

## Cable Clamp

### Field of the Invention

[0001] The present invention relates field of cable clamps and, in particular, discloses an improved form of cable clamp arrangement suitable for clamping electrical and high-voltage cables or the like.

[0002] The invention has been developed primarily for use as cable clamp for clamping electrical cables, or more particularly for clamping high-voltage electrical cables of the type typically found in electrical sub-stations supporting 11 or 22 kW of electrical power carrying capability and will be described hereinafter with reference to this application. However, it will be appreciated that the invention is not limited to this particular field of use.

### Background of the Invention

[0003] Any discussion of the background art throughout the specification should in no way be considered as an admission that such background art is prior art, nor that such background art is widely known or forms part of the common general knowledge in the field.

[0004] Clamps for clamping power cables are well-known and come in many different varieties. One very popular form of clamp is a clamp manufactured by a company ID Technik of Germany. The clamps the aforementioned company are designed to clamp high-voltage cables or the like and come in various sizes so as to manage different size clapping requirements. An example of such an electrical cable clamp **10** is depicted in **Figure 1A**. A further example of a prior art cable clamp **20** is depicted in **Figure 1B** depicted attached to a busbar **50**. Prior art cable clamps **10** and **20** each utilise a spring arrangement for securing the cable clamp against the bus bar as shown in **Figure 1A** to prevent movement of the clamp in use. **Figure 1A** illustrates a photographic view of a series of three such clamps all interconnected on a single busbar for mounting.

[0005] The aforementioned clamps have a number of disadvantages when being utilised in practice. They are manufactured with some free floating pads which are often lost and provide a complicated installation process. Further, the design of any backplane mounting strut for the clamps is ill considered in that is often difficult to install the clamp in a confined space. Often these clamps must be installed in a small spaces which results in difficult working requirements.

[0006] Accordingly, there is a need for an improved cable clamping arrangement suitable for efficient and uncomplicated use in practice.

## Summary

[0007] It is an object of the present invention to substantially overcome or at least ameliorate one or more of the disadvantages of the prior art, or at least to provide a useful alternative to existing cable clamps.

[0008] The following definitions are provided as general definitions and should in no way limit the scope of the present invention to those terms alone, but are put forth for a better understanding of the following description.

[0009] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by those of ordinary skill in the art to which the invention belongs. For the purposes of the present invention, the following terms are defined below.

[0010] The articles “a” and “an” are used herein to refer to one or to more than one (i.e. to at least one) of the grammatical object of the article. By way of example, “an element” refers to one element or more than one element.

[0011] The term “about” is used herein to refer to quantities that vary by as much as 30%, preferably by as much as 20%, and more preferably by as much as 10% to a reference quantity.

[0012] Throughout this specification, unless the context requires otherwise, the words “comprise”, “comprises” and “comprising” will be understood to imply the inclusion of a stated step or element or group of steps or elements but not the exclusion of any other step or element or group of steps or elements.

[0013] In accordance with a first aspect of the present invention, there is provided a cable clamping unit for clamping a cable including: a first and second mating units for clamping around the cable, each of the mating units further including a soft sleeve for engaging the cable, the sleeves being at least semi permanently attached to a corresponding mating unit.

[0014] The soft sleeves are preferably attached by means of a series of posts mating with a corresponding series of cavities and forming a snug fit there to. The series of posts are preferably formed on the sleeve and the series of cavities are preferably formed in the mating units. The soft sleeve further preferably engages a corresponding mating unit in a snug fit by means of an arcuate lip engaging a slot. A lip can be formed on the soft sleeve and the slot can be formed on the mating unit.

[0015] The clamping units are preferably stackable. The clamping units can include a series of through hole screw, with the through hole screws of adjacent clamping units being

interconnected. The non cable engaging surface of the mating unit forms a generally planar supporting surface for stacking.

[0016] Multiple clamping units can be attached to a U shaped busbar with mating bolts. The mating bolts can include a profiled head which engages with the busbar to resist rotation of the mating bolt.

[0017] According to a second aspect there is provided a cable clamp adapted for clamping electrical cables. The cable clamp may comprise a busbar securing portion for securing the cable clamp to a busbar. The cable clamp may further comprise a first mating unit comprising a first cable locating formation. The cable clamp may further comprise at least two securing nuts comprising a threaded portion for engaging at least two attachment bolts and also engaging at least two respective securing bolts. In particular arrangements, the clamp may comprise two, three or four securing nuts and two, three or four securing bolts respectively. The cable clamp may further comprise a second mating unit comprising a second cable locating formation. The second mating unit may be adapted to engage with said first mating unit thereby to securely clamp an electrical cable located between respective first and second locating formations of the first and second mating units. The cable clamp may be particularly adapted for clamping high-voltage electrical cables.

[0018] The busbar securing portion may comprise a busbar engaging portion comprising at least two apertures adapted to receive at least two respective attachment bolts. The busbar securing portion may comprise two, three or four apertures and two, three or four attachment bolts respectively.

[0019] The first mating unit may comprise an arcuate upper surface forming the first cable locating formation. The first mating unit may further comprise an arcuate resilient sleeve semi-permanently attached to the upper arcuate surface for engaging an electrical cable therewith. The first mating unit may further comprise at least two cavities therein adapted to receive said at least two attachment bolts for attachment of said first mating unit to the busbar. The first mating unit may comprise two, three or four cavities therein to receive two, three or four attachment bolts respectively.

[0020] The second mating unit may comprise an arcuate lower surface forming the second cable locating formation. The second mating unit may further comprise an arcuate resilient sleeve semi-permanently attached to said second cable locating formation for engaging an electrical cable therewith. The second mating unit may further comprise at least two cavities aligned with said at least two cavities of said first mating unit and adapted to receive at least two securing bolts to secure said second mating unit to said first mating unit such that said upper arcuate surface and said lower arcuate surface of respective mating units are aligned

and therefore secure an electrical cable therein. The second mating unit may comprise two, three or four cavities therein to receive two, three or four securing bolts respectively.

[0021] The cable clamp may further comprise at least two securing nuts. The cable clamp may comprise two, three or four securing nuts as required. The at least two securing nuts may comprise a threaded portion for engaging a respective one of the at least two attachment bolts and also a respective one of the at least two respective securing bolts.

[0022] The at least two cavities of the first mating unit and the at least two cavities of the second mating unit may each be further adapted to at least partially conceal a respective one of the at least two securing nuts. Concealment, even partially, of the metal securing nuts may significantly minimise the chance of unwanted corona discharge, particularly associated with electrical cabling, particularly associated with high-voltage electrical cables in the presence of metal surfaces having sharp edges such as corners of hexagonal or octagonal securing nuts or the like.

[0023] The arcuate resilient sleeves may be attached to a respective one of the first and second mating units by means of a series of posts on the sleeves. The posts may be adapted to mate with a corresponding series of cavities in the respective mating unit and forming a snug fit to respective cable locating formations of the first and second mating units.

[0024] The first mating unit and the second mating unit may each be formed from a non-conducting material. The first mating unit and the second mating unit may be formed from a material having a high dielectric constant to assist in minimisation of unwanted corona discharge. The first mating unit and the second mating unit may be formed from a plastics material. The first mating unit and the second mating unit may be formed via an injection moulding technique.

[0025] The first mating unit and the second mating unit may be substantially identical. The first and second mating units may be formed from the same mould in the injection moulding technique. This provides a significant manufacturing advantage as it practically halves the tooling costs that would be needed to create two separate moulds and production lines to manufacture two different injection moulded mating units. Therefore only a single mould is required to produce both mating units and two such mating units are packaged together to form a single cable clamp on installation. This system of identical mating units also has significant advantages in the installation of the cable clamps, which is often done in confined or difficult spaces, since there is no need for the installer to identify which of the mating units is the top and which is the bottom – either mating unit in the cable clamp kit would suffice as either the top or bottom mating unit which therefore minimises the chance of install error and re-work, thus making the installation an easier and quicker process than using prior art clamps.

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[0026] In an arrangement of the second aspect, there is provided a cable clamp adapted for clamping electrical cables, comprising: a busbar securing portion for securing the cable clamp to a busbar; a first mating unit comprising a first cable locating formation; at least two securing nuts comprising a threaded portion for engaging at least two respective attachment bolts and also for engaging at least two respective securing bolts; and a second mating unit comprising a second cable locating formation and adapted to engage with said first mating unit thereby to securely clamp an electrical cable located between respective first and second locating formations of the first and second mating units. In a particular arrangement, the cable clamp may be adapted for clamping high-voltage electrical cables.

[0027] In a particular arrangement of the second aspect, there is provided a cable clamp adapted for clamping electrical cables, comprising a) a busbar securing portion comprising a busbar engaging portion comprising at least two apertures adapted to receive at least two respective securing bolts; b) a first mating unit comprising: an arcuate upper surface; an arcuate resilient sleeve semi-permanently attached to said upper arcuate surface for engaging an electrical cable therewith, and at least two cavities therein adapted to receive said at least two attachment bolts for attachment of said first mating unit to a busbar; c) at least two securing nuts comprising a threaded portion for engaging said attachment bolts and also engaging at least two respective securing bolts, said at least two cavities of said first mating unit further adapted to at least partially conceal a respective one of said at least two securing nuts; and d) a second mating unit adapted to engage with said first mating unit, said second mating unit comprising: an arcuate lower surface; an arcuate resilient sleeve semi-permanently attached to said arcuate lower surface for engaging an electrical cable therewith; at least two cavities aligned with said at least two cavities of said first mating unit and adapted to: at least partially conceal a respective one of said at least two securing nuts; and to receive at least two securing bolts adapted to engage with the threaded portion of a respective securing nut thereby to secure said second mating unit to said first mating unit such that said upper arcuate surface and said lower arcuate surface of respective mating units are aligned and therefore secure an electrical cable therein. Concealment, even partially, of the metal securing nuts may significantly minimise the chance of unwanted corona discharge associated with electrical cabling, and particularly associated with high-voltage electrical cabling in the presence of metal surfaces having sharp edges such as corners of hexagonal or octagonal securing nuts or the like.

[0028] According to a third aspect there is provided a kit for a cable clamp for clamping electrical cables. The kit may comprise a busbar securing portion for securing the cable clamp to a busbar. The kit may further comprise a first mating unit. The first mating unit may comprise a first cable locating formation. The kit may further comprise at least two attachment bolts for

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attachment of the busbar securing portion and the first mating unit to the busbar. The kit may further comprise at least two securing nuts comprising a threaded portion for engaging a respective one of the at least two attachment bolts thereby to secure the first mating unit and the busbar securing portion to the busbar. The kit may further comprise a second mating unit. The second mating unit may comprise a second cable locating formation. The kit may further comprise at least two securing bolts adapted to engage with the threaded portion of a respective one of the securing nuts thereby secure the second mating unit in cooperation to the first mating unit and thereby secure a cable located in engagement with the first and the second cable locating formations.

[0029] In an arrangement of the third aspect, there is provided a kit for a cable clamp for clamping electrical cables, the kit comprising:

- a busbar securing portion for securing the cable clamp to a busbar;

- a first mating unit comprising a first cable locating formation;

- at least two attachment bolts for attachment of the busbar securing portion and the first mating unit to the busbar

- at least two securing nuts comprising a threaded portion for engaging a respective one of said at least two attachment bolts thereby to secure the first mating unit and the busbar securing portion to the busbar;

- a second mating unit comprising a second cable locating formation;

- at least two securing bolts adapted to engage with said threaded portion of a respective one of said securing nuts thereby secure the second mating unit in cooperation to said first mating unit and thereby secure a cable located in engagement with said first and said second cable locating formations.

[0030] The kit may further comprise: a first arcuate resilient sleeve semi-permanently attached to the first cable securing formation of the first mating unit for engaging an electrical cable therewith; and a second arcuate resilient sleeve semi-permanently attached to the second cable securing formation of the second mating unit for engaging an electrical cable therewith.

[0031] In a particular arrangement of the third aspect, the first and the second mating units may be substantially identical.

[0032] In a particular arrangement of the third aspect, the cable clamp may be adapted for clamping high-voltage electrical cables.

[0033] The arcuate resilient sleeves may be attached to a respective one of the first and second mating units by means of a series of posts on the sleeves. The posts may be adapted to mate with a corresponding series of cavities in the respective mating unit and forming a

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snug fit to respective cable locating formations of the first and second mating units. The arcuate resilient sleeves may be substantially identical.

[0034] The first mating unit and the second mating unit may be formed from a non-conducting material. The first mating unit and the second mating unit may be formed from a plastics material. The first mating unit and the second mating unit may be formed via an injection moulding technique. The first mating unit and the second mating unit may be substantially identical.

[0035] The kit may further comprise washers adapted to engage the at least two attachment bolts and the at least two securing bolts to assist in securing the first and second mating units as would be appreciated by the skilled addressee.

### **Brief description of the drawings**

[0036] Arrangements of the above aspects will now be described, by way of an example only, with reference to the accompanying drawings wherein:

[0037] **Figure 1A** is a picture of a prior art cable clamp for electrical cables;

[0038] **Figure 1B** is a picture of a prior art cable clamp indicating a method for securing the cable clamp to a bus bar;

[0039] **Figure 1C** illustrates a prior art clamping device, partially disassembled;

[0040] **Figure 2** illustrates a photograph of the clamping device of the preferred embodiment, again, partially disassembled;

[0041] **Figure 3** and **Figure 4** illustrate photographs of lower and upper matting units of a clamping unit;

[0042] **Figure 5** and **Figure 6** illustrate the back surface photographs of matting units of a clamping unit;

[0043] **Figure 7** illustrates a photograph of the clamping device of the preferred embodiment, again, partially disassembled;

[0044] **Figure 8** and **Figure 9** illustrate a first form of stacking of clamping units;

[0045] **Figure 10** is a computer rendering of another form of stacking of clamping units;

[0046] **Figure 11** is a photograph of a non pad mount busbar assembly;

[0047] **Figure 12** is a photograph of a pad mounted busbar assembly;

[0048] **Figure 13** is a photograph of the bottom mating units attached to a pad mounted busbar;

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[0049] **Figure 14** is a computer generated exploded perspective of the insulating portions of the cable clamp of the preferred embodiment;

[0050] **Figure 15A** is a picture of an arrangement of a cable clamp as disclosed herein

[0051] **Figure 15B** is a picture of an arrangement of a cable clamp as disclosed herein depicted with a electrical cable engaging a cable locating portion of the cable clamp;

[0052] **Figure 15C** is picture of an arrangement of a cable clamp attached to a busbar and securely engaging an electrical cable.

[0053] **Figure 15D** is a picture of a first mating unit of an arrangement of a cable clamp as disclosed herein depicting the attachment of the first mating unit to a bus bar;

[0054] **Figure 16A** is a picture of a busbar securing portion of a cable clamp as disclosed herein and a busbar; and

[0055] **Figure 16B** is a further picture of a busbar securing portion of a cable clamp as disclosed herein shown engaging a busbar.

[0056] **Figures 17A** and **17B** are cutaway schematic views of a cable clamp for electrical cables as disclosed herein depicted clamped to a busbar and clamping an electrical cable;

[0057] **Figure 18** is an exploded view of a particular arrangement of a first mating unit of the cable clamp as disclosed herein depicting the relationship between an arcuate surface of the mating unit and a resilient sleeve to form a cable locating formation of the mating unit;

[0058] **Figures 19A** to **19E** depict the assembly sequence of the cable clamp arrangement of **Figure 17A**;

[0059] **Figures 20, 21** and **22** depict perspective views of the arrangement of the cable clamp of **Figure 17A** when in use where **Figure 20** depicts the busbar securing portion engaged with a busbar, **Figure 21** depicts a first mating unit of the cable clamp engaged with a busbar and **Figure 22** depicts the cable clamp engaged with the busbar and clamping a cable; and

[0060] **Figures 23** to **25** each depict side plan, top plan & perspective views of respective particular arrangements of the cable clamp as described herein.

### **Description of preferred and other embodiments**

[0061] Referring to the drawings, there is provided an enhanced clamping arrangement. A particular arrangement of a cable clamp as disclosed herein is initially the illustrated in **Figure 2** which illustrates three clamping units **121 – 123** in various states of assembly. The first unit

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**121** is fully assembled, with the unit **122** being almost separated in half and the unit **123** having the bottom half only assembled.

[0062] The clamping units are made from two mating units e.g. **123**, **125** which are affixed together. Each mating unit includes a rubber like mating pad which is affixed to the mating unit in a semi permanent manner such that they do not fall off in general use. This can be achieved using a number of techniques.

[0063] **Figure 3** shows the bottom mating unit **125** which includes a series of holes e.g. **132** for the engagement of corresponding posts formed on a mating pad **131**, which, in this instance, includes four mating posts. The mating pad **131** also includes an edge lip which mates with the edge lip of mating unit **125**. The mating pad can be formed from a soft pad like material which forms a bed for the clamped cable to stop movement thereof.

[0064] Similarly **Figure 4** illustrates the top mating unit, also with a series holes for receiving corresponding posts of mating pad **131**, in addition to having a mating lip for the mating lip at the ends of the mating pads.

[0065] A further advantage of the design of the cable clamp arrangements disclosed herein is that the clamping units are stackable allowing for compact stacking of multiple units. **Figure 5** and **Figure 6** illustrate the planar back surfaces of each of the mating units. This leads to possible stacking of multiple units. A simple form of stacking of units is shown in **Figure 8** and **Figure 9** wherein steel posts are used to clamp multiple clamping units in a spaced apart manner.

[0066] **Figure 10** illustrates an alternative arrangement where multiple clamping units are stacked together.

[0067] The design of the particular arrangements disclosed herein provides a number of significant advantages. As illustrated in **Figure 11** and **Figure 12**, the clamping units are designed to be mounted on a bus bar having a U shaped cross section with a hexagonal headed bolt being held in the cusp of the U shape. This provides for simple mounting with the hexagonal bolt being firmly supported both in a pad mounted arrangement (**Figure 12**) and non-pad mounted arrangements (**Figure 11**). The mating portions of each clamping unit can then be bolted to the busbar (**Figure 13**). This allows for one bus bar to work both inside and outside a pad mount.

[0068] Further, whilst the rubber mating pad is separable from the mating unit, it is designed to not be easily separated during normal use with the posts being inserted into corresponding holes in the mating units for semi-permanent attachment thereto.

[0069] Further the utilisation of the busbar arrangement allows for multiple units of a phase to be assembled together.

[0070] Referring to **Figures 15A and 15B**, there is provided a further arrangement of a cable clamp **200** adapted for clamping electrical cables **250** and the like. The cable clamp **200** comprises a busbar securing portion (portion **300** as shown in **Figures 16A and 16B**) for securing the cable clamp **200** to a busbar **50**. The cable clamp further comprises a first mating unit **201** comprising a first cable locating formation **203**. The cable clamp **200** further comprises at least two securing nuts **205a** and **205b** (for example barrel nuts) each comprising a threaded portion for engaging attachment bolts (bolts **215a** and **215b** shown in **Figures 16A and 16B**) of the busbar securing portion **300** and also engaging at least two respective securing bolts **207a** and **207b** when in use. The cable clamp **200** further comprises a second mating unit **209** comprising a second cable locating formation **211** as shown in either **Figure 16A** or **Figure 17A**. The second mating unit **209** is adapted to engage with the first mating unit **201** thereby to securely clamp an electrical cable **250** located between respective first and second locating formations (**203** and **211** respectively) of the first and second mating units (**201** and **209** respectively). The electrical cable may be a high-voltage electrical cable.

[0071] The first mating unit **201** comprises an arcuate surface **202** forming the first cable locating formation **203**. In use, the arcuate surface **202** forming cable locating formation **203** is the upper surface of the first mating unit **201** when attached to a busbar **50**. The first mating unit **201** further comprises an arcuate resilient sleeve **204** semi-permanently attached to said upper arcuate surface **202** for engaging an electrical cable **250** therewith. The first mating unit **201** further comprises at least two cavities therein (cavities **220a** and **220b** as shown in **Figure 17A**) adapted to receive said at least two attachment bolts (not shown) for attachment of said first mating unit **201** to the busbar **50**.

[0072] The first mating unit **201** and the second mating unit **209** are typically be formed from a non-conducting material, e.g. plastic or other non-conducting material as would be appreciated by the skilled addressee. In particular arrangements, the first mating unit **201** and the second mating unit **209** are identical. Having the first and second mating units being formed from identical moulds provides a significant advantage in both the manufacturing of the cable clamp **200** and also for ease of installation.

[0073] Referring to either **Figure 16A** or **Figure 17A**, the busbar securing portion **300** comprises a busbar engaging portion **301** comprising at least two apertures **303a** and **303b** adapted to receive at least two respective attachment bolts **215a** and **215b**. In use, the busbar engaging portion slides into the central cavity **51** of busbar **50** with attachment bolts **215a** and **215b** extending out of the busbar central cavity **51** as is shown in **Figure 16B**. The first mating

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unit **201** is then fitted to the busbar engaging unit **50** such that the attachment bolts **215a** and **215b** are inserted into a respective one of the at least two cavities **220a** and **220b** as shown in **Figure 4**. Securing nuts **205a** and **205b** are screwed onto respective attachment bolts **215a** and **215b** to secure the first mating unit **201** to the busbar **50**. Screwing the securing nuts **205a** and **205b** onto the respective attachment bolts causes the attachment bolts **215a** and **215b** to lift the busbar engaging portion **301** until it engages with the upper lips **53a** and **53b** of the busbar **50** thereby securing the first mating unit **201** to the busbar **50**.

[0074] Referring back to either **Figure 15B** or **Figure 17A**, the second mating unit **209** comprises an arcuate surface **210** forming the second cable locating formation **211**. In use, the arcuate surface **210** forming cable locating formation **211** is the lower surface of the second mating unit **209** when attached to a busbar **50** as shown in **Figures 17A** and **17B**. The second mating unit **209** further comprises an arcuate resilient sleeve **212** semi-permanently attached to the second cable locating formation **211** for engaging an electrical cable **250** therewith. The second mating unit **209** further comprises at least two cavities (cavities **230a** and **230b** as shown in **Figure 17A**) which in use are aligned with the at least two cavities (**220a** and **220b**) of the first mating unit **201** as can be seen in **Figure 17A**. The at least two cavities (**230a** and **230b**) of the second mating unit **209** are adapted to receive at least two securing bolts (bolts **207a** and **207b**) to secure the second mating unit **209** to the first mating unit **201** such that the upper arcuate surface **202** and said lower arcuate surface **210** of respective mating units **201** and **209** are aligned and therefore secure an electrical cable **250** therein as depicted in **Figure 15C** and **Figure 17A**. In use, securing bolts **207a** and **207b** are screwed into securing nuts **205a** and **205b** as can be seen in **Figure 17A** thereby to secure the second mating unit **209** to the first mating unit **201** and to secure a cable **250** between the first and second mating units in the generally circular cavity **260** formed by the alignment of the first locating portion **203** and the second locating portion **211** when the first and second mating units **201** and **209** are secured to the busbar **50** when in use.

[0075] Referring to **Figures 17A** and **17B** it can be seen that cavities **220a** and **220b** of the first mating unit **201** comprise an enlarged cavity portion **221a** and **221b** respectively to receive the securing nuts **205a** and **205b** respectively when the securing nuts are engaged with attachment bolts **215a** and **215b**. It can thus be seen that enlarged cavity portions **221a** and **221b** at least partially conceal the securing nuts **205a** and **205b** when in use. Similarly, cavities **230a** and **230b** of the second mating unit **209** each comprise **231a** and **231b** respective enlarged cavity portion **231a** and **231b**. Enlarged cavity portions **231a** and **231b** of the second mating unit are adapted to receive the securing nuts **205a** and **205b** when the second mating unit **209** is engaged with the first mating unit **201**. Therefore in use, the at least two cavities **220a** and **220b** of the first mating unit **201** and the at least two cavities **230a** and

**230b** of the second mating unit **209** act in cooperation to conceal the securing nuts **205a** and **205b** when in use. Concealment, even partially, of the securing nuts **205a** and **205b** may significantly minimise the chance of unwanted corona discharge associated with electrical cabling (for example electrical cable **250**) in the presence of metal surfaces having sharp edges such as corners of hexagonal or octagonal securing nuts **205a** and **205b** or the like, particularly associated with the minimisation of corona discharge associated with electrical cabling, and particularly associated with high-voltage electrical cabling. This is achieved by ensuring an additional non-conductive material (comprising mating units **201** and **209**) is located intermediate the electrical cable and the edges of the securing nuts where corona discharge is likely to occur, thereby forming an increased potential barrier between the electrical cable and potential corona forming surfaces

[0076] The arcuate resilient sleeves **204** and **212** are semi-permanently attached to a respective one of the first and second mating units (**201** and **209** respectively) by means of a series of posts **204a** (of sleeve **204** as shown in **Figure 18**) on the sleeves. The posts **204a** are adapted to mate with a corresponding series of cavities (e.g. cavities **204b** formed in the arcuate surface **202** of the first mating unit **201** as shown in **Figure 18**) in the respective mating unit and forming a snug fit to the respective cable locating formations **203** and **211** of the first and second mating units respectively.

[0077] Referring now to **Figures 19A to 19E**, there is shown the assembly sequence for the cable clamp described above. In **Figure 19A**, there is provided a busbar securing portion **300** comprising busbar engaging portion **301** and two attachment bolts **215a** and **215b** engaged therewith. In **Figure 19B**, busbar engaging portion **301** is engaged with busbar **50**. In **Figure 19B**, first mating unit **201** is engaged with attachment bolts **215a** and **215b** and securing nuts **205a** and **205b** are screwed into attachment bolts **215a** and **215b** to secure the first mating unit **210** to the busbar **50**. In **Figure 19D**, cable **250** is located in cable locating formation **203** to engage with arcuate resilient sleeve **204** semi-permanently attached to said upper arcuate surface **202** of first mating unit **201**. In **Figure 19E**, second mating unit **209** is located such that arcuate resilient sleeve **212** of second mating unit **209** engages cable **250**. Second mating unit **209** is then secured to the first mating unit **201** by securing bolts **207a** and **207b**, which engage with securing nuts **205a** and **205b**. Thus, cable **250** is secured between arcuate resilient sleeves **204** and **212** of first and second mating units **201** and **209** respectively. **Figures 22 to 23** depict particular arrangements of the cable clamp as described above.

[0078] Although any methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, preferred methods and materials are described. It will be appreciated that the methods, apparatus and systems

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described herein may be implemented in a variety of ways and for a variety of purposes. The description here is by way of example only.

We claim:

1. A cable clamping unit for clamping a cable including:  
a first and second mating units for clamping around the cable, each of the mating units further including a soft sleeve for engaging the cable, said sleeves being at least semi permanently attached to a corresponding mating unit.
2. A cable clamping unit as claimed in claim 1 wherein said soft sleeves are attached by means of a series of posts mating with a corresponding series of cavities and forming a snug fit there to.
3. A cable clamping unit as claimed claim 2 wherein the series of posts are formed on the sleeve and the series of cavities are formed in the mating units.
4. A cable clamping unit as claimed in any one of the preceding claims wherein said soft sleeve further engages a corresponding mating unit in a snug fit by means of an arcuate lip engaging a slot.
5. A cable clamping unit as claimed in claim 4 wherein the lip is formed on the soft sleeve and the slot is formed on the mating unit.
6. A cable clamping unit as claimed in any one of the preceding claims wherein the clamping units are stackable.
7. A cable clamping unit as claimed in claim 6 wherein the clamping units include a series of through hole screws, with the through hole screws of adjacent clamping units being interconnected.
8. A cable clamping unit as claimed in claim 6 where the non cable engaging surface of the mating unit forms a generally planar supporting surface for stacking.
9. A cable clamping unit as claimed in any previous claim wherein multiple clamping units can be attached to a U shaped busbar with mating bolts.
10. A cable clamping unit as claimed in claim 8 wherein the mating bolts include a profiled head which engages with the busbar to resist rotation of the mating bolt.
11. A cable clamp adapted for clamping electrical cables, comprising:  
a busbar securing portion for securing the cable clamp to a busbar;  
a first mating unit comprising a first cable locating formation;

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at least two securing nuts comprising a threaded portion for engaging at least two respective attachment bolts and also for engaging at least two respective securing bolts; and

a second mating unit comprising a second cable locating formation, said second mating unit being adapted to engage with said first mating unit thereby to securely clamp an electrical cable located between respective first and second locating formations of the first and second mating units.

12. A cable clamp as claimed in claim 11 wherein the busbar securing portion comprises:

a busbar engaging portion comprising at least two apertures adapted to receive said at least two attachment bolts.

13. A cable clamp as claimed in claim 12 wherein the first mating unit comprises an arcuate upper surface forming the first cable locating formation;

an arcuate resilient sleeve semi-permanently attached to said upper arcuate surface for engaging an electrical cable therewith, and

at least two cavities therein adapted to receive said at least two attachment bolts for attachment of said first mating unit to the busbar.

14. A cable clamp as claimed in claim 13 wherein the second mating unit comprises: an arcuate lower surface forming the second cable locating formation;

an arcuate resilient sleeve semi-permanently attached to said second cable locating formation for engaging an electrical cable therewith;

at least two cavities adapted to align with said at least two cavities of said first mating unit when in use and further adapted to receive at least two securing bolts to secure said second mating unit to said first mating unit such that said upper arcuate surface and said lower arcuate surface of respective mating units are aligned and therefore secure an electrical cable therein.

15. A cable clamp as claimed in claim 14 further comprising at least two securing nuts comprising a threaded portion for engaging a respective one of said at least two attachment bolts and also a respective one of said at least two respective securing bolts.

16. A cable clamp as claimed in claim 15 wherein said at least two cavities of said first mating unit and said at least two cavities of said second mating unit are each further adapted to at least partially conceal a respective one of said at least two securing nuts.

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17. A cable clamp as claimed in claim 16 wherein said at least partial concealment of said at least two securing nuts significantly minimises unwanted corona discharge associated with said electrical cable.
18. A cable clamp as claimed in any one of claims 14 to 17 wherein said arcuate resilient sleeves are attached to a respective one of said first and second mating units by means of a series of posts on said sleeves, said posts adapted to mate with a corresponding series of cavities in said respective mating unit and forming a snug fit to respective cable locating formations of said first and second mating units.
19. A cable clamp as claimed in any one of the preceding claims wherein the first mating unit and the second mating unit are formed from a non-conducting material.
20. A cable clamp as claimed in claim 19 wherein the first mating unit and the second mating unit are formed from a plastics material.
21. A cable clamp as claimed in either claim 19 or claim 20 wherein the first mating unit and the second mating unit are formed from a material having a high dielectric constant to assist in minimisation of unwanted corona discharge.
22. A cable clamp as claimed in claim 20 wherein the first mating unit and the second mating unit are formed via an injection moulding technique.
23. A cable clamp as claimed in any one of the preceding claims wherein the first mating unit and the second mating unit are substantially identical.
24. A cable clamp as claimed in any one of the preceding claims wherein the electrical cable is a high-voltage electrical cable.
25. A cable clamp substantially as herein described with respect to any one of the accompanying figures and/or examples.
26. A kit for a cable clamp for clamping electrical cables, the kit comprising:
  - a busbar securing portion for securing the cable clamp to a busbar;
  - a first mating unit comprising a first cable locating formation;
  - at least two attachment bolts for attachment of the busbar securing portion and the first mating unit to the busbar
  - at least two securing nuts comprising a threaded portion for engaging a respective one of said at least two attachment bolts thereby to secure the first mating unit and the busbar securing portion to the busbar;
  - a second mating unit comprising a second cable locating formation;

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at least two securing bolts adapted to engage with said threaded portion of a respective one of said securing nuts thereby secure the second mating unit in cooperation to said first mating unit and thereby secure a cable located in engagement with said first and said second cable locating formations.

27. A kit as claimed in claim 26 further comprising:

a first arcuate resilient sleeve semi-permanently attached to said first cable securing formation of said first mating unit for engaging an electrical cable therewith; and

second arcuate resilient sleeve semi-permanently attached to said second cable securing formation of said second mating unit for engaging an electrical cable therewith.

28. A kit as claimed in either claim 26 or claim 27 wherein the first and the second mating units are substantially identical.

29. A kit for a cable clamp substantially as herein described with respect to any one of the accompanying figures and/or examples.