

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(10) International Publication Number
WO 2013/089966 A1

(43) International Publication Date
20 June 2013 (20.06.2013)

W I P O | P C T

(51) International Patent Classification:
m m 9/04 (2006.01) **m m 13/533** (2006.01)
m 1H 73/20 (2006.01)

(72) Inventors: **SISLEY, James P.**; 103 Clearview Drive, Baden, Pennsylvania 15005 (US). **MERCK, Paul A.**; 1244 Erie Avenue, Crescent, Pennsylvania 15046 (US). **MUELLER, Robert W.**; 212 Littell Road, Aliquippa, Pennsylvania 15001 (US).

(21) International Application Number:
PCT/US20 12/0654 18

(74) Agents: **HOUSER, Kirk D.** et al; Eckert Seamans Cherin & Mellott, LLC, 600 Grant Street, 44th Floor, Pittsburgh, Pennsylvania 152 19 (US).

(22) International Filing Date:
16 November 2012 (16.1.2012)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(25) Filing Language: **English**
(26) Publication Language: **English**

(30) Priority Data:
61/569,726 12 December 2011 (12.12.2011) US

(71) Applicant: **EATON CORPORATION** [US/US]; Eaton Center, 1111 Superior Avenue, Cleveland, Ohio 441 14 (US).

[Continued on nextpage]

(54) Title: CIRCUIT BREAKER, CIRCUIT BREAKER TERMINAL LUG COVER, AND METHOD OF PROTECTING A TERMINAL LUG

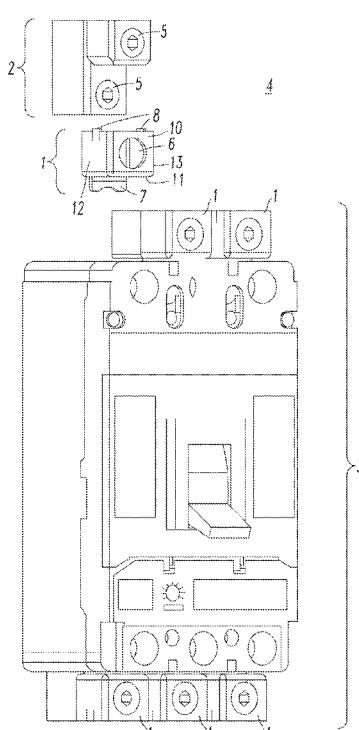


FIG.1

(57) Abstract: A circuit breaker terminal lug cover (1) is structured to mechanically secure to a circuit breaker terminal lug (2) and protect the terminal lug from degradation or corrosion. The terminal lug includes a number of terminal lug screws (5) capable of securing a number of cables to the circuit breaker (3). The terminal lug cover includes a plurality of sides (10, 11, 12, 13) structured to carry heat away from the terminal lug or deflect ionized gases away from the terminal lug. At least one (12, 13) of the sides includes a number of securing members (8, 9) structured to mechanically secure the terminal lug cover to the circuit breaker terminal lug. One (10) of the sides includes an access hole (6) permitting access to the number of terminal lug screws.

WO 2013/089966 A1

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.1 7(H))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.1 7(iii))

Published:

— *with international search report (Art. 21(3))*

CIRCUIT BREAKER, CIRCUIT BREAKER TERMINAL LUG COVER, AND
METHOD OF PROTECTING A TERMINAL LOG

CROSS REFERENCE TO RELATED APPLICATION

5 This application claims the benefit of U.S. Patent Application Serial No. 61/569,726, filed December 12, 2011, which is incorporated by reference herein.

BACKGROUND

Field

10 The disclosed concept pertains generally to heat and corrosion protection devices and, more particularly, to devices used to protect circuit breaker terminals, terminal screw threads, connecting cables, and the like, from heat and corrosion caused by high temperature gases. The disclosed concept further pertains to circuit breakers. The disclosed concept also pertains to methods of protecting circuit breaker terminals, terminal screw threads, connecting cables, and the like.

15 Background information

20 Circuit breakers function to interrupt the flow of electric current when an overload or short circuit is detected within a power circuit. When the circuit breaker interrupts the overload or short circuit current, an arc is generated, which creates exhaust gases of high temperature. These ionized exhaust gases can damage the terminal lug of the circuit breaker by causing corrosion. Additionally, the heated exhaust gases can damage the circuit breaker terminal lug by causing connecting cables to melt onto the terminal lug. Corrosion of the terminal lug coupled with melted cable material can damage terminal lug screw threads rendering the threads and terminal lug unusable.

25 When the cabling connected to a circuit breaker melts onto the terminal lug, such that removal thereof becomes difficult, it is standard practice to cut the damaged cabling. Additionally, when circuit breaker terminal lugs have degraded to such a degree that corrosion and cable melt have made the terminal lug and threads therein unusable, it is standard practice to replace the terminal lug, or in some cases, 30 the entire circuit breaker. Information relevant to attempts to address these problems are found in U.S. Patent No. 5,111,008. However, it is believed that the teachings

- 2 -

found in this Patent suffer **from** the fact that it is not easily adaptable **to interface** between a **commercial** circuit breaker and its terminal **lug**.

Also, several manufacturers of industrial circuit breakers have produced "terminal shields". These shields are not to be confused with the device to be described hereinbelow. In contrast to the device described by the disclosed concept, "terminal shields" lie between the internal phases of a circuit breaker and protect each phase from the arc of another phase. It is believed that such terminal shields fail to properly address or protect external circuit breaker terminal lugs and connecting cables from such arcing events.

Consequently, a need exists in the art for a **method**, apparatus, and device capable of preventing such **terminal lug** degradation or **corrosion**.

There is room for improvement in circuit breakers.

There is also room for improvement in circuit breaker terminal **lugs**.

There is further room for improvement in methods of protecting circuit breaker terminal lugs.

SUMMARY

These needs and others are met by embodiments of the disclosed concept in which a circuit breaker **terminal** lug cover protects a circuit breaker **terminal** lug and a number of connecting cables from degradation or **corrosion** (e.g., without limitation, caused by heat and/or ionized exhaust gases).

in accordance with one aspect of the disclosed concept, a circuit breaker terminal lug cover is structured to mechanically secure to a circuit breaker **terminal** lug and protect the **terminal** lug from degradation or corrosion, the **terminal** lug includes a number of **terminal** lug screws capable of securing a number of cables to the circuit breaker. The **terminal** lug cover comprises: a plurality of sides structured to carry heat away from the **terminal** lug or deflect ionized gases away from the **terminal** lug, wherein at least one of the sides includes a number of securing members structured to mechanically secure the **terminal** lug cover to the circuit breaker **terminal** lug, and wherein one of the sides includes an access hole permitting access to the number of **terminal** lug screws.

As another aspect of the disclosed concept, a circuit breaker apparatus comprises; a circuit breaker comprising: a circuit breaker **terminal** lug including a

- 3 -

number of terminal lug screws capable of securing a number of cables to the circuit breaker; and a circuit breaker terminal lug cover mechanically secured to the circuit breaker terminal lug in order to protect the terminal lug from degradation or corrosion, the terminal lug cover comprising; a plurality of sides structured to carry

5 heat away from the terminal lug or deflect ionized gases away from the terminal lug, wherein at least one of the sides includes a number of securing members mechanically securing the terminal lug cover to the circuit breaker terminal lug, and wherein one of the sides includes an access hole permitting access to the number of terminal lug screws.

10 The plurality of sides may be a front side, a bottom side, and two opposing sides each of which is coupled to the front and bottom sides. The terminal lug cover may fit snugly on a front side, a bottom side, and two opposing sides of the terminal lug in order that physical contact between the terminal lug cover and the terminal lug permits the terminal lug cover to conduct heat away from the terminal lug and the number of cables or deflect ionized gases away from the terminal lug.

15

As another aspect of the disclosed concept, a method protects a circuit breaker terminal lug from degradation or corrosion. The circuit breaker terminal lug includes a number of terminal lug screws capable of securing a number of cables to a circuit breaker, and the circuit breaker includes a terminal lug. The method

20 comprises: mechanically securing a circuit breaker terminal lug cover to the circuit breaker terminal lug in order to protect the terminal lug from degradation or corrosion; providing the circuit breaker terminal lug cover with a plurality of sides structured to carry heat away from the terminal lug or deflect ionized gases away from the terminal lug; including with at least one of the sides a number of securing

25 members mechanically securing the terminal lug cover to the circuit breaker terminal lug; and providing one of the sides with an access hole permitting access to the number of terminal lug screws.

BRIEF DESCRIPTION OF THE DRAWINGS

A full understanding of the disclosed concept can be gained from the

30 following description of the preferred embodiments when read in conjunction with the accompanying drawings in which:

Figure 1 is a partially exploded isometric view of an electrical circuit breaker, including a circuit breaker terminal lug and a terminal lug cover in accordance with **embodiments of the disclosed concept**.

5 Figure 2 is an exploded isometric view of the terminal lug and the terminal lug cover of Figure 1.

Figure 3 is a side profile view of a **fully assembled** terminal lug cover mechanically coupled to and assembled to the **terminal lug** of Figure 2.

Figure 4 is a front profile view of the **terminal lug cover** shown mechanically affixed and assembled to the **terminal lug** of Figures 1-3.

10 Figure 5 is a top plan view of the terminal lug cover affixed and assembled to the **terminal lug** of Figures 1-4.

Figure 6 is a top **plan view** of the terminal lug cover affixed to the **terminal lug of Figure 5**, except **magnified** to show details of the **terminal lug** and the **terminal lug cover**.

15 **DESCRIPTION OF THE PREFERRED EMBODIMENTS**

As employed herein, the term "number" shall mean **one** or an integer greater than one (i.e., a plurality).

20 As employed herein, the **statement** that two or more parts are "connected" or "coupled" or "affixed" together shall **mean that** the parts are joined together either directly or joined through one or more intermediate parts. Further, as employed herein, the **statement** that two or more parts are "attached" shall mean that the parts are joined together directly.

25 As employed herein, the term "circuit breaker" shall mean any electrical switch or circuit **interrupter** that **interrupts the flow of electrical current in an electrical circuit** upon the existence or **occurrence** of specified number of electrical/mechanical fault conditions, **and** that permits the flow of electric **current** in the electrical circuit under other conditions.

30 As employed herein, the term "circuit breaker terminal" shall mean a component of a circuit breaker that permits a number of cables of a circuit to connect to the circuit breaker.

- 5 -

As employed herein, the term "circuit breaker terminal **lug**" or "terminal lug" shall mean a physical **component of a** circuit breaker having a **circuit** breaker terminal.

As employed herein, the term "hole" shall mean an opening through **something; an area where** something is **missing; or an aperture through** something.

As employed herein, the term "access hole" shall mean a hole **through** or **in** something to access something else.

As employed herein, the term "screw" shall mean a **simple machine** of the inclined plane **type** consisting of a **spirally grooved** solid cylinder structured **to fit** into a correspondingly grooved hollow cylinder; a nail-shaped **or rod-shaped** piece with a spiral groove structured to fit into a **correspondingly grooved** hollow material **by rotating; or a threaded** or spirally grooved fastener **structured to fit into a** correspondingly threaded **or** spirally grooved terminal lug **by rotating.**

As employed hereto, the term "cable" shall mean a **circuit** conductor having a number **of individual** electrical conductors.

The disclosed concept provides advantageous apparatus and devices for protecting circuit breakers from failure, degradation, corrosion, and eventual replacement due to excessive heat resulting from **ionized** gases released during arcing events. The circuit breaker **terminal** lug covers described herein prolong the operational lifetime of circuit breakers, and their connecting components. Using the apparatus and devices according to the disclosed concept, thermal energy and/or ionized **exhaust** gasses **are** efficiently **and** effectively conducted **away from** or deflected away from the circuit breaker and its connecting cables.

Figure 1 shows **an isometric view of one embodiment of an electrical** circuit breaker 3, including a circuit breaker terminal lug 2 and a **terminal** lug cover 1. The electrical circuit breaker 3, a number of the circuit breaker **terminal** lugs 2 and a number of the terminal lug covers 1 **form** a circuit breaker apparatus 4. The example circuit breaker 3 includes six example circuit breaker terminals, although the **disclosed** concept is **applicable** to circuit **breakers** having any suitable **number** of circuit breaker **terminals**. As shown in the embodiment of Figure 1, three **terminals** are on a top (with respect to Figure 1) portion of the circuit breaker 3, and three **terminals** are on a bottom (with respect to Figure 1) portion thereof. Five of the

circuit breaker terminals are shown as being assembled, having a terminal lug cover 1 shown affixed to a terminal lug 2. The terminal lugs 2 (only one is shown in Figure 1, it being understood that each of the circuit breaker terminals includes a terminal lug 2) and associated and respective terminal lug covers 1 are shown as assembled with the 5 circuit breaker 3 in five of the six terminal assemblies of Figure 1. A sixth terminal assembly of Figure 1 shows the terminal lug 2 and the terminal lug cover 1 in exploded fashion, shown in an "unassembled" arrangement (i.e., unassembled from the circuit breaker 3).

As shown in Figure 1, each terminal lug 2 includes a number of 10 terminal lug screws 5 that are used to secure a number of circuit breaker cables (not shown) to each terminal lug 2. The terminal lug cover 1 includes an access hole 6 which allows for a screwdriver or similar tool (not shown) to tighten the number of terminal lug screws 5 to the number of cables (not shown). In one embodiment, as shown in Figure 1, the terminal lug cover 1 includes a lower flange 7 and securing 15 clips 8. The lower flange 7 and securing clips 8 are used in assembling and affixing the terminal lug cover 1 to the terminal lug 2.

The terminal lug 2 can be made of copper, aluminum or any other suitable conductor for a circuit, such as a power circuit

The terminal lug cover 1 can be made of a suitable thermoplastic 20 material (e.g., without limitation, LEXAN[®] 500 10% glass filled VO rated).

The terminal lug cover 1 advantageously couples to a portion of the terminal lug 2 external to the circuit breaker 3. The terminal lug 2 is removable from the circuit breaker 3. The upper (with respect to Figure 1) portion of the terminal lug 2 and the terminal lug cover 1 coupled thereto are both external to the circuit breaker 25 3. The terminal lug 2 electrically and mechanically connects to one of the line or load conductors (not shown) of the circuit breaker 4 via a terminal mounting screw (not shown).

Figure 2 shows an exploded isometric view of the terminal lug 2 and the terminal lug cover 1. As shown in Figure 2, the terminal lug 2 includes two 30 terminal lug screws 5 used to secure a number of cables (not shown) to each terminal. The embodiment of Figure 2 further shows the terminal lug cover 1 including the securing clips 8. The securing clips 8 extend from a top (with respect to Figure 2)

portion of the **terminal lug cover 1**. In the **embodiment shown**, the **terminal lug cover 1** includes **the flange 7 extending** therefrom. The **access hole 6 is provided** through the **terminal lug cover 1** as shown in Figure 2. The **access hole 6 permits** access to a number of the **terminal lug screws 5**, which are **in turn used** to couple cabling (not shown) to a respective circuit breaker **terminal (not shown)** positioned within the circuit breaker.

Figure 3 shows a side profile view of the **rally assembled** **terminal lug cover 1** mechanically **coupled to** and **assembled** to the **terminal lug 2**. In the **embodiment shown** in Figure 3, a side profile of the **terminal lug 2** is visible. In this **embodiment**, the **terminal lug cover 1** is snugly affixed to the **terminal lug 2** via the **top** (with respect to Figure 3) **securing clips 8** (**only one** securing clip 8 is **shown** in Figure 3). A profile view of the lower (with respect to Figure 3) flange 7 of the **terminal lug cover 1** described above with reference to Figures 1 and 2 is shown in contact with a lower (with respect to Figure 3) **half of the terminal lug 2**. The **terminal lug cover 1** **fits snugly on a front side 16, a bottom side 17, and two opposing sides 18,19 (shown in Figure 2) of the terminal lug 2** in order that **physical contact** between the **terminal lug cover 1** and the **terminal lug 2** permits the **terminal lug cover 1** to conduct heat away from the **terminal lug 2** and the **number of cables** (not shown) and/or deflect ionized gases away from the **terminal lug 2**.

Figure 4 is a front (with respect to Figures 1 and 4) **profile** view of the **terminal lug cover 1** of Figures 1-3 shown mechanically affixed and assembled to the **terminal lug 2** described above with reference to Figures 1-3. The **embodiment of the terminal lug cover 1 shown in Figure 4** comprises four sides 10,11,12,13, the **securing clips 8** described above with reference to Figures 1-3, the **lower (with respect to Figure 4) flange 7, and the access hole 6 located on the front (with respect to Figure 4) side 10 of the terminal lug cover 1**. As described above with reference to Figures 1 and 2, the **access hole 6** allows access to a number of the **terminal lug screws 5** by a screwdriver or **similar** tool (not shown). As described above, the **number of iermiiial lug screws 5** may be used to secure a number of **connecting** cables (not shown) to the **terminal lug 2**.

Figure 5 shows a top (with respect to Figures 1 and 5) **plan view of the terminal lug cover 1** affixed and assembled to the **terminal lug 2** described above with

reference to Figures 1-4. As shown in Figures 3-5, three 10,12,13 of the four sides 10,11,12,13 of the terminal lug cover 1 are shown affixed to the terminal lug 2. The securing clips 8 described above with reference to Figures 1-4 help secure the terminal lug cover 1 to the terminal lug 2. As shown in Figure 5, one embodiment of the terminal lug cover 1 also includes additional securing clips 9 that span the vertical (with respect to Figure 1) length of the rear (with respect to Figure 1) portion of the terminal lug cover 1. In this embodiment, the additional securing clips 9 help to further secure and mechanically affix the terminal lug cover 1 to the terminal lug 2. In one embodiment, the additional securing clips 9 interface with and couple to a chamfered edge 14 (a top portion of which is best shown in Figure 6) of the terminal lug 2 wherein the chamfered edge 14 is structured to mechanically couple to the additional securing clips 9.

Figure 6 is a top (with respect to Figures 1, 5 and 6) plan view of the terminal lug cover 1 affixed to the terminal lug 2 of Figure 5, except magnified to show the terminal lug cover 1 in more detail. In this embodiment, a top (with respect to Figure 1) portion of the terminal lug 2 is shown mechanically coupled to the terminal lug cover 1. Three 10,12,13 of the four sides 10,11,12,13 of the terminal lug cover 1 are in view, as well as the securing clips 8 and additional securing clips 9.

The disclosed terminal lug cover 1 protects the terminal lug 2 against relatively high temperature exhaust gasses after the circuit breaker 3 has interrupted the corresponding circuit (not shown). The terminal lug cover 1 protects against erosion of the terminals of the terminal lugs 2 from melted terminal material caused by high temperature gases exiting the circuit breaker 3. Since terminals and lug screw threads can otherwise be damaged to a point where the cabling would need to be cut in order to change out the product, the disclosed solution can help avoid potentially costly repairs, beyond a simple circuit breaker replacement.

The disclosed terminal lug cover 1 assembles to the profile of the circuit breaker terminal lug 2, with securing clips 8 and/or 9 to hold the cover in position. The cover 1 allows access to a number of the circuit breaker terminal lug screws 5 in order to connect cabling. The cover 1 then deflects ionized gases away from the body of the terminal lug 2.

In view of what is described above, one skilled in the art will understand that the embodiments of the assembly thus far described comprise the circuit breaker 3, the circuit breaker terminal lug 2, and the terminal lug cover 1. One embodiment of the disclosed concept utilizes a terminal lug cover, such as 1, having four sides 10,11,12,13 with the lower (with respect to Figure 1) flange 7 and the top (with respect to Figure 1) securing clips 8 as well as the rear (with respect to Figure 1) securing clips 9 and the circular hole 6 in the face allowing for the terminal lug screw 5 to pass through and connect to the terminal. The characteristics of the terminal lug cover 1 function to affix securely to the terminal lug 2 and carry heat away from the terminal lug 2 and connecting cables (not shown) through physical contact and/or function as a shield and deflect ionized gases away from the terminal lug 2. The gases deflect off of the shield, thereby preventing the heat of the gases from melting the terminal lug material and the cable's insulating/electrode material. Preferably, the material of the terminal lug cover 1 includes a suitable fire retardant component (e.g., without limitation, a VO fire retardant component).

One skilled in the art may find advantages by using a mechanism different than the securing clips 8 and/or 9 to fasten the terminal lug cover 1 to the terminal lugs 2. One skilled in the art may also find advantages by using a different type of hole than the circular hole 6 on the front (with respect to Figure 1) side 10 of the terminal lug cover 1 to permit the terminal lug screw 5 to pass through such cover. One skilled in the art may also find advantages by using more or fewer sides for the terminal lug cover 1. One skilled in the art may also find advantages by changing the shape and orientation of the flange 7 such that it may not exist at all, or in the alternative, may extend the full length of the lower (with respect to Figure 1) half of the terminal lug 2, while containing an additional access hole or terminal lug screw pass-through feature (not shown).

According to several embodiments, the disclosed concept will extend the life of circuit breaker terminal lugs and connecting cables (not shown) by protecting against degradation and/or corrosion from heat, ionized exhaust gasses or connecting cable melt. These advantageous characteristics of the terminal lug cover 1 will result in substantial cost savings in circuit breaker maintenance.

~ 10 ~

What **has** been shown is the **circuit** breaker terminal **lug** cover 1.

While the **terminal lug** cover 1 has been **described** through specific embodiments and applications **thereof**, it **is understood** that numerous modifications and variations could be made **thereto by those** skilled in the art without **departing** from the spirit and scope of the disclosed concept. It is therefore understood that within the scope of the claims, the disclosed concept may be practiced **otherwise** than specifically described herein.

Accordingly, it is **to be understood** that the disclosed concept is not **to** be limited by the **specific illustrated embodiments**, but only by the **scope of the appended claims**. The **description** may provide examples of similar features as are recited in the claims, but it should not be assumed **that** such similar **features** are identical to those in the **claims** unless such identity is essential to **comprehend** the scope **of the** claim. in some instances, the intended distinction between claim **features** and **description** features is **underscored by** using slightly **different** terminology.

15 The disclosed concept is described in association with a molded case circuit breaker, although the disclosed concept is applicable to a wide range of circuit breakers,

20 While specific **embodiments** of the disclosed concept have been described in detail, it **will** be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. Accordingly, the particular arrangements disclosed are meant to be illustrative **only** and not **limiting as to** the scope **of the disclosed concept which is to be given the full breadth of the claims appended and any and all equivalents thereof.**

~ 11 ~

What is Claimed is:

1. A circuit breaker terminal lug cover (1) structured to mechanically secure to a circuit breaker terminal lug (2) and protect the terminal lug from degradation or corrosion, the terminal lug including a number of terminal lug screws (5) capable of securing a number of cables to the circuit breaker, said terminal lug cover comprising:

a plurality of sides (11, 12, 13, 14) structured to carry heat away from the terminal lug or deflect ionized gases away from the terminal lug,

wherein at least one (12, 13) of the sides includes a number of securing members (8, 9) structured to mechanically secure the terminal lug cover to the circuit breaker terminal lug, and

wherein one (10) of the sides includes an access hole (6) permitting access to the number of terminal lug screws.

2. The circuit breaker terminal lug cover (1) of Claim 1 wherein the number of securing members are a plurality of securing clips (8; 9) structured to couple to a top portion or a rear portion of the terminal lug.

3. The circuit breaker terminal lug cover (1) of Claim 2 wherein the plurality of securing clips (9) are further structured to span and couple to a vertical length of the rear portion of the terminal lug.

4. The circuit breaker terminal lug cover (1) of Claim 3 wherein the vertical length of the rear portion of the terminal lug is a chamfered edge (14); and wherein the plurality of securing clips are further structured to mechanically couple to the chamfered edge.

5. A circuit breaker apparatus (4) comprising:

a circuit breaker (3) comprising:

the circuit breaker terminal lug (2) of Claim 1; and

the circuit breaker terminal lug cover (1) mechanically secured to the circuit breaker terminal lug.

6. The circuit breaker apparatus (4) of Claim 5 wherein the plurality of sides are four sides (10, 11, 12, 13); and wherein the number of securing members are a plurality of securing clips (8, 9) that couple the terminal lug cover to the terminal lug.

~ 12 ~

7. The circuit breaker apparatus (4) of Claim 5 wherein the plurality of sides are a front side (10), a **bottom** side (11), and two **opposing** sides (12,13) each of which is coupled to the front and bottom sides; wherein the **terminal lug** cover fits snugly on a front side (16), a **bottom** side (17), and two opposing sides (18,19) of the terminal lug in order that physical contact between the **terminal lug** cover and the **terminal lug** permits the **terminal lug** cover to conduct heat away from the **terminal lug** and the number of cables or deflect ionized gases away from the **terminal lug**.

8. The circuit breaker apparatus (4) of Claim 5 wherein the number of securing members are a plurality of securing clips (8,9) coupled to a top portion or a rear portion of the **terminal lug**.

9. The circuit breaker apparatus (4) of Claim 5 wherein the plurality of securing clips (9) further span and couple to a vertical length of the rear portion of the **terminal lug**; wherein the vertical length of the rear portion of the **terminal lug** is a chamfered edge (14); and wherein the plurality of securing clips mechanically couple to the chamfered edge.

10. The circuit breaker apparatus (4) of Claim 5 wherein said **terminal lug** cover is coupled to a portion of said **terminal lug** external to said circuit breaker; wherein said **terminal lug** is removable from said circuit breaker; and wherein the portion of said **terminal lug** and said **terminal lug** cover coupled thereto are both external to the circuit breaker.

11. A method of protecting a circuit breaker **terminal lug** (2) from degradation or **corrosion**, said circuit breaker **terminal lug** including a number of **terminal lug** screws (5) capable of securing a number of cables to a circuit breaker (3), said circuit breaker including a **terminal lug** (2), said method comprising;

mechanically securing a circuit breaker **terminal lug** cover (1) to the circuit breaker **terminal lug** in order to protect the **terminal lug** from degradation or corrosion;

providing said circuit breaker **terminal lug** cover with a plurality of sides (10,11,12,13) structured to carry heat away from the **terminal lug** or deflect ionized gases away from the **terminal lug**;

~ 13 ~

including with at least one (12,13) of the sides a number of securing members (8,9) mechanically securing the terminal lug cover to the circuit breaker terminal lug; and

providing one (10) of the sides with an access hole (6) permitting access to the number of terminal lug screws.

12. The method of Claim 11 further comprising:

coupling the **terminal** lug cover to the terminal lug with a plurality of securing clips (8,9) from a number (12,13) of said **plurality of sides**.

13. The method of **Claim 12** comprising:

coupling (8,9) the terminal lug cover to a top portion or a rear portion of the terminal lug.

14. The method of Claim 11 further comprising:

providing four sides (10,11,12,13) as said plurality of sides;

snugly fitting the terminal lug cover on a front (16), a bottom (17), and two sides 0.8,19 of the terminal lug with said four sides; and
conducting heat away from the terminal lug and said **number of cables from** physical contact between the terminal lug and the terminal lug, or deflecting ionized gases away from the **terminal lug**.

15. The method of Claim 12 further comprising:

coupling the **plurality** of securing clips (9) to a rear portion of the terminal lug;

spanning and coupling the **plurality** of securing clips to a vertical length of the rear portion of the terminal lug;

providing the vertical length of the rear portion of the terminal lug with a chamfered edge (14); and

mechanically coupling the plurality of securing clips (9) to the chamfered edge.

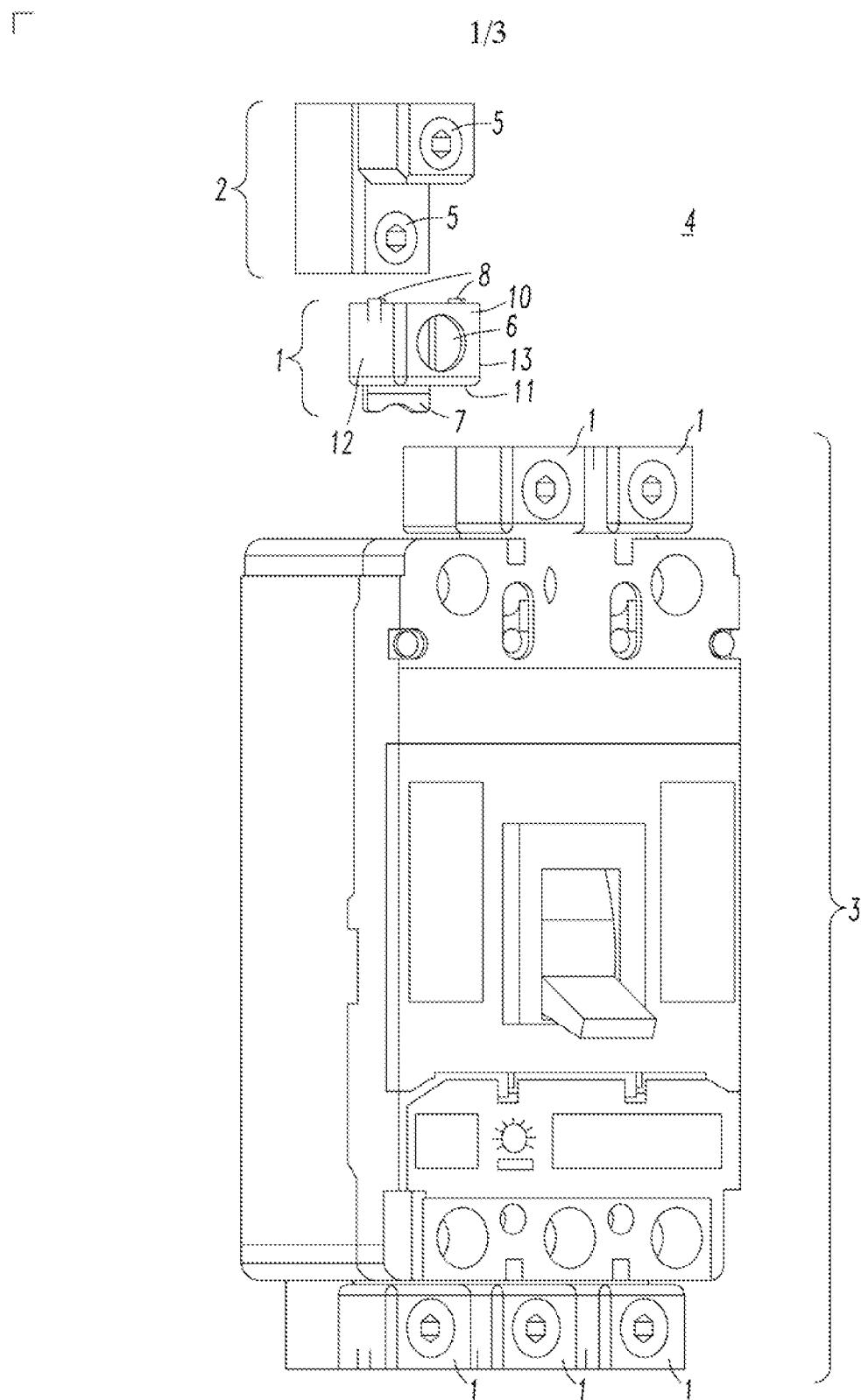


FIG. 1

Γ

2/3

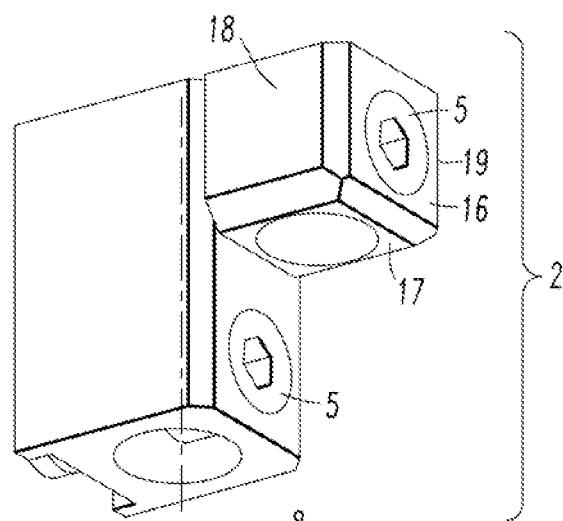


FIG. 2

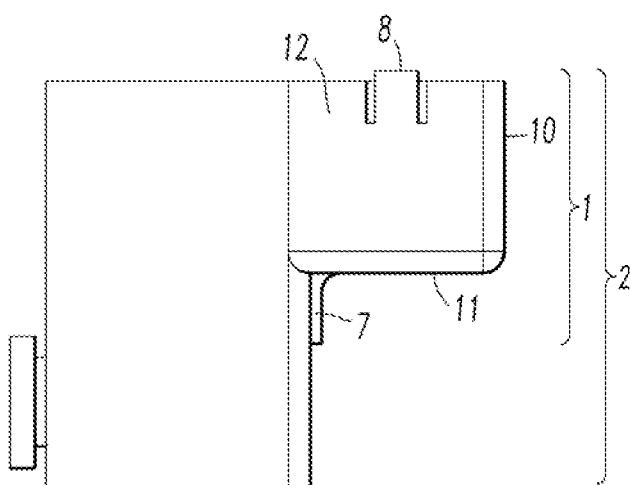
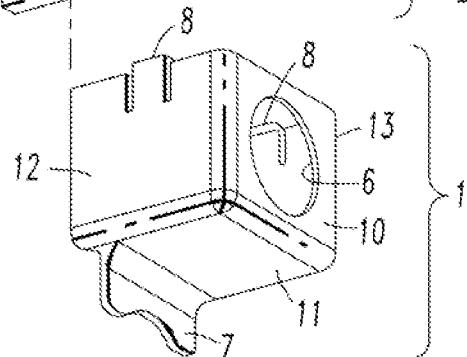


FIG. 3

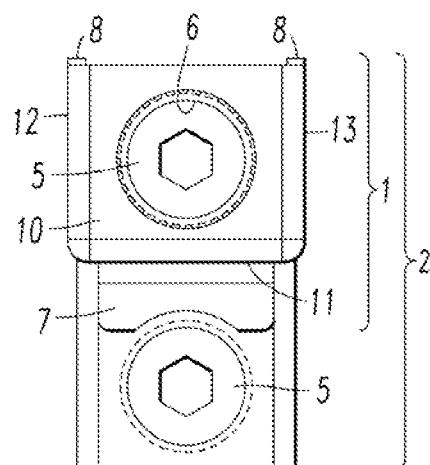


FIG. 4

3/3

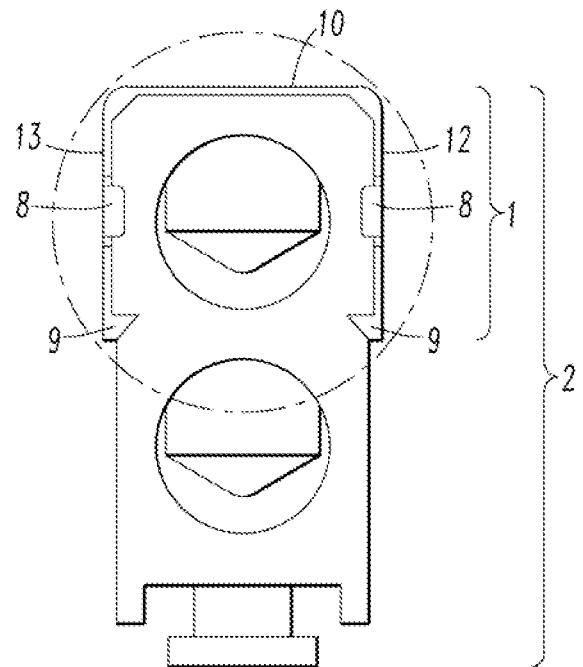


FIG. 5

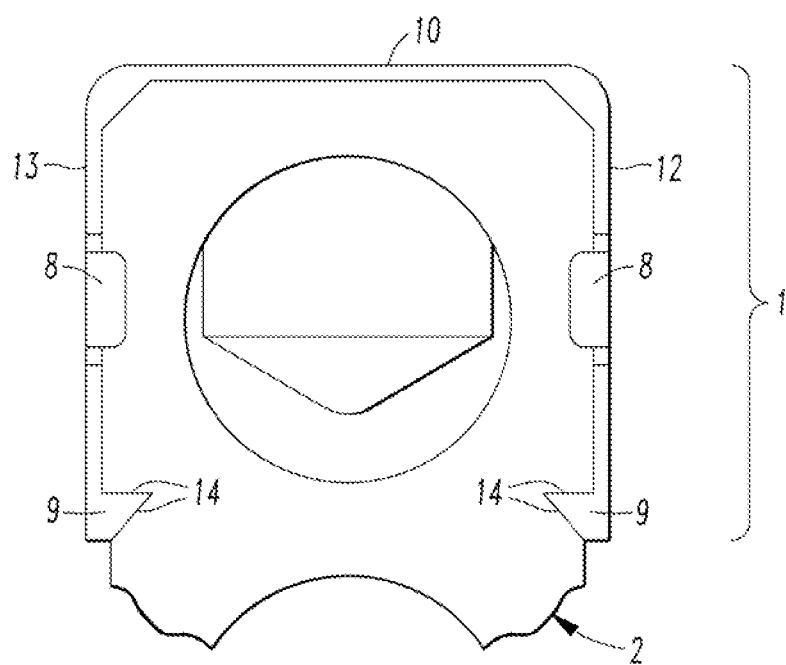


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/065418

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H01H9/Q4 H01H73/2Q
 ADD. H01R13/533

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)
 H01H H01R

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)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/057333 A1 (SUBRAMANIAN ANANTHARAM [IN] ET AL) 17 March 2005 (2005-03-17) paragraphs [0002] , [0020] - [0023] figures 1,3,5 -----	1,5,7 , 10, 11, 14
X	US 2008/074217 A1 (DUCHROW ROBERT A [US] ET AL) 27 March 2008 (2008-03-27) paragraphs [0016] - [0022] pages 1-5 -----	1,5, 10, 11
X	US 6 211 759 B1 (LITTLE DAVID E [US] ET AL) 3 April 2001 (2001-04-03) column 2, line 33 - column 3, line 58 figures 1-4 ----- -/-	1,5, 11

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
 "E" earlier application or patent but published on or after the international filing date
 "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)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 February 2013	11/03/2013
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Ledoux, Serge

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/065418

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 620 076 A (MRENNAN STEPHEN A [US] ET AL) 28 October 1986 (1986-10-28) column 3, line 22 - column 4, line 2 figures 3-5 ----- US 2002/144978 A1 (LEONE DAVID A [US] ET AL) 10 October 2002 (2002-10-10) paragraphs [0024] - [0027] figures 1-4 -----	1,5,11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/065418

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
US 2005057333	AI 17-03-2005		NONE		
US 2008074217	AI 27-03-2008		NONE		
US 6211759	BI 03-04-2001		NONE		
US 4620076	A 28-10-1986	AU AU CA US	588576 5475286 1276215 4620076	B2 A C A	21-09-1989 02-10-1986 13-11-1990 28-10-1986
US 2002144978	AI 10-10-2002	US US	2002144978 2003201858	AI AI	10-10-2002 30-10-2003