling element includes a circular sleeve to surround at least a portion of the or each cable.

BRIEF DESCRIPTION OF THE DRAWINGS

- 10 The invention will be further described, by way of non-limiting example only, with reference to the accompanying drawings in which:

Figure 1 is an upper perspective view of a cable connector of one embodiment of the invention; and

Figure 2 is a lower perspective view of the mechanism of Figure 1.

15

DETAILED DESCRIPTION

- With reference to Figures 1 and 2, there is shown a connector 10 for fixing a shaft 12 to at least one endless cable 14 that passes around a wheel (not shown). In the described example the at least one cable 14 is a pair of endless cables 14a, 14b. The connector 10 comprises a coupling element, in the form of a pair of sleeves 16a, 16b, which is configured to surround at least a portion of each cable 14a, 14b. Each of the sleeves 16a, 16b have extensions 20a, 20b which extend along the cable on a side 19b of the sleeve which is remote to the wheel when the cable passes around the wheel.

25

Each sleeve 16a, 16b is arcuate between the extensions 20a, 20b to prevent contact between the sleeve 16a, 16b and the wheel. A thickness of leading and trailing edges 18a, 18b respectively of each sleeve 16a, 16b is also tapered to further prevent contact between the sleeve 16a, 16b and the wheel.

30

A lug 22 is coupled to the sleeves 16a, 16b. The lug 22 is configured to accept the shaft 12

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in such manner so that the shaft 12 is free to rotate with respect to the connector 10.

Each sleeve 16 is arcuate or curved in a central portion 24 which is between the extensions 20a, 20b. The amount of curvature of the curved portion 24 is slight and proportional to a
5 radius of a wheel (not shown) about which the cable is intended to extend around. In this regard, the radius of the arc takes into consideration the bend radius of the cable and is just enough to ensure that there is no contact between the sleeve 16 and the wheel. The radius of the arc is smaller than a radius of the wheel so that the sleeve 16 does not contact the wheel as the connector 10 moves over the wheel. The curvature of the central portion 24
10 may be constant or vary in a regular or irregular manner.

The curvature of the central portion 24 prevents contact between the sleeve and the wheel by pushing the sleeve away from the wheel, thus reducing the amount of disturbance inflicted on the wheel as the connector 10 passes over it, thereby reducing unwanted noise
15 and vibrations.

The tapering of the thickness of the leading and trailing edges 18a, 18b in a region 19a of the sleeve 16 which is innermost during use also reduces the amount of disturbance inflicted on the drive member as the connector 10 passes over it. Depending on the
20 configuration of the wheel, a groove may be provided in the wheel to receive the cable 14. It will be appreciated that sides of sleeves 16 have a potential to contact the wheel and cause noise. Tapering of the connector around the leading and trailing edges may prevent this contact occurring.

25 The extensions 20a, 20b also urge the cables 14a, 14b into an arc so as to raise each sleeve 16a, 16b away from the wheel. The extensions 20a, 20b also act to cushion any contact between a sleeve and the wheel.

The curvature of the central portion 24 also contributes a small amount of force to fix the
30 connector 10 to each cable 14 so as to transfer power from the shaft 12 to the cable 14 and, in turn, the drive member about which the cable 14 extends. In this regard, because the

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extensions 20a, 20b of the sleeve 16 urge the cable 14 into an arc, as the connector 10 becomes loaded the tension in the cable 14 will act to a straighten the cable and the sleeve 16, thus imparting small force from the cable 14 on the sleeve 16 which acts to affix the two components together.

5

As the connector shown in Figure 1 is used for a system having two cables 14a, 14b which are offset from each other, the sleeves 16a, 16b are required to be coupled together. The sleeves 16a, 16b are coupled by a coupling member 26 from which the lug 22 extends. A support member 28 also extends between the sleeves 16a, 16b and adjacent the coupling member 26. The support member 28 is fixed to the coupling member 26 and has two passages extending through it in which grub screws can be received to form a connection between the sleeve 16a, 16b and the cables 14a, 14b.

10

Each sleeve 16 is sized so that an internal diameter of the sleeve 16 is slightly larger than an external diameter of the cable 14 so that connector may be easily installed on the cable 14 by threading the cable 14 through the sleeve 16. The curvature of sleeve 16 is formed prior to the insertion of the cable 14. An upper portion of each sleeve 16 is configured to accept the grub screw that extends through the support member 28 and through the upper portion of the sleeve to engage the cable and fix the connector to the cable.

15

20

Each grub screw acts to fix the connector 10 to the cable 14 so as to transfer power from the shaft 12 to the cable 14 and, in turn, the wheel or drive member about which the cable 14 extends.

25

Lug 22 has a central hole through which the shaft 12 can be received. In the example shown, a screw 30 is used to fix a collar 32 to the shaft 12, though it will be appreciated that other forms of connection may be used to couple the shaft 12 to the lug 22.

30

Although described with reference to a pair of cables, it will be appreciated that a single cable or more than 2 cables, for example 3 or 4, may be used. Furthermore, a single

- 5 -

coupling element or sleeve may surround each cable or a number of cables. Each of the illustrated sleeves is shown as being circular in cross section, though it will be appreciated that the sleeve may take other forms which are not circular. In some examples, a sleeve may be configured to surround more than one cable and thus would be appropriately
5 shaped so as to engage each of those cables.

It will be appreciated by persons skilled in the art that the above embodiments have been described by way of example only and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the
10 invention as defined by the appended claims.

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CLAIMS

1. A connector for fixing a shaft to at least one endless cable that passes around a wheel, the connector comprising:
 - 5 a coupling element which is configured to surround at least a portion of the or each cable, the coupling element having extensions which extend along the cable on a side remote to said wheel when the cable passes around the wheel; and
 - a lug coupled to the coupling element, the lug being configured to accept the shaft, wherein the coupling element is arcuate between the extensions to prevent contact
- 10 between the coupling element and the wheel.
2. A connector as claimed in claim 1, wherein a radius of the arc of the coupling element is smaller than that of the wheel.
3. A connector as claimed in claim 1 or claim 2, wherein the extensions urge the cable into an arc so as to raise the coupling element from the wheel.
- 15 4. A connector as claimed in any one of the preceding claims, wherein the at least one cable is a pair of cables which are offset from each other, the cables being coupled by a coupling member from which the lug extends.
5. A connector as claimed in any one of the preceding claims, wherein the coupling element includes a circular sleeve to surround at least a portion of the or each cable.

1 / 2

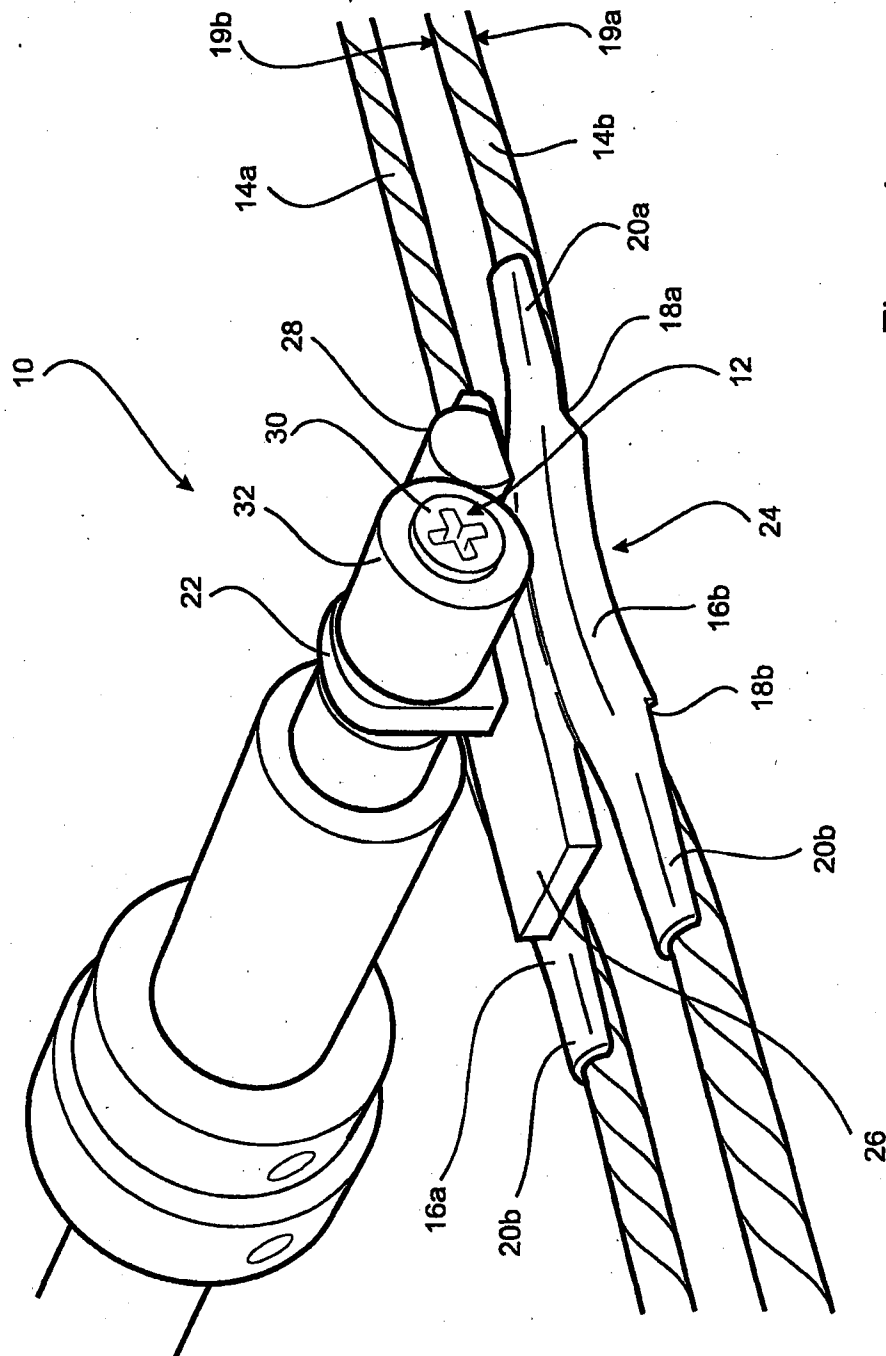


Figure 1

2/2

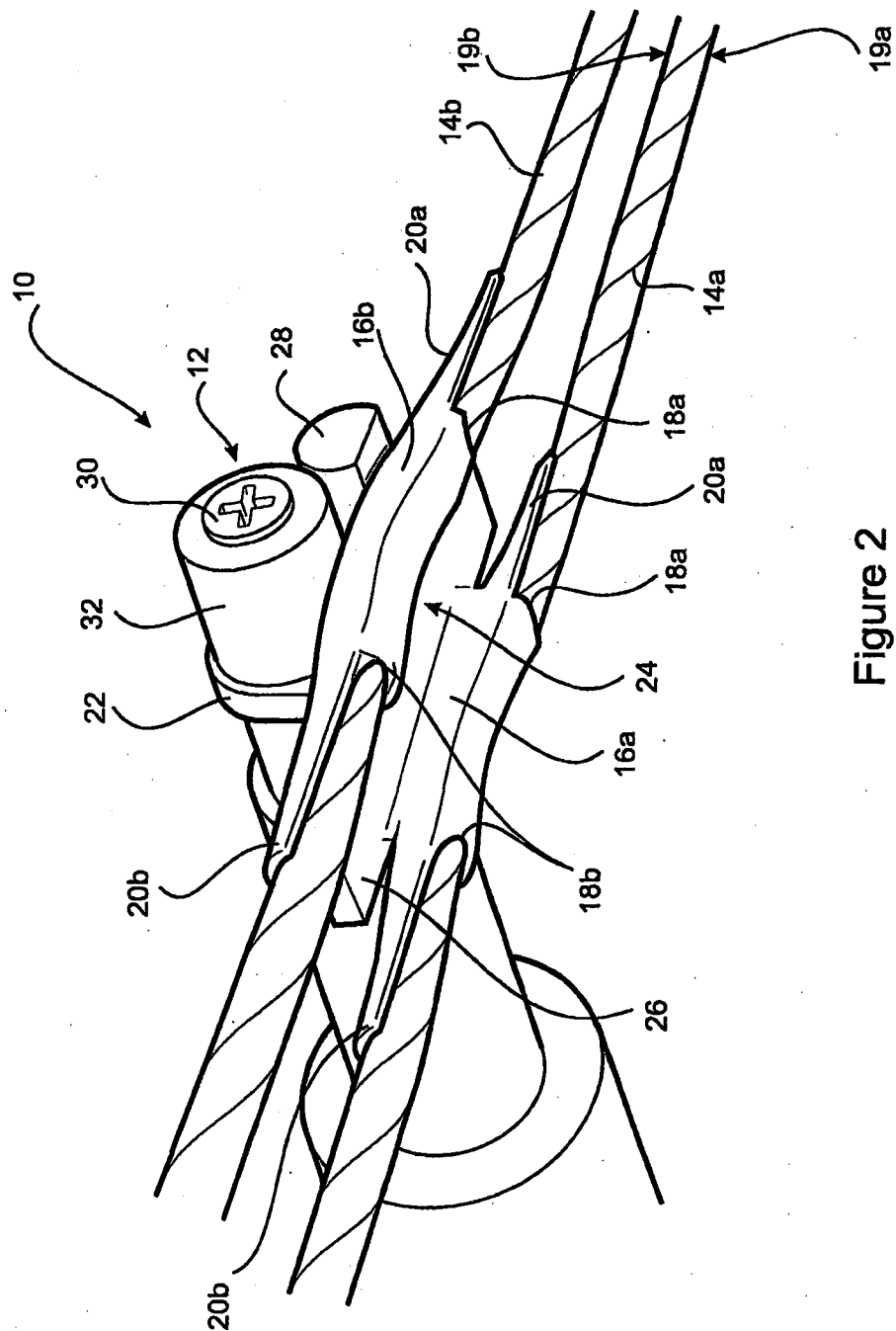


Figure 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2012/000561

A. CLASSIFICATION OF SUBJECT MATTER

F16G 11/00 (OCT 2005) B65G 15/00 (OCT 2005)

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)

EPODOC, WPI: cable, wire, wheel, disc, drum, spool, guide, coupler, connector, attach, fasten, lug, shaft, arm, rod, extension, projection, sleeve, prevent, avoid, friction, noise, vibration, noise and similar keywords.

Esp@cenet, Google patents and Google Scholar were also searched with similar keywords as above.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

☒ 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	"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
"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	

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INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2012/000561
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CA 2253692 A1 (CANIMEX INC) 28 May 1999 Whole document	1-5
A	US 7017715 B2 (LAPI) 28 March 2006 Whole document	1-5
A	US 3106366 A (BERNARD) 08 October 1963 Whole document	1-5

Form PCT/ISA/210 (fifth sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2012/000561

This Annex lists known 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/s Cited in Search Report		Patent Family Member/s	
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CA 2253692 A1	28 May 1999	CA 2220710 A1	01 Jan 1998
		CA 2253692 A1	28 May 1999
US 7017715 B2	28 Mar 2006	EP 1419086 A1	19 May 2004
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		IT PI20010057 A1	13 Feb 2003
		US 2004238291 A1	02 Dec 2004
		US 7017715 B2	28 Mar 2006
		WO 03016125 A1	27 Feb 2003
US 3106366 A	08 Oct 1963	US 3106366 A	08 Oct 1963
		US 3258545 A	28 Jun 1966

End of Annex