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(72) Inventor; and
(71) Applicant : **ZINN, Albert, Gareth** [ZA/ZA]; 48 Clair Avenue, Manor Gardens, 4001 Durban (ZA).

(74) Agent: **VAN DER MERWE, Andries, Petrus, Schalk**; P O Box 20301, 2522 Noordbrug (ZA).

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(54) **Title**: ENERGY CARRYING CORD LOCATION OF JOINING INSULATOR

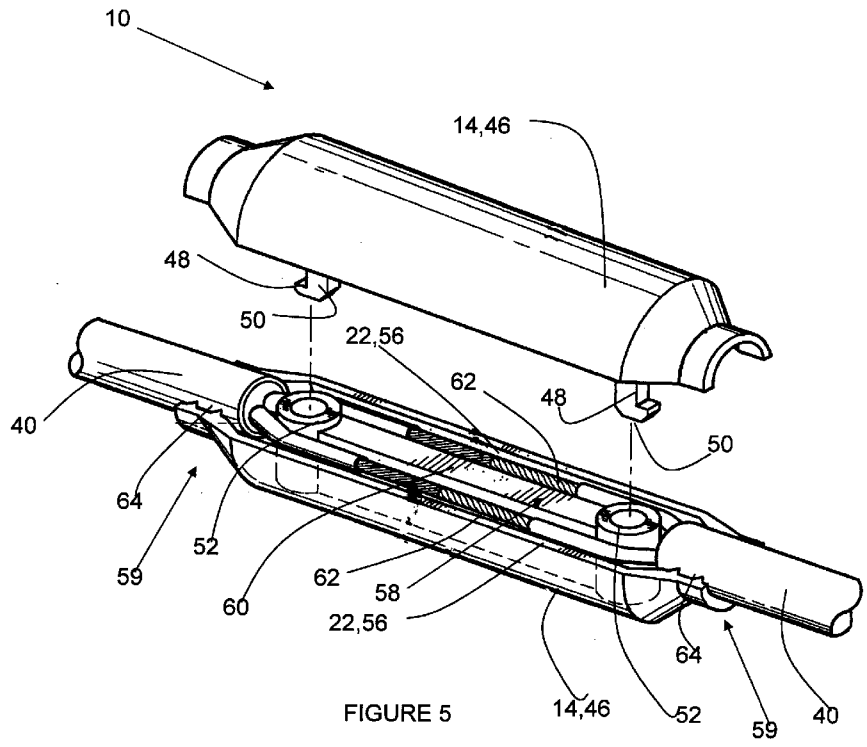

FIGURE 5

(57) **Abstract**: An electrical cord joining and sealing insulator (10) comprising an insulating housing (12) constituted from two sealably inter-engageable cup shaped bodies (24) that, once engaged, define a wire connecting zone (16), housing cord access apertures (18) to the zone (16) and a linearly extending wire isolating facility in the form of a tri-walled facility (30) that is locatable along the zone (16) in separating connected wire lengths (62) against short circulating. Cord sealing along the apertures (18) is achieved by seals (42) that become pinched onto cord ends on inter-engaged of the bodies (24).

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(1) TITLE OF THE INVENTION

ENERGY CARRYING CORD LOCATION OF JOINING INSULATOR

(2) FIELD OF INVENTION

This invention relates to an energy carrying cord location of joining insulator for insulating an energy-carrying cord joint during the joint forming process that involves the joining of a number of individual energy carrying wires, against both an exposure to the environment and a transfer of energy between separate lines of energy carrying wires. While not so limited the invention finds useful application for isolating electrical cord joints.

(3) BACKGROUND TO THE INVENTION

The electrical joining of cords by way of joining matching wires running along cords intended for joining is a common occurrence. The wires once joined must naturally be electrically isolated from one another. This is commonly done by isolation tape or other sealer that if often prone to decay in the long run creating the possibility of short circuiting. In addition to isolating the joined wires the object of such isolation is also to seal the joint against the ingress of the elements of the environment, and especially water. The use of especially insulation tape does not effectively perform such a sealing function. It is, amongst others, an object of this invention to address these problems.

(4) BRIEF DESCRIPTION OF DRAWINGS

The invention is now described by way of example of the invention, with reference to the accompanying diagrammatic drawings.

In the drawings:

Figure 1 shows one embodiment of an energy carrying cord location of joining insulator in the form of an electrical cord location of joining insulator, according to the invention, in housing part unengaged and operatively used cord end engaging side elevation,

Figure 2 shows the insulator of the figure 1 embodiment in engaged and sectioned side elevation,

Figure 3 shows the insulator of the figures 1 and 2 embodiment in figure 2 view side elevation,

Figure 4 shows the insulator of the figures 1 to 3 embodiment along section line A-A in figure 3 however omitting any cord ends and electrical wiring,

Figure 5 shows another embodiment of the insulator in housing part partly unengaged and operatively used cord end engaging three-dimensional view,

Figure 6 shows the insulator of the figures 5 embodiment in upper housing part removed overhead view,

Figure 7 shows the insulator of the figures 5 and 6 embodiment in exploded and housing part sectioned side elevation, and

Figure 8 shows the insulator of the figures 5 to 7 embodiment in the figure 7 view engaged condition.

(5) DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

Referring to the drawings an energy carrying cord location of joining insulator according to the invention in the form of an electrical cord location of joining insulator is generally indicated by reference numeral 10.

The insulator 10 comprises a linearly extending insulating housing 12 that is constituted from at least two sealably inter-engageable housing parts 14 (as shown in their engaged conditions in figures 2, 3, and 8) that, once engaged, define a generally tubular wire connecting zone 16, locations of sealable cord access to the housing 12 extending along apertures 18 formed at opposite ends of the housing 12, at least once constituted from its parts 14, and a linearly extending wire isolating facility generally indicated by reference numeral 20 and discussed below in detail for each of the embodiments, along which a number of inter-isolated wire accommodating paths 22 extend, at least once the parts 14 of the housing 12 are inter-engaged.

In referring to the figures 1 to 4 embodiment the parts 14 of the housing 12 are in the form of two housing sections as provided by hollow cup shaped bodies 24 that are engageable along a common axis 26. The bodies 24, as thus in the form of cups that are centrally apertured through their closed ends, are screwably securable while sealing between them is achieved via a ring seal 28. The wire-connecting zone 16 is consequently formed once the bodies 24 are secured to one another.

The wire isolating facility 20 is in the form of a wall defining formation as provided by a tri-wall facility 30 of which the various walls 32 radiate at fixed inter wall spacings from a common central axis 34, as more clearly shown in figure 4. While the facility 30 fully removably fits the housing 12 its diameter is selected to snugly fit the inner end regions 36 of the opposite bodies 24. The length of the facility 30 is in fact selected so that its one half fits the inner end region 36 of the one body 24 and its other half the inner end region 36 of the other body 24 resulting in a firm and snug overall fit of the facility within the zone 16 once the bodies 24 are fully engaged. The various wire-accommodating paths 22 are consequently defined between adjacent radiating walls 32 once the facility 30 is held in the zone 16. Once the bodies 24 are disengaged while cord ends intended for joining by way of the insulator 10 are threaded along their apertures 18, matching stripped wire ends can in an unencumbered way be secured to one another as the facility 30 only becomes positioned to perform its wire-accommodating path defining function once the wire ends have been secured.

While the object of the insulator 10 is to create an electrical connection between electrical cords 40 that is sealed from the environment the apertures 18 must also hold cord end regions against ingress of environmental elements into the zone 16. In this regard the cross sectional areas of the bodies 24 narrow in the direction of their aperture presenting ends, at least from beyond the reach of the facility 30, forming tapering end regions 38. The insulator 10 incorporates cord end region sealing in the form of a ring seal 42 that is locatable onto the end lengths 44 of each of opposite cords 40. The degree of body narrowing or tapering is naturally coordinated with the diameter of the seals 42 as in turn adequately snugly fitting the relevant cord end lengths 44 to cause the bodies 24 to progressively pinch the seals 42 onto the cord

end lengths 44 in sealing the cords 40 in their apertures 18 on the progressive engagement of the bodies 24. It will be appreciated that variation in seal diameter can accommodate a variety of cord diameters while the insulator 10 can also be made in a variety of sizes.

In another embodiment and referring to figures 5 to 8 the housing 12 as defined by two housing parts 14, is in the form of two half sections 46 that are engageable to form the housing 12 while on such engagement also creating opposite end apertures 18 owing to the appropriate formation of the sections 46. The sections 46 may be sealably inter-securable by snap fit configurations in the form of resilient arms 48 extending from the one section 46 that are formed at their remote ends with catch formations 50. The arms 48 are receivable down guides 52 presented by the other section 46 that are formed with bottom end catch formation snap fit apertures 54. The snap fit configuration will naturally be configured to obtain a sealing fit between the sections 46 once the catch formations 50 are received in the apertures 54.

The wire accommodating paths 22 of this embodiment are defined along a number of channels 56 formed along a core 58 extending along one of the sections 46. The channels 56 are separated by a central wall 60 forming part of the core 58 that come into abutment with a ridge along the other section 46 on their snap fit securing. The core 58 as presenting the channels 56 and in combination with the ridge of the other section 46 define the wire isolating facility 20 of this embodiment. Prior to engagement of the non-channel displaying section 46 with the other section 46 the wire-connecting zone 16 it thus fully exposed enabling the unencumbered joining of matching wire ends. Once so joined lengths of joined wiring 62 are simply located along the relevant channels 56 followed by the securing of the sections 46 to one another.

Similar to the figure 1 to 4 embodiment the apertures 18 once formed must sealably hold cord end lengths. The sections 46 once inter-secured form narrowing end regions 59 that promote the pinchable engagement of the sections 46 onto cord end lengths during the in use assembly of the insulator 10. The end regions 59 of the sections 46 may be resilient to accommodate a variety of cord diameters. But a

variety of insulator sizes can also accommodate for such variation. Similar to the figures 1 to 4 embodiment seals can also be used to achieve a proper sealing. As conventional, the flexible end regions 59 of the sections 46 may be formed with a plurality of ridge formations 64 on their operatively internal surfaces. These formations 64 serve to grip the outer surfaces of the cords lengths 40 where they pass through the apertures 18 thus limiting any axial movement of the cords relative to the housing 12.

In referring to the figures 1 to 4 embodiment, preparation for use of the insulator 10 commences with the disengagement of the bodies 24 and removal of the facility 30. The subsequent step involves the positioning of the bodies 24 onto the end lengths of the to-be-joined cords 40 by threading them through the apertures 18, as more clearly shown in figure 1. The next step involves the serial location of the seals 42 onto the two cord end lengths followed by the conventional securing of matching cord wires into forming lengths of joined wiring 62. At this time the insulator 10 is still unassembled as shown in figure 1. The subsequent step involves the operative positioning of the facility 30 within the connecting zone 16 and amongst the joined wiring 62 in a way that results in each of the lengths of joined wiring extending along a wire accommodating path 22 thus being sealed against short circuiting from one another by the walls 32 of the facility 30.

The final step simply involves the screwable engagement of the sections 24 into forming a sealed connection by way of the seal 28. During such engagement the opposite halves of the facility 30 become received within the inner end regions 36 of the bodies 24 until becoming firmly lodged within the connecting zone 16. Simultaneously the seals 42 become progressively located into the end regions 38 of their respective sections 24 to the extent of becoming pinched onto the cords 40 thereby also sealing the apertures 18 against the environment. Once the insulator 10 has been fully assembled the connecting zone 16 is fully sealed against the ingress of environmental elements while the location of cord joining along the zone 16 extends against any short circuiting between lengths of joined wiring 62. The insulator 10 is naturally re-usable by simply disengagement of the sections 24 and severing of the lengths of joined wiring 62.

In referring to figures 5 to 8 a cord joining action commences by the location of cord end lengths of cords 40 along the end recesses 61 formed along the section 46 that houses the core 58 and that on combination with the matching recesses 63 of the other section 46 on their engagement form the apertures 18. Matching wiring ends are subsequently secured into forming lengths of joined wiring 62, again typically by a soldering process. The lengths of joined wiring 62 are each located along a channel 56 causing their separation against short-circuiting by way of the separating wall 60. The final step involves the inter-securing of the sections 46 by urging them up against one another to achieve their sealed engagement once the catch formations 50 are received in their apertures 54. In the process the opposite recesses 61, 63 close sealing onto the cords 40 on forming the apertures 18 and against linear displacement of the cords 40 relative to the housing as brought about by the functioning of the ridge formations 64 in biting into the cords 40.

It will be understood that the invention provides a device for insulating an electrical wire connection that has wide application potential depending on requirements. Also, numerous variations may be made to the embodiment of the invention described above without departing from the scope hereof.

(6) CLAIMS

(1) An energy carrying cord location of joining insulator (10) comprising

an insulating housing (12) that is constituted from at least two sealably inter-engageable housing parts (14) that, once engaged, define a wire connecting zone (16) within which exposed wire ends of a number of cords (40) along each of which a plurality of wires run are joinable into in an energy transferring way connection of such cords, and

locations of cord access (18) to the housing (12) along which cord end regions are receivable in a way that seals off the wire connecting zone (16) from the environment while also holding such cords (40) against at least substantial linear displacement relative to the housing (12) at the latest once the parts of the housing are inter-engaged under conditions of cord end region fitment thus sealingly holding cord ends along the locations of cord access;

characterised in that the insulator also incorporates a wire isolating facility (20) that becomes enclosed by the housing (12) once its parts are engaged and along which facility a number of inter-isolated wire accommodating paths (22, 56) extend, at least once the parts of the housing are inter-engaged, for holding joined wire ends against inter joined-wire-length energy transfer while the connecting zone (16) is adequately accessible to permit the unencumbered joining of matching wire end regions by way of conventional joining techniques while the parts are still disengaged.

(2) An energy carrying cord location of joining insulator as claimed in claim 1 in which the locations of cord access (18) are from opposite ends of the housing that extends linearly consequently defining a generally tubular wire connecting zone (16) while the wire isolating facility is arranged to define generally linearly extending inter-isolated wire accommodating paths.

(3) An energy carrying cord location of joining insulator as claimed in claim 1 or claim 2 in which the wire isolating facility (20, 30) fully removably fits the wire connecting zone (16) at the latest becoming firmly operatively positioned once the housing parts (14, 24) are inter-engaged enabling the joining of matching wire ends prior to causing

inter joined-wire-length energy transfer isolation in response to the operative positioning of the wire isolating facility.

(4) An energy carrying cord location of joining insulator as claimed in claim 3 insofar as the wire isolating facility (20, 30) extends linearly in which the wire isolating facility is in the form of a wall defining formation (30) extending along the central axis (26) of the housing (12), at least once operatively positioned if removably fitting the wire-connecting zone (16).

(5) An energy carrying cord location of joining insulator as claimed in claim 4 in which the wall defining formation (30) is in the form of a multi-wall facility of which the various walls (32) radiate from a common central axis (34) that at least substantially coincides with the axis of the housing (26), at least once the facility is operatively positioned, with the wire accommodating paths (22) extending along the arcuately formed zones between adjacent radiating walls of the multi-wall facility.

(6) An energy carrying cord location of joining insulator as claimed in any one of claims 3 to 5 in which in the housing parts (14, 24), insofar as the wire isolating facility (20) extends linearly, are in the form of two housing sections (30) each being in the form of a hollow body of not necessarily fixed circular profile and which bodies are sealably inter-engageable along a common axis by way of their inner ends in the process encompassing the isolating facility (20, 30) as removably fitting along the wire connecting zone while at the latest becoming operatively positioned once matching wires have been joined on operative use of the insulator, the bodies each being formed with an end aperture (18) defining its location of cord access along each of which a cord end length is consequently sealably receivable.

(7) An energy carrying cord location of joining insulator as claimed in claim 6 in which the housing sections (30) are arranged to sealingly hold cord end regions, as passable there along, along the end apertures (18), by way of flexible cord end sealing (42), not necessarily forming part of the insulator, that are pre-fitted to cord end lengths prior to joining their matching wires during operative use of the insulator with the housing sections narrowing from their inner ends, via which they are inter-secured, to their aperture presenting ends to the extent of adequately pinching the

sealing onto their cord end lengths at the latest once the housing sections are fully inter-secured to the extent of attaining a seal that seals the wire connecting zone (16) against the ingress of environmental elements during operative use of the insulator while, once the insulator is thus assembled, also holding cord end lengths against at least substantial linear displacement relative to the housing.

(8) An energy carrying cord location of joining insulator as claimed in claim 2 in which the wire accommodating paths (22) are formed along channels (56) extending along a core (58) of the insulator that is situated within the wire-connecting zone while the housing accommodates the secure holding of the core.

(9) An energy carrying cord location of joining insulator as claimed in claim 5 or claim 8 in which the housing (12) is constituted from engageable housing halves (46) that create the locations of cord access by way of opposite end apertures (18) that are formed on securing of the housing halves to one another while in the case of the wire accommodating paths being formed along the channels (56) extending along the core (58), the secure holding of the core is accommodated in being fitted to one of the halves (46).

(10) An energy carrying cord location of joining insulator as claimed in claim 9 in which the end apertures (18) formed once the housing halves (46) are interconnected are arranged to hold cord end regions against the ingress of environmental elements in response to the housing halves combining into forming narrowing end regions (59) to the effect of at least indirectly urging up against the outer surfaces such cord end regions once the insulator is operatively used.

(11) An energy carrying cord location of joining insulator as claimed in claim 10 in which the narrowing end regions (59) formed on fitting the housing halves together are of resiliently flexible character to accommodate cords of varying diameters.

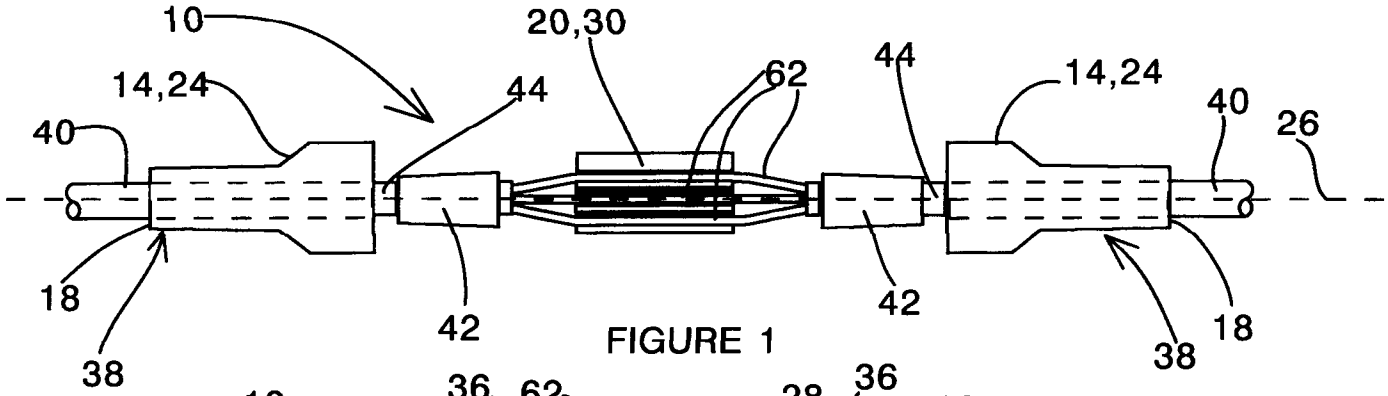

FIGURE 1

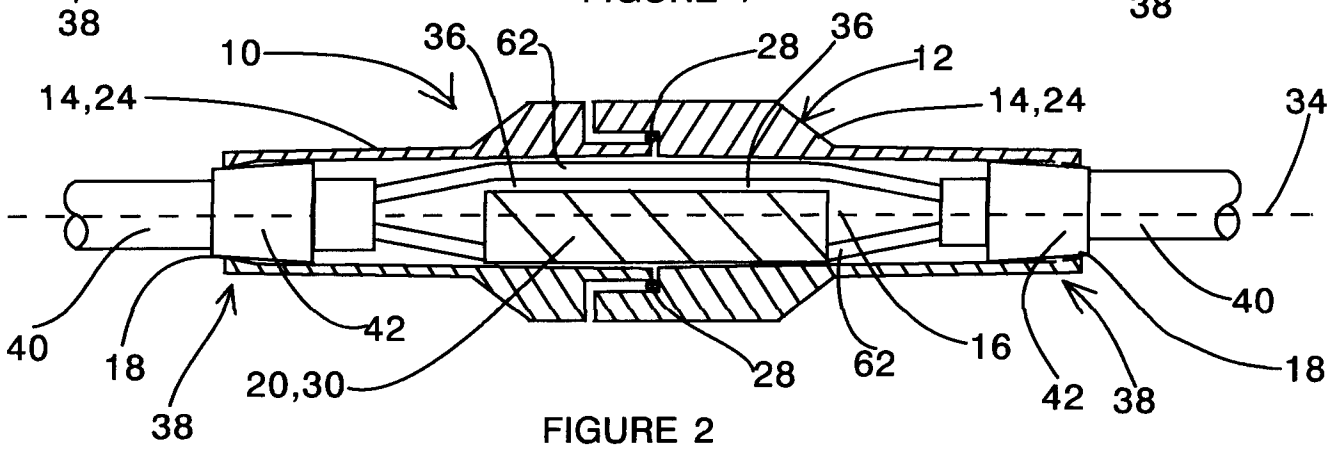

FIGURE 2

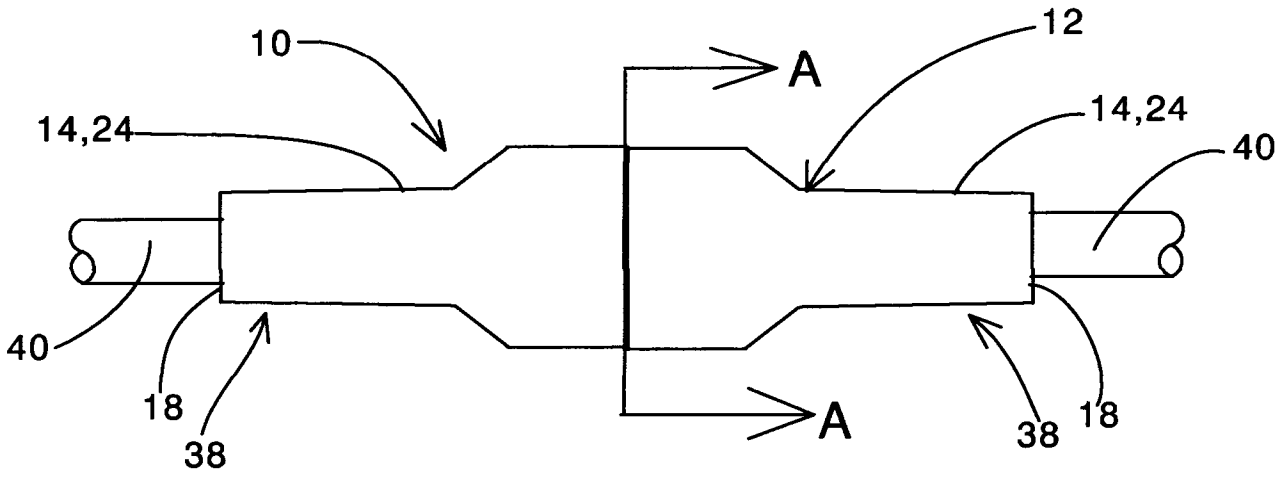

FIGURE 3

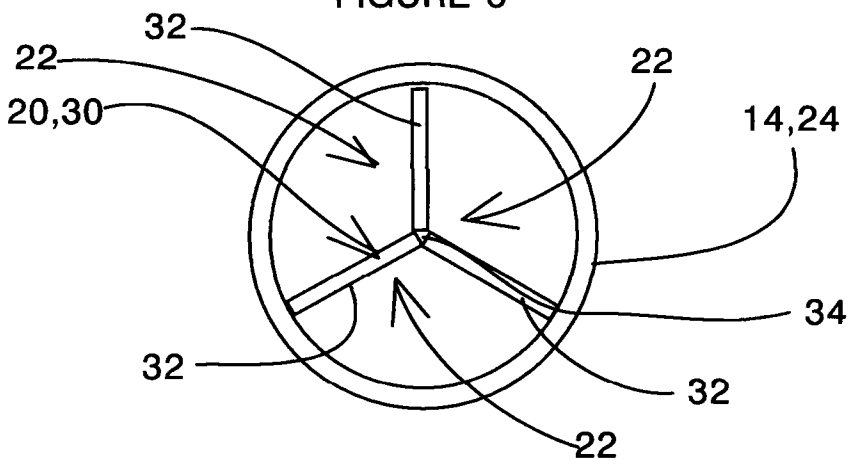

FIGURE 4

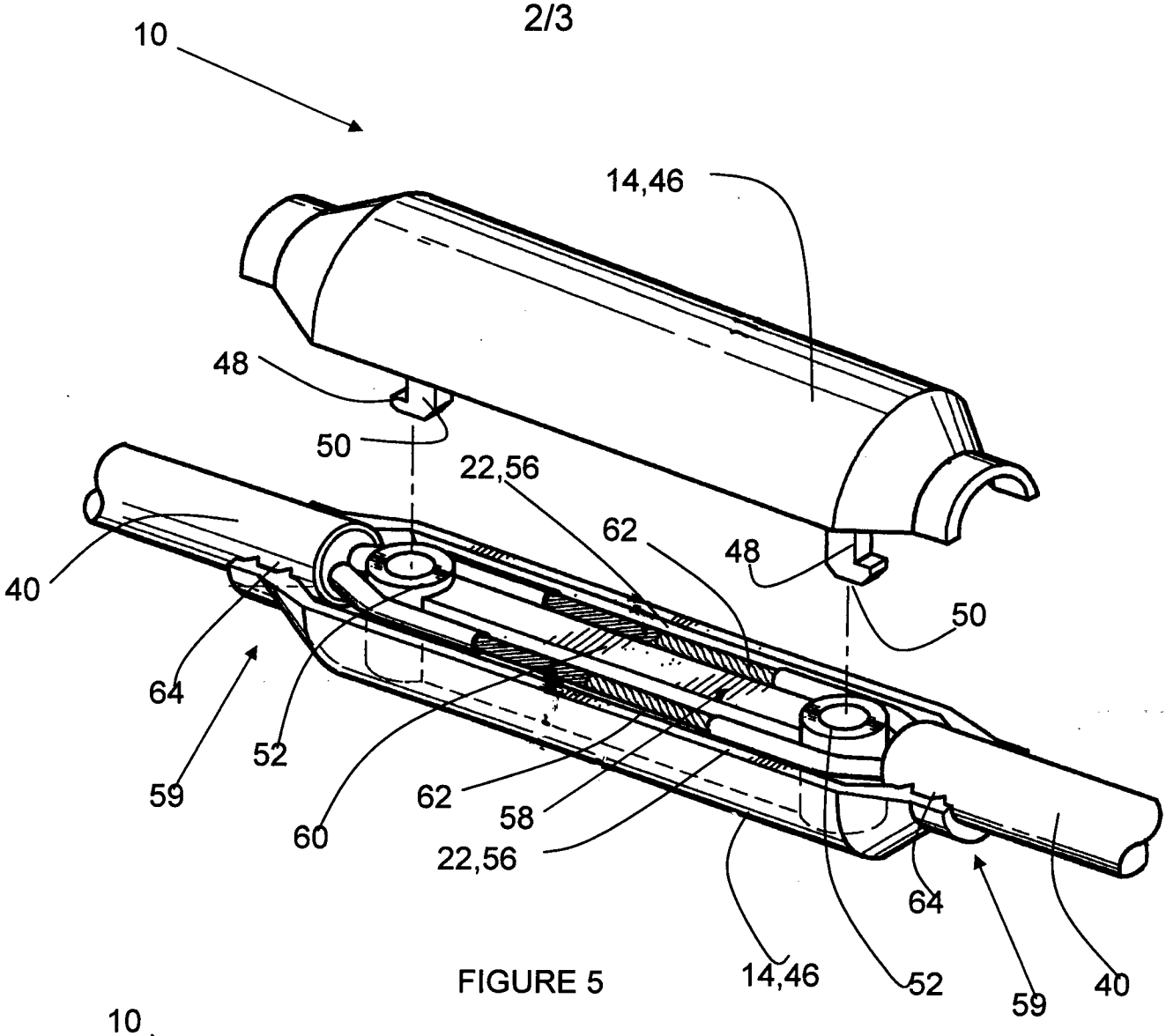

FIGURE 5

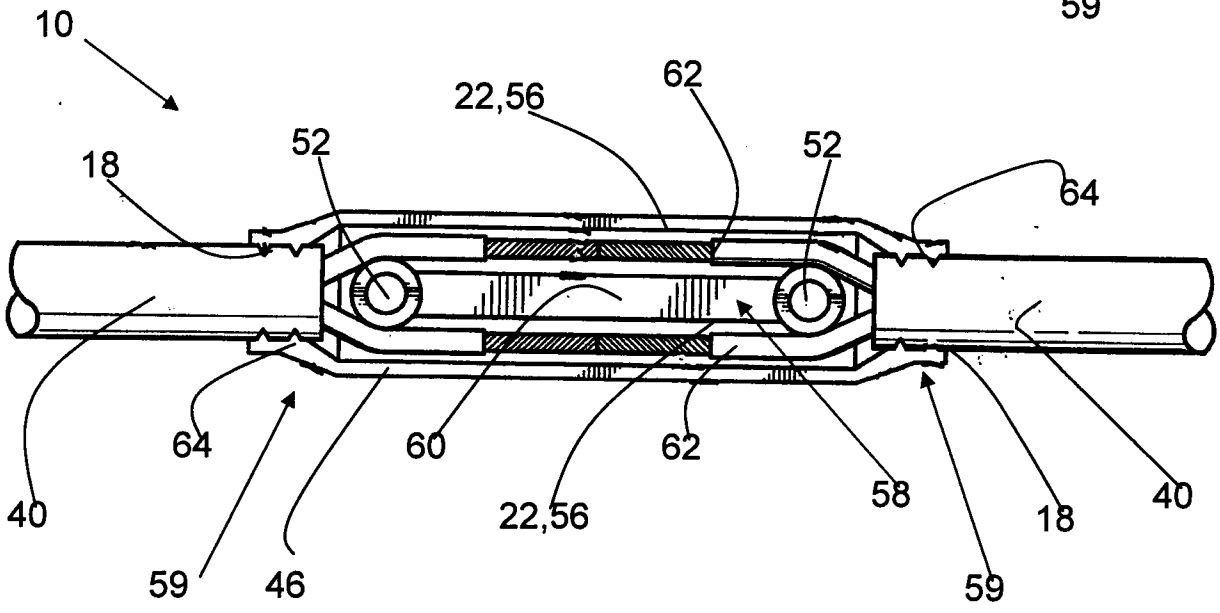

FIGURE 6

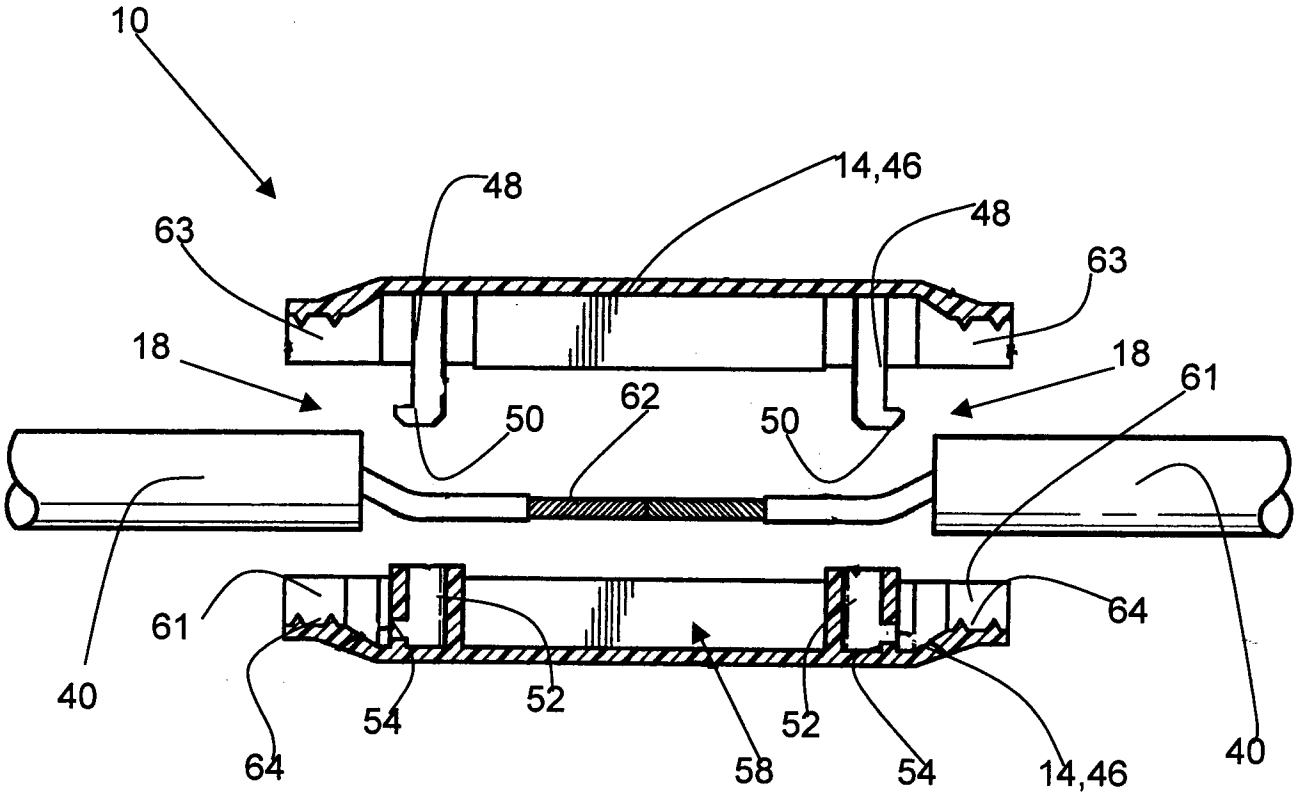

FIGURE 7

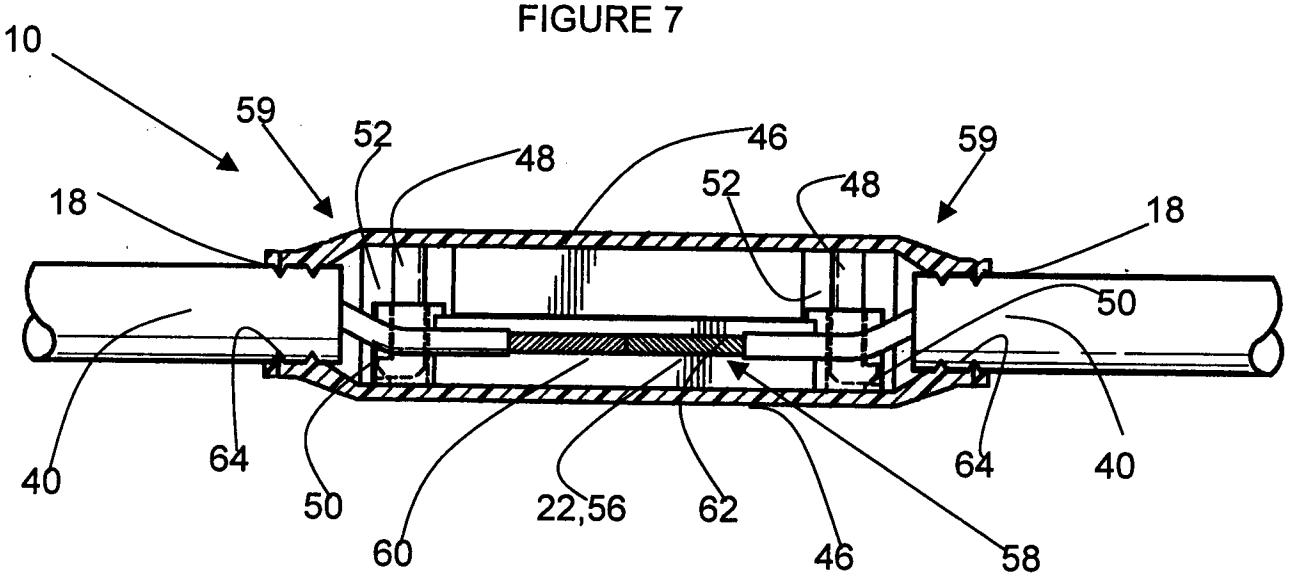

FIGURE 8

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***H02G 15/113*** (2006.01); ***H01R 13/502*** (2006.01); ***H01R 4/70*** (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)
H01R; H02G

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)
WPI, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	NL 1025320 C2 (NOSSBAUM FREDERIK DANIEL) 26 July 2005 (26.07.2005) figures 1 and 2 and description of figures.	1-4,6-11
Y		5
X	GB 2292641 A (CRISCUOLO D.E.P.) 28 February 1996 (28.02.1996) figures 1B, 1C and 2 and description of figures	1-4, 6-11
Y		5
X	GB 2410843 A (AZARMI KOUROSH) 10 August 2005 (10.08.2005) whole document	1-4,5-11
Y		5
Y	WO 2009103443 A1 (CCS TECHNOLOGY, INC) 27 August 2009 (27.08.2009) figures 1 to 3	5

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/ZA2011/000040

Patent document cited in search report			Patent family member(s)			Publication date
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			DE	U1	202008002464	2008-05-15
			EP	A1	2245492	2010-11-03
			WO	A1	2009103443	2009-08-27