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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
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CONFIRMATION NO. 6017

26610
STROOCK & STROOCK & LAVAN LLP
180 MAIDEN LANE
NEW YORK, NY 10038

FILING RECEIPT

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Date Mailed: 04/01/2010

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Applicant(s)

Glenn J. Luzzi, Mt. Bethel, PA;

Power of Attorney:
Charles Cantine--43531

If Required, Foreign Filing License Granted: 03/30/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/316,176**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

600A ELBOW ARRESTER ASSEMBLY

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Application Data Sheet

Application Information

Application Type::	Regular
Subject Matter::	Utility
Title::	600A ELBOW ARRESTER ASSEMBLY
Attorney Docket Number::	493331/0036
Total Drawing Sheets::	5
Small Entity?::	Yes
Secrecy Order in Parent Appl.?::	

Applicant Information

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Postal or Zip Code of mailing address::	18343

Correspondence Information

Correspondence Customer Number:: 26610

Representative Information

Representative Customer Number:: 26610

Domestic Priority Information

Country::	Application Number::	Filing Date::	Priority Claimed::

Foreign Priority Information

Country::	Application Number::	Filing Date::	Priority Claimed::
None			

PTO/SB/16 (10-08)
Approved for use through 06/30/2010. OMB 0651-0032
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 1 of 2

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. ELECTRONICALLY FILED (EFS)

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Glenn J.	**Luzzi**	**Mt. Bethel, PA**

Additional inventors are being named on the _____ *separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max):

600A ELBOW ARRESTER ASSEMBLY

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☒ The address corresponding to Customer Number: **26610**

OR

☐ Firm or Individual Name

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City	State	Zip
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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Application Data Sheet. See 37 CFR 1.76

☐ CD(s), Number of CDs _____

☒ Drawing(s) *Number of Sheets* 5

☐ Other (specify) _____

☒ Specification (e.g. description of the invention) *Number of Pages* 22

Fees Due: Filing Fee of $220 ($110 for small entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fee and application size fee (if applicable).

☐ Payment by credit card. Form PTO-2038 is attached

$110.00

TOTAL FEE AMOUNT ($)

☒ The Director is hereby authorized to charge the filing fee and application size fee (if applicable) or credit any overpayment to Deposit Account Number: 19-4709.

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PTO/SB/16 (10-08)
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☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

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SIGNATURE _____ Date **March 22, 2010**

TYPED or PRINTED NAME **Charles E. Cantine** REGISTRATION NO. **43,531** *(if appropriate)*

TELEPHONE **212-806-5400** Docket Number: **493331/0036**

600A ELBOW ARRESTER ASSEMBLY

CROSS-REFERENCE TO PRIOR APPLICATIONS

[0001] This application is related to U.S. Provisional Application Serial No. 61/301,315, filed on February 4, 2010, which is hereby incorporated by reference in is entirety.

FIELD

[0002] The present invention relates to electrical connector assemblies, and specifically to an arrester assembly for 600 Ampere systems.

BACKGROUND

[0003] Electrical systems, such as underground utility systems, typically require protection against transient voltages. Transient voltages may be caused by a number of sources, for example, from fault conditions in the system, lightning strikes, etc., and are typically orders of magnitude greater than operating voltages. Accordingly, transient voltages can damage electrical components such as cables, splices, terminations, transformers, switchgear, etc. To protect systems and components from transient voltages, suppression components are generally employed. One such suppression component that is widely used includes elbow arresters.

[0004] In underground utility systems, 200A load-break elbow arresters are commonly used. In 200A systems, 200A load-break elbow arresters can be easy installed and removed. Further, 200A load-break arresters permit live operation, i.e., the ability to be installed or removed while the 200A system is energized. Live operation permits easy maintenance and servicing of the system. Live operation of 200A load-break elbow arresters are typically performed using a fiberglass hot-stick.

[0005] Despite the ease with which 200A load-break arresters can be installed or removed, the use of elbow arresters in 600A systems is more complicated. In order to install a 200A load-break arrester in a 600A system, a 600A to 200A reducing component is typically required. These reducing components are expensive, and increase the size and complexity of the assembly. The increased size of the assembly may cause the stack height of the installation to become excessive and require a large enclosure. Alternatively, the use of a 600A to 200A reducing component can be avoided by directly installing an arrester onto a 600A elbow. However, there are complications associated with installing an arrester directly onto a 600A elbow. First, 600A devices typically require a bolted and torqued connection. Thus, installation and removal of the arrester is often difficult and time-consuming. Second, 600A components typically cannot be installed or removed while the 600A system is energized. Accordingly, installation or removal of the arrester for servicing would require powering down the 600A system.

SUMMARY

[0006] The present invention is directed to a 600A arrester assembly. In an embodiment of the present invention, the assembly includes a connector module and an arrester module. In an alternative embodiment, the assembly includes a connector module, a connecting plug module,

and an arrester module. The embodiments of the present invention provide a 600A elbow arrester that does not require a 600A to 200A reducing device and is capable of live operation using a standard hot-stick. Further, the assembly prevents flashovers which are inherent in live operation of 600A systems.

[0007] In an embodiment, the present invention provides a 600A arrester assembly. The arrester assembly includes a connector module including an internal conductor disposed within an insulative housing. The connector module includes a connecting plug interface configured to engage a bushing, a cable interface configured to receive a cable, and a first mating interface having a contact, a locking element, and an insulative element. The assembly further includes an arrester module including a second mating interface having a contact and a locking element. The arrester module is configured to releasably engage the connector module via a releasable engagement of the first mating interface and the second mating interface. The insulative element is disposed at least partially within the first mating interface so as to insulate the conductor and the contact of the first mating interface from an edge of the first mating interface, and the locking elements of the first and second mating interfaces providing the releasable engagement of the first and second mating interfaces.

[0008] In an alternative embodiment, the present invention provides a 600A arrester assembly. The arrester assembly includes a connector module, a connecting plug module, and arrester module. The connector module includes a bushing interface configured to engage a bushing, a cable interface configured to receive a cable and a mating interface configured to engage the connecting plug module. The connecting plug module includes an internal conductor disposed within an insulative housing, and two mating interfaces having an insulative element. The assembly further includes an arrester module including a mating interface having a contact and a

locking element. The arrester module is configured to releasably engage the connecting plug module via a releasable engagement. The insulative element is disposed at least partially within the mating interfaces so as to insulate the conductor and the contact of the mating interfaces of the connecting plug from an edge of the mating interfaces, and the locking elements provide the releasable engagement of the arrester module and the connecting plug.

[0009] In an alternative embodiment, the present invention provides a 600A arrester assembly. The arrester assembly includes a bushing extender module, a connecting plug module, and arrester module. The bushing extender module includes a bushing interface configured to engage a bushing and a mating interface configured to engage the connecting plug module. The connecting plug module includes an internal conductor disposed within an insulative housing, and two mating interfaces having an insulative element. The assembly further includes an arrester module including a mating interface having a contact and a locking element. The arrester module is configured to releasably engage the connecting plug module via a releasable engagement. The insulative element is disposed at least partially within the mating interfaces so as to insulate the conductor and the contact of the mating interfaces of the connecting plug from an edge of the mating interfaces, and the locking elements provide the releasable engagement of the arrester module and the connecting plug.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The present invention will be more readily understood from the detailed description of exemplary embodiments presented below considered in conjunction with the accompanying drawings, in which:

[0011] Figure 1 is a cross sectional view of an unmated 600A arrester assembly, shown proximate a bushing, in accordance with an embodiment of the present invention;

[0012] Figure 2 is a cross sectional enlarged view of a portion of the connector module of the 600A arrester assembly in accordance with an embodiment of the present invention;

[0013] Figure 3 is a cross sectional view of a mated 600A arrester assembly attached to a bushing in accordance with an embodiment of the present invention;

[0014] Figure 4 is a cross sectional enlarged view of a portion of a mated 600A arrester assembly in accordance with an embodiment of the present invention

[0015] Figure 5 is a cross sectional view of an unmated 600A arrester assembly in accordance with an embodiment of the present invention;

[0016] Figure 6 is a cross sectional view of a mated 600A arrester assembly attached to a bushing in accordance with an embodiment of the present invention; and

[0017] Figure 7 is a cross sectional view of a mated 600A arrester assembly in accordance with an embodiment of the present invention..

DETAILED DESCRIPTION

[0018] Figure 1 presents a cross-sectional view of an unmated 600A arrester assembly 100 in accordance with an embodiment of the present invention. The arrester assembly 100 includes an arrester module 7 couplable to a connector module 8. The connector module 8 is similar to the elbow described in U.S. Patent No. 7,588,469, which is hereby incorporated by reference in its entirety. The connector module 8 includes an insulative housing 110 and an internal conductor 120. The connector module 8 is configured to include three mating interfaces 1, 2, 11. Although each mating interface may be configured to mate with a variety of various connectors or devices, the mating interfaces preferably include a bushing interface 2, a cable interface 1, and a mating interface 11. The bushing interface 2 is preferably configured to mate with a bushing 15, and includes a bore 21 and a contact 22. Alternatively, bushing interface 2 may be configured to mate with a connecting plug or other electrical connectors and/or devices. The bore 21 is preferably cylindrical or conical, and is preferably configured to receive a bushing 15. The contact 22 is electrically coupled to the internal conductor 120 and preferably includes threads to threadedly engage a portion of the bushing 15. The contact 22 may also include a portion 4 that can be engaged by a tool to rotate the contact 22 so as to threadedly engage the threads of the contact 22 with a portion of the bushing 15. Alternatively, contact 22 can be a female connector configured to mate with a male connector of the bushing 15. Preferably, the bushing interface 2 is a 600A female bushing interface and is configured to mate with the industry standard 600A male bushing interface.

[0019] The cable interface 1 is configured to receive a cable (not shown) and includes a bore 111 and a contact 112. In a preferred embodiment, the contact 112 is preferably a lug that is electrically coupled to the cable. The bore 111 is preferably cylindrical or conical and is

preferably configured to receive a cable that mates with the connector module 8. The contact 112 provides an electrical connection between the cable and the contact 22, and ultimately the bushing 15 and the internal conductor 120. Preferably, the contact 112 includes a lug hole through which the contact 22 passes through in mating with a portion of the bushing 15. The contact 112 optionally includes various adapters configured to receive different types of cables.

[0020] The mating interface 11 is configured to mate with an electrical component or connector such as the arrester module 7. Although the mating interface 11 is described with respect to the arrester module 7, one of ordinary skill in the art will understand that the mating interface 11 can be configured to mate with a wide range of electrical components and/or connectors. The mating interface 11 preferably includes a cylindrical or conical bore 131, a contact 5, a locking mechanism 13, and an insulating element 3. The bore 131 is defined by insulative material 122 forming the mating interface 11, and is configured to house at least a portion of the internal conductor 120, the contact 5, and at least a portion of the insulating element 3. The contact 5 is electrically coupled to the internal conductor 120, and is configured to mate with an electrical contact 6 of the arrester module 7. Preferably, the contact 5 of the mating interface 11 is a female connector, and the contact 6 of the arrester module 7 is preferably a male connector. The physical connection between the connector module 8 and the mated arrester module 7 is secured via the locking mechanism 13. Locking mechanism 13 may include a protrusion that engages a recess 14 of the arrester module 7, or may include other securing mechanisms. Although the locking mechanism 13 is shown as being disposed towards an end of the mating interface 11, the locking mechanism 13 can be disposed at other locations along the mating interface 11 such as at locations 18 and 19 as shown in FIG. 1, or at location 23 as shown in Figures 2 and 4.

[0021] The insulating element 3 is disposed at an end of the bore 131 of the mating interface 11 that mates with the arrester module 7. In a preferred embodiment, the insulating element 3 extends beyond the end of the bore 131 of the mating interface 11 past the end of the insulative material 122. The insulating element 3 helps ensure that neither the internal conductor 120 nor the contact 5 is exposed at the end of the bore 131 of the mating interface 11. This can help protect against flashovers that are inherent in typical 600A system interfaces. The mating interface 11 is preferably similar to a typical 600A male interface. Figure 2 presents an end of the mating interface 11 in greater detail. Figure 2 shows the bore 131, the insulating element 3, insulative material 122, and the locking mechanism 13.

[0022] The arresting module 7 is couplable with the connector module 8 and resembles a 200A elbow arrester component. The arresting module 7 mates with the mating interface 11 of the connector module 8. The arresting module 7 includes an insulative housing 700, a mating interface 10, a block stack 9, and a ground connection 702 coupled to the bottom of the block stack 9. The block stack 9 is disposed within the insulative housing 700, and typically includes a stack of metal oxide varistor ("MOV") blocks. The mating interface 10 resembles a 600A female interface, and engages the male mating interface 11 of the connector module 8. The mating interface 10 includes a bore 701, a contact 6, and a locking mechanism 14. When the arresting module 7 is mated to the connecting module 8, the locking mechanism 14 engages the locking mechanism 13 of the connector module 8, securing the mechanical connection of the arresting module 7 to the connecting module 8. Preferably, the locking mechanism 14 includes a groove or a recess complementary to the protrusion of the locking mechanism 13. Although the locking mechanism 14 is shown as being disposed near the base of the contact 6, the locking

mechanism 14 may be disposed anywhere along the bore 701, such as near locations 16 and 17, as long as the design is complementary to locking mechanism 13 of the mating interface 11.

[0023] The contact 6 is preferably a male connector, and is disposed in the bore 701, which is preferably conical or cylindrical. When the mating interface 10 is mated to the mating interface 11 of the connector module 8, the contact 6 is electrically coupled to the contact 5 of the connector module 8. The insulating element 3 ensures that the internal conductor 120 and the contact 5 are sufficiently buried within the bore 131 and separated from the contact 6 to prevent flashover during live operation, i.e., installation or removal of the arrester module 7 while the system is energized. Accordingly, arrester module 7 preferably includes a pulling eye 12 to engage a hot-stick for live operation of the arrester module 7.

[0024] Figure 3 presents a cross-sectional view of a mated 600A arrester assembly 100 in accordance with an embodiment of the present invention. The assembly 100 includes the connector module 8 and the arrester module 7, shown installed to a bushing 15. As shown in Figure 3, the connector module 8 is mated to the arrester module 7 and the assembly is installed to a 600A bushing 15. The connector module 8 is mated to the 600A bushing 15 via the bushing interface 2. In this mated position, the contact 22 is electrically coupled to the 600A bushing 15. As shown in Figure 3, the contact 22 includes threads which are threadedly engaged with the 600A bushing 15. The threaded engagement may have been actuated via rotation of the contact 22 with a tool configured to engage the contact 22 at portion 4 of the contact 22.

[0025] Additionally, the connector module 8 is mated to the arrester module 7 via a releasable engagement of the interface modules 10 and 11. In this mated position, the contact 6 of the arrester module 7 is electrically coupled to the contact 5 of the connector module 8. The releasable engagement is provided via engagement of the locking mechanisms 13 and 14. As

shown in greater detail in Figure 4, locking mechanisms 13 and 14 preferably include a complementary protrusion and recess to provide the releasable engagement of the connector module 8 and arrester module 7. Other means, devices or physical structures for releasably connecting the arrester module 7 to the connector module 8 in accordance with the teachings herein are contemplated as a matter of design choice to one of ordinary skill in the art. In addition, locking mechanisms 13 and 14 can be disposed at other locations, such as those designated by reference numbers 16, 17, 18, 19, and 23, and can also provide releasable engagement of the connector module 8 and the arrester module 7. Alternatively, locking mechanisms can be incorporated in the contact 5 of the connector module 8 and the contact 6 of the arrester module 7, for example in an area of the contact 5 referenced by reference number 18. Another option includes disposing a locking mechanism at an end of contact 6 to releasably engage with a locking mechanism at 19. Other options include incorporating the locking mechanisms at the end of the bushing shown by reference number 16, or on the mating interfaces shown by reference number 17. Alternatively, the locking mechanism may be disposed towards an end of the mating interface 11, for example, at location 23. Accordingly, the design of the modules and the releasable engagement of the modules allows for live operation of the arrester module 7 and does not require a 600A to 200A reducing component.

[0026] Figure 5 shows a cross-sectional view of an unmated 600A arrester assembly 1000 in accordance with an alternative embodiment of the present invention. The arrester assembly 1000 shown in Figures 5 and 6 is similar to the arrester assembly 100. The arrester assembly 1000 includes an arrester module 7 couplable to a connecting plug module 200, which is couplable to a connector module 300. The connector module 300 is also couplable to a bushing 15. The connector module 300 is similar to the connector module 8, but includes an interface 1103 that is

configured to mate with the connecting plug module 200. The connector module 300 includes an insulative housing 1100, and is configured to include three mating interfaces 1101, 1102, and 1103. Although each mating interface may be configured to mate with a variety of various connectors or devices, the mating interfaces preferably include a bushing interface 1102, a cable interface 1101, and a mating interface 1103. The bushing interface 1102 is similar to the bushing interface 2 of the connector module 8, and the cable interface 1101 is similar to the cable interface 110 of the connector module 8. The bushing interface 1102 is preferably configured to mate with the bushing 15, and includes a bore 210 and a contact 220. Alternatively, bushing interface 1102 may be configured to mate with a connecting plug or other electrical connectors and/or devices known in the art. The bore 210 is preferably cylindrical or conical, and is preferably configured to receive the bushing 15. The contact 220 is electrically couplable to the bushing 15, and preferably includes threads to threadedly engage a portion of the bushing 15. Alternatively, contact 220 can be a female connector configured to mate with a male connector of the bushing 15. Preferably, the bushing interface 1102 is a 600A female bushing interface and is configured to mate with the industry standard 600A male bushing.

[0027] The cable interface 1101 is configured to receive a cable (not shown) and includes a bore 1110 and a contact 1120. In a preferred embodiment, the contact 1120 is preferably a lug that is electrically coupled to the cable. The bore 1110 is preferably cylindrical or conical and is preferably configured to receive a cable that mates with the connector module 300. The contact 1120 provides an electrical connection between the cable and the contact 220, and ultimately the bushing 15 . Preferably, the contact 1120 includes a lug hole through which the contact 220 passes through in mating with a portion of the bushing 15. The contact 1120 optionally includes various adapters configured to receive different types of cables.

[0028] The mating interface 1103 is configured to mate with an electrical component or connector such as a connecting plug module 200. Although the mating interface 1103 is described with respect to the connecting plug module 200, one of ordinary skill in the art will understand that the mating interface 1103 can be configured to mate with a wide range of electrical components and/or connectors. The mating interface 1103 preferably includes a cylindrical or conical bore 501 configured to receive end 2001 of the connecting plug module 200. The mating interface 1103 allows the connecting plug module 200 to electrically mate with the contact 220. Further, the mating interface 1103 also includes a locking mechanism 500 to releasably secure the connecting plug module 200 to the connector module 300.

[0029] The connecting plug module 200 includes mating interfaces 2001 and 2002. Mating interface 2001 includes an internal conductor 1200 is configured to mate with mating interface 1103 of the connector module 300. Mating interface 2001 is received into mating interface 1103 and forms an electrical connection with the contact 220. Preferably, contact 220 includes threads to threadedly engage at least a portion of the connecting plug module 200 in mating the connecting plug module 200 to the connector module 300. Alternatively, contact 220 can be a female connector configured to mate with a male connector of the connecting plug module 200.

[0030] The mating interface 2002 is similar to the mating interface 11 of the connector module 8, and is preferably configured to mate with arrester module 7. Although the mating interface 2002 is described with respect to the arrester module 7, one of ordinary skill in the art will understand that the mating interface 2002 can be configured to mate with a wide range of electrical components and/or connectors. The mating interface 2002 preferably includes a cylindrical or conical bore 1310, a contact 50, a locking mechanism 130, and an insulating element 30. The bore 1310 is defined by insulative material 1220 forming the mating interface

2002, and is configured to house at least a portion of the internal conductor 1200, the contact 50, and at least a portion of the insulating element 30. The contact 50 is electrically coupled to the internal conductor 1200, and is configured to mate with an electrical contact 6 of the arrester module 7. Preferably, the contact 50 of the mating interface 2002 is a female connector, and the contact 6 of the arrester module 7 is preferably a male connector. The physical connection between the connecting plug module 200 and the mated arrester module 7 is secured via the locking mechanism 130. Locking mechanism 130 may include a protrusion that engages a recess 14 of the arrester module 7, or may include other securing mechanisms similar to those described with respect to the earlier embodiments. Although the locking mechanism 130 is shown as being disposed towards an end of the mating interface 2002, the locking mechanism 130 can be disposed at other locations along the mating interface 2002, such as at locations 180, 190, and 230, similar to the releasable coupling provided by mating interface 11 of the connector module 8.

[0031] The insulating element 30 is disposed at an end of the bore 1310 of the mating interface 2002 that mates with the arrester module 7. In a preferred embodiment, the insulating element 3 extends beyond the end of the bore 1310 of the mating interface 2002 past the end of the insulative material 1220. The insulating element 30 helps ensure that neither the internal conductor 1200 nor the contact 50 is exposed at the end of the bore 1310 of the mating interface 2002. This can help protect against flashovers that are inherent in typical 600A system interfaces. The mating interface 2002 is preferably similar to a typical 600A male interface.

[0032] Similar to the arrester assembly 100, the arresting module 7 is couplable to the connecting plug module 200 and resembles a 200A elbow arrester component. The arresting module 7 mates with the mating interface 2002 of the connecting plug module 200. The

arresting module 7 includes an insulative housing 700, a mating interface 10, a block stack 9, and a ground connection 702 coupled to the bottom of the block stack 9. The block stack 9 is disposed within the insulative housing 700, and typically includes a stack of metal oxide varistor ("MOV") blocks. The mating interface 10 resembles a 600A female interface, and engages the male mating interface 2002 of the connecting plug module 200. The mating interface 10 includes a bore 701, a contact 6, and a locking mechanism 14. When the arresting module 7 is mated to the connecting plug module 200, the locking mechanism 14 engages the locking mechanism 130 of the connecting plug module 200, securing the mechanical connection of the arresting module 7 to the connecting plug module 200. Preferably, the locking mechanism 14 includes a groove or a recess complementary to the protrusion of the locking mechanism 130. Although the locking mechanism 14 is shown as being disposed near the base of the contact 6, the locking mechanism 14 may be disposed anywhere along the bore 701, such as near locations 16 and 17, as long as the design is complementary to locking mechanism 130 of the mating interface 11.

[0033] The contact 6 is preferably a male connector, and is disposed in the bore 701, which is preferably conical or cylindrical. When the mating interface 10 is mated to the mating interface 2002 of the connecting plug module 200, the contact 6 is electrically coupled to the contact 50 of the connecting plug module 200. The insulating element 30 ensures that the internal conductor 1200 and the contact 50 are sufficiently buried within the bore 1310 and separated from the contact 6 to prevent flashover during live operation, i.e., installation or removal of the arrester module 7 while the system is energized. Accordingly, arrester module 7 preferably includes a pulling eye 12 to engage a hot-stick for live operation of the arrester module 7.

[0034] Figure 6 presents a cross-sectional view of a mated 600A arrester assembly 1000 in accordance with an embodiment of the present invention. The assembly 1000 includes the connector module 300, the connecting plug module 200, and the arrester module 7, shown installed to a bushing 15. As shown in Figure 6, the connecting plug module 200 is mated to the arrester module 7, which is mated to the connector module 300, and the assembly is installed to a 600A bushing 15. The connector module 300 is mated to the 600A bushing 15 via the bushing interface 1102. In this mated position, the contact 220 is electrically coupled to the 600A bushing 15. As shown in Figure 6, the contact 220 includes threads which are threadedly engaged with the 600A bushing 15 and the connecting plug module 200.

[0035] Additionally, the connecting plug module 200 is mated to the arrester module 7 via a releasable engagement of the mating interfaces 10 and 2002. In this mated position, the contact 6 of the arrester module 7 is electrically coupled to the contact 50 of the connecting plug module 200. The releasable engagement is provided via engagement of the locking mechanisms 130 and 14. Other means, devices or physical structures for releasably connecting the arrester module 7 to the connecting plug module 200 in accordance with the teachings herein are contemplated as a matter of design choice to one of ordinary skill in the art. In addition, locking mechanisms 130 and 14 can be disposed at other locations, and can also provide releasable engagement of the connecting plug module 200 and the arrester module 7, such as at locations 16, 17, 180, 190, and 230. Locking mechanisms can be incorporated in the contact 50 of the connecting plug module 200 and the contact 6 of the arrester module 7. Another option includes disposing a locking mechanism at an end of contact 6 to releasably engage with a locking mechanism at 190. Other options include incorporating the locking mechanisms at the end of the bushing shown by reference number 16, or on the mating interfaces shown by reference number 17. Alternatively,

the locking mechanism may be disposed towards an end of the mating interface 11 at location 230. Accordingly, the design of the modules and the releasable engagement of the modules allows for live operation of the arrester module 7 and does not require a 600A to 200A reducing component.

[0036] Figure 7 shows a cross-sectional view of an unmated 600A arrester assembly 2000 in accordance with an alternative embodiment of the present invention. The arrester assembly 2000 shown in Figure 7 is similar to the arrester assembly 1000 shown in Figures 5 and 6. The arrester assembly 2000 includes an arrester module 7 couplable to a connecting plug module 200, which is couplable to a bushing extender module 5000. The bushing extender module 5000 is also couplable to a bushing 15. The bushing extender module 5000 is similar to the connector module 300, but does not include an interface configured to receive a cable. The bushing extender module 5000 includes an insulative housing 2100, and is configured to include two mating interfaces 2101 and 2102. Although each mating interface may be configured to mate with a variety of various connectors or devices, the mating interfaces preferably include an interface to mate with bushing interface 2101 and a mating interface 2102. The bushing interface 2101 is similar to the bushing interface 2 of the connector module 8, and the bushing interface 1102 of the connector module 300. The bushing interface 2101 is preferably configured to mate with the bushing 15, and includes a bore 2105 and a contact 2110. Alternatively, bushing interface 2101 may be configured to mate with a connecting plug or other electrical connectors and/or devices known in the art. The bore 2105 is preferably cylindrical or conical, and is preferably configured to receive the bushing 15. The contact 2110 is electrically couplable to the bushing 15, and preferably includes threads to threadedly engage a portion of the bushing 15. Alternatively, contact 2110 can be a female connector configured to mate with a

male connector of the bushing 15. Preferably, the bushing interface 2101 is a 600A female bushing interface and is configured to mate with the industry standard 600A male bushing.

[0037] The mating interface 2102 is configured to mate with an electrical component or connector such as a connecting plug module 200. Although the mating interface 2102 is described with respect to the connecting plug module 200, one of ordinary skill in the art will understand that the mating interface 2102 can be configured to mate with a wide range of electrical components and/or connectors. The mating interface 2102 preferably includes a cylindrical or conical bore 2120 configured to receive end 2001 of the connecting plug module 200. The mating interface 2102 allows the connecting plug module 200 to electrically mate with the contact 2110. Further, the mating interface 2102 also includes a locking mechanism 2125 to releasably secure the connecting plug module 200 to the connector module 5000.

[0038] The connecting plug module 200 includes mating interfaces 2001 and 2002. Mating interface 2001 includes an internal conductor 1200 is configured to mate with mating interface 2102 of the bushing extender module 5000. Mating interface 2001 is received into mating interface 2102 and forms an electrical connection with the contact 2110. Preferably, contact 2110 includes threads to threadedly engage at least a portion of the connecting plug module 200 to the bushing extender module 5000. Alternatively, contact 2110 can be a female connector configured to mate with a male connector of the connecting plug module 200.

[0039] The mating interface 2002 is similar to the mating interface 11 of the connector module 8, and is preferably configured to mate with arrester module 7. Although the mating interface 2002 is described with respect to the arrester module 7, one of ordinary skill in the art will understand that the mating interface 2002 can be configured to mate with a wide range of electrical components and/or connectors. The mating interface 2002 preferably includes a

cylindrical or conical bore 1310, a contact 50, a locking mechanism 130, and an insulating element 30. The bore 1310 is defined by insulative material 1220 forming the mating interface 2002, and is configured to house at least a portion of the internal conductor 1200, the contact 50, and at least a portion of the insulating element 30. The contact 50 is electrically coupled to the internal conductor 1200, and is configured to mate with an electrical contact 6 of the arrester module 7. Preferably, the contact 50 of the mating interface 2002 is a female connector, and the contact 6 of the arrester module 7 is preferably a male connector. The physical connection between the connecting plug module 200 and the mated arrester module 7 is secured via the locking mechanism 130. Locking mechanism 130 may include a protrusion that engages a recess 14 of the arrester module 7, or may include other securing mechanisms similar to those described with respect to the earlier embodiments. Although the locking mechanism 130 is shown as being disposed towards an end of the mating interface 2002, the locking mechanism 130 can be disposed at other locations along the mating interface 2002, such as at locations 180, 190, and 230, similar to the releasable coupling provided by mating interface 11 of the connector module 8.

[0040] The insulating element 30 is disposed at an end of the bore 1310 of the mating interface 2002 that mates with the arrester module 7. In a preferred embodiment, the insulating element 3 extends beyond the end of the bore 1310 of the mating interface 2002 past the end of the insulative material 1220. The insulating element 30 helps ensure that neither the internal conductor 1200 nor the contact 50 is exposed at the end of the bore 1310 of the mating interface 2002. This can help protect against flashovers that are inherent in typical 600A system interfaces. The mating interface 2002 is preferably similar to a typical 600A male interface.

[0041] Similar to the arrester assemblies 100 and 1000, the arresting module 7 is couplable to the connecting plug module 200 and resembles a 200A elbow arrester component. The arresting module 7 mates with the mating interface 2002 of the connecting plug module 200. The arresting module 7 includes an insulative housing 700, a mating interface 10, a block stack 9, and a ground connection 702 coupled to the bottom of the block stack 9. The block stack 9 is disposed within the insulative housing 700, and typically includes a stack of metal oxide varistor ("MOV") blocks. The mating interface 10 resembles a 600A female interface, and engages the male mating interface 2002 of the connecting plug module 200. The mating interface 10 includes a bore 701, a contact 6, and a locking mechanism 14. When the arresting module 7 is mated to the connecting plug module 200, the locking mechanism 14 engages the locking mechanism 130 of the connecting plug module 200, securing the mechanical connection of the arresting module 7 to the connecting plug module 200. Preferably, the locking mechanism 14 includes a groove or a recess complementary to the protrusion of the locking mechanism 130. Although the locking mechanism 14 is shown as being disposed near the base of the contact 6, the locking mechanism 14 may be disposed anywhere along the bore 701, such as near locations 16 and 17, as long as the design is complementary to locking mechanism 130 of the mating interface 11.

[0042] The contact 6 is preferably a male connector, and is disposed in the bore 701, which is preferably conical or cylindrical. When the mating interface 10 is mated to the mating interface 2002 of the connecting plug module 200, the contact 6 is electrically coupled to the contact 50 of the connecting plug module 200. The insulating element 30 ensures that the internal conductor 1200 and the contact 50 are sufficiently buried within the bore 1310 and separated from the contact 6 to prevent flashover during live operation, i.e., installation or removal of the arrester

module 7 while the system is energized. Accordingly, arrester module 7 preferably includes a pulling eye 12 to engage a hot-stick for live operation of the arrester module 7.

[0043] In an embodiment of the present invention provides an arrester assembly that is easily installed onto industry accepted standard 600A bushings and is capable of live operation using a standard hot-stick without requiring a 600A to 200A reducing device. Further, the assembly allows removal of the arrester module 7 while the system is energized and protects against flashovers that are common in typical 600A systems.

[0044] The present invention is not limited to the described embodiments. It will be understood by those skilled in the art that various omissions, substitutions, and changes in the form and details of the illustrated embodiments, and in their operation, may be made without departing from the spirit and scope of the invention.

I claim:

1. A 600A elbow arrester assembly, comprising:

a connector module including an internal conductor disposed within an insulative housing, the connector module including a bushing interface configured to engage a bushing, a cable interface configured to receive a cable, and a first mating interface having a contact, a locking element, and an insulative element; and

an arrester module including a second mating interface having a contact and a locking element, the arrester module being configured to releasably engage the connector module via a releasable engagement of the first mating interface and the second mating interface,

the insulative element disposed at least partially within the first mating interface so as to insulate the conductor and the contact of the first mating interface from an edge of the first mating interface, and the locking elements of the first and second mating interfaces providing the releasable engagement of the first and second mating interfaces.

2. A live-operable 600A elbow arrester, comprising:

an insulative housing;

a contact disposed within the insulative housing;

a mating interface having a locking element and being configured to mate with an electrical connector module and provide an electrical connection between the electrical connector module and the contact; and

a block stack having a ground connection coupled to the contact,

the locking element providing releasable engagement of the arrester.

ABSTRACT

A 600A elbow arrester assembly including a connector module having an internal conductor disposed within an insulative housing. The connector module including a bushing interface configured to engage a bushing, a cable interface configured to receive a cable, and a first mating interface having a contact, a locking element, and an insulative element. The assembly further including an arrester module including a second mating interface having a contact and a locking element. The arrester module being configured to releasably engage the connector module via a releasable engagement of the first mating interface and the second mating interface. The insulative element being disposed at least partially within the first mating interface so as to insulate the conductor and the contact of the first mating interface from an edge of the first mating interface, and the locking elements of the first and second mating interfaces providing the releasable engagement of the first and second mating interfaces.