

MOUNT ASSEMBLY FOR TELECOMMUNICATION EQUIPMENT

FIELD OF INVENTION

- 5 The invention relates to a mount assembly. More particularly, the invention relates to a mount assembly for holding one or more telecommunication equipment onto a pole structure.

BACKGROUND OF THE INVENTION

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A remote radio unit (RRU) is a piece of equipment that facilitates wireless communication between user equipment and a network such as 5G, 4G LTE, GSM, CDMA, UMTS, Wireless local loop, WAN, WiFi, WiMAX, etc. RRUs are commonly found installed on a pole structure, for example, at a rooftop of commercial buildings, factory buildings, or residential buildings, especially in urban area. Although RRUs are usually installed in areas with access restriction, they are still highly prone to theft and tampering.

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Installation for RRUs generally includes a bracket for mounting the RRUs onto the pole structure. Anti-theft alarm systems are usually installed at the installation site to prevent the RRUs from being stolen or tampered. Nonetheless, the conventional bracket can be easily dismounted by a thief within a very short period of time by simply loosening or tampering the relevant screws or nuts and bolts. As a result, the response team is not able to reach the crime scene in time before the thief flees even though the anti-theft alarm systems are being triggered.

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One example of such RRU mounting bracket can be found in International Publication No. WO 2017/101986 A1. This publication discloses a bracket assembly mounted to a pole structure by clamping two panel brackets onto the pole structure via a pair of bolts.

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The main drawback of the bracket assembly is that the bolts can be easily unscrewed or loosened by conventionally available bolt drivers. In addition, the body of the bolts are exposed and they can be easily cut by any appropriate tools.

Therefore, a need exists for the bracket assembly to incorporate anti-theft and anti-tampering features. The invention provides such an assembly.

5 SUMMARY OF INVENTION

The present invention describes a mount assembly for holding a plurality of telecommunication equipment onto a pole structure, the mount assembly comprises an integrated bracket body formed by a protective casing having a plurality of slots for
10 accommodating a first bracket and one or more second brackets, wherein each bracket includes an attachment surface for which a telecommunication equipment is attached thereto, and wherein at least one of the brackets further includes a clamber for mounting the integrated bracket body to the pole structure.

15 Preferably, the clamber may include a clamping arm that is pivotable between a closed configuration and an open configuration.

Preferably, the clamping arm in its closed configuration can be retained by a nut and a bolt. More preferably, the bolt has an unequal-sided bolt head that can only be
20 unfastened by a corresponding bolt driver.

Preferably, the bolt driver can be incorporated with Global Positioning System module for tracking its position information and the tracked position information can be further transmitted to a cloud-based server via a communication module upon activation of the
25 bolt driver.

Preferably, the first bracket may further comprise a pair of space apart side portions extended outwardly from the integrated bracket body to form a generally U-shape section for receiving the pole structure, and an undercut section for receiving the a bolt
30 head in such a way that the bolt head is positioned at the same level or at level below the attachment surface of the first bracket.

Preferably, the clamping arm of the clamper may further comprise a first end pivoted at one side portion of the first bracket and a second end which is retainable at the other side portion of the first bracket.

- 5 Preferably, the plurality of slots of the protective casing can be arranged in an array such that the brackets can be positioned side by side in a row within the protective casing.

Preferably, the first bracket can be positioned in between the second brackets.

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Preferably, the protective casing may include a first opening for exposing the attachment surfaces of the first and second brackets and a second opening for the clamper to be outwardly extended therefrom.

- 15 Preferably, the plurality of telecommunication equipment are remote radio heads or remote radio units.

The preferred embodiment of the invention consists of novel features and a combination of parts hereinafter fully described and illustrated in the accompanying drawings and particularly pointed out in the appended claims; it being understood that various changes in the details may be effected by those skilled in the arts but without departing from the scope of the invention or sacrificing any of the advantages of the present invention.

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25 **BRIEF DESCRIPTION OF THE DRAWINGS**

For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawing the preferred embodiments from an inspection of which when considered in connection with the following description, the invention, its construction and operation and many of its advantages would be readily understood and appreciated.

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- Fig. 1A is a front perspective view diagram illustrating a first embodiment of a mount assembly that holds a telecommunication equipment onto a pole structure.
- 5 Fig. 1B is a rear perspective view diagram illustrating the first embodiment of the mount assembly.
- Fig. 1C is a top view diagram illustrating the first embodiment of the mount assembly.
- 10 Fig. 2A is a front perspective view diagram illustrating a second embodiment of the mount assembly that holds multiple telecommunication equipment onto the pole structure.
- 15 Fig. 2B is a rear perspective view diagram illustrating the second embodiment of the mount assembly.
- Fig. 3A is a front perspective view diagram of an integrated bracket body of the mount assembly.
- 20 Fig. 3B is a rear perspective view diagram of the integrated bracket body.
- Fig. 4 is an exploded view diagram of the integrated bracket body which embodies therein the principle features of the invention.
- 25 Fig. 5A is an enlarged view diagram, taken from section A of Fig. 1B, illustrating a clamper of the mount assembly in a closed configuration.
- Fig. 5B is an enlarged view diagram illustrating the clamper of the mount assembly in an open configuration.
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Fig. 6 is an enlarged view diagram, taken from section A of Fig. 3A, illustrating an undercut section of the integrated bracket body.

DETAILED DESCRIPTION OF THE INVENTION

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Hereinafter, the invention shall be described according to the preferred embodiments of the present invention and by referring to the accompanying description and drawings. However, it is to be understood that limiting the description to the preferred embodiments of the invention and to the drawings is merely to facilitate discussion of the present invention and it is envisioned that those skilled in the art may devise various modifications without departing from the scope of the appended claims.

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The invention relates to a mount assembly. More particularly, the invention relates to a mount assembly for holding one or more telecommunication equipment onto a pole structure.

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Referring to the Figs. 1A to 2B, a mount assembly as illustrated therein generally comprises one or more telecommunication equipment (1) attached to an integrated bracket body (100) and the integrated bracket body (100) is further secured to a pole structure (2) via a clumper (140). The telecommunication equipment (1) can be any hardware used for telecommunication purposes, including but is not limited to, switch equipment, transmission equipment, customer premises equipment, or any combinations thereof. By way of example, the telecommunication equipment (1) are remote radio heads or remote radio units. The pole structure (2) is preferably extended in an upright position for the integrated bracket body (100) to be clamped thereon. Nevertheless, it should be understood that the pole structure (2) can also be in horizontal position depending on the application. The allowable number of the telecommunication equipment (1) to be attached to the pole structure (2) or the integrated bracket body (100) is dependent on the arrangement of the integrated bracket body (100) which will be discussed in further details in the paragraphs that follow.

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Referring to Figs. 3A to 4, the integrated bracket body (100) as illustrated therein comprises a protective casing (110) having a plurality of slots (115, 116, 117), one of which for accommodating a first bracket (120) and the others for accommodating one or more second brackets (130). Preferably, the plurality of slots (115, 116, 117) are defined by a space formed by a plurality of side walls (111, 112, 113, 114) of the protective casing (110) and the space is further divided by one or more dividers (118, 119). By way of example, the side walls (111, 112, 113, 114) are joined in such a way that they form a generally rectangular protective casing (110) with a front opening and a rear opening. Although not shown in any of the accompanying drawings, the side wall walls (111, 112, 113, 114) may be joined to form a protective casing (110) of other configurations, for example, in generally a V-shaped, an O-shaped or any other suitable configurations which may be fitted onto the pole structure (2). The space within the protective casing (110) is divided by the dividers (118, 119) to form an array of slots (115, 116, 117) for which the brackets (120, 130) are accommodated therewithin such that the brackets (120, 130) are positioned adjacent or side by side of one another. In this embodiment, the first bracket (120) is positioned in between two second brackets (130), and the brackets (120, 130) are each substantially in the form of a rectangular block. Nonetheless, the position of the first and second brackets (120, 130) is not limited thereto and can be re-arranged according to different needs and applications. Likewise, the shape of the brackets (120, 130) can be easily replaced by other shapes such as triangular, pentagon, hexagon and etc. The brackets (120, 130) may also be retained in their respective slots (115, 116, 117) by welding, adhesive attachment, or fastening by any types of mechanical fasteners.

This arrangement allows the protective casing (110) to simultaneously connect the different brackets (120, 130) together and protect the brackets (120, 130) which are contained therewithin by its side walls (111, 112, 113, 114). Furthermore, the connection of the brackets (120, 130) can be easily enhanced by varying the thickness or material of the side walls (111, 112, 113, 114). In addition to that, the brackets (120, 130) can be connected in any number by just altering the dimension of the side walls (111, 112, 113, 114) instead of the brackets (120, 130) as the side walls (111, 112, 113,

114) are flat pieces which can be easily altered with low production cost comparing to the brackets (120, 130).

Preferably, each bracket (120, 130) includes an attachment surface (121, 131) for which
5 a telecommunication equipment (1) is attached thereto. Each attachment surface (121, 131) may comprise one or more raised portions (122, 132) adapted for insertion into one or more mating recesses of the telecommunication equipment (1). Each raised portion (122, 132) can be further provided with a threaded hole for securing the telecommunication equipment (1) onto the respective raised portions (122, 132) via any
10 suitable fasteners, for example, screws or nuts and bolts. The main function of the raised portions (122, 132) are to position the telecommunication equipment (1) in such a way that the thread holes of the raised portions (122, 132) are aligned with attachment holes on the mating recesses of the telecommunication equipment (1), thereby allowing easy fastening of screws or nuts and bolts. By way of example, the attachment surfaces (122, 132) of the different brackets (120, 130) are exposed by the front opening of the protective casing (110) as shown in Fig. 3A.

Any one of the brackets (120, 130) can be provided with the clamper (140) for mounting the integrated bracket body (100) to the pole structure (2). By way of example, the
20 clamper (140) is provided at the first bracket (120) as shown in Fig. 3B. In this embodiment, the first bracket (120) further comprises a pair of space apart side portions (123, 124) extended outwardly from the integrated bracket body (100) to form a generally U-shape section for receiving the pole structure (2). Preferably, the side portions (123, 124) extend from a surface opposed to the attachment surface (121) of the first bracket (120) and also outwardly from the rear opening of the protective casing (110).

Preferably, the clamper (140) includes a clamping arm (141) that is pivotable between a closed configuration as shown in Fig. 5A and an open configuration as shown in Fig.
30 5B. By way of example, the clamping arm (141) comprises a first end (142) pivoted at one side portion (123) of the first bracket (120) and a second end (143) which is retainable at the other side portion (124) of the first bracket (120) via a nut and bolt

attachment (144, 145). To further protect and enhance security of the mount assembly, such nut and bolt attachment (144, 145) may include a nut (144) and a bolt (145) with an unequal-sided bolt head (146) that can only be unfastened by a corresponding bolt driver, such as an electric bolt driver. The bolt driver can be incorporated with a Global
5 Positioning System module for tracking its position information and the tracked position information can be further transmitted to a cloud-based server via a communication module upon activation of the bolt driver. Thus, any irregular activities of the bolt driver, such as unusual location or unauthorized use, can be detected or monitored. As shown in Fig. 6, the unequal-sided bolt head (146) is received within an
10 undercut (125) at the attachment surface (121) of the first bracket (120) so that the unequal-sided bolt head (146) can be positioned at the same level or at level below the attachment surface (121) of the first brackets (120) for preventing the unequal-side bolt head (146) from being tampered simply by hacking or gripping.

15 The present disclosure includes as contained in the appended claims, as well as that of the foregoing description. Although this invention has been described in its preferred form with a degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangements of parts may be
20 resorted to without departing from the scope of the invention.

CLAIMS

1. A mount assembly for holding a plurality of telecommunication equipment (1) onto a pole structure (2), the mount assembly comprising:
 - 5 an integrated bracket body (100) formed by a protective casing (110) having a plurality of slots (115, 116, 117) for accommodating a first bracket (120) and one or more second brackets (130), wherein each bracket (120, 130) includes an attachment surface (121, 131) for which a telecommunication equipment (1) is attached thereto, and
 - 10 wherein at least one of the brackets (120, 130) further includes a clasper (140) for mounting the integrated bracket body (100) to the pole structure (2).
2. The mount assembly according to claim 1, wherein the clasper (140) includes a clamping arm (141) that is pivotable between a closed configuration and an
- 15 open configuration.
3. The mount assembly according to claim 2, wherein the clamping arm (141) in its closed configuration is retained by a nut (144) and a bolt (145).
- 20 4. The mount assembly according to claim 3, wherein the bolt (145) has an unequal-sided bolt head (146) that can only be unfastened by a corresponding bolt driver.
5. The mount assembly according to claim 4, wherein the bolt driver is
- 25 incorporated with a Global Positioning System module for tracking its position information.
6. The mount assembly according to claim 5, wherein the tracked position information is further transmitted to a cloud-based server via a communication
- 30 module upon activation of the bolt driver.
7. The mount assembly according to any one of claims 3-6, wherein the first bracket (120) further comprises a pair of space apart side portions (123, 124)

extended outwardly from the integrated bracket body (100) to form a generally U-shape section for receiving the pole structure (2).

- 5 8. The mount assembly according to any one of claims 3-7, wherein the first bracket further comprises an undercut section (125) for receiving a bolt head (146) in such a way that the bolt head (146) is positioned at the same level or at level below the attachment surface (121) of the first bracket (120).
- 10 9. The mount assembly according to claim 8, wherein the clamping arm (141) of the clamper (140) further comprises a first end (142) pivoted at one side portion (123) of the first bracket (120) and a second end (143) which is retainable at the other side portion (124) of the first bracket (120).
- 15 10. The mount assembly according to any one of claims 1 to 9, wherein the plurality of slots (115, 116, 117) of the protective casing (110) is arranged in an array such that the brackets (120, 130) are positioned side by side in a row within the protective casing (110).
- 20 11. The mount assembly according to claim 10, wherein the first bracket (120) is positioned in between the second brackets (120).
- 25 12. The mount assembly according to any one of claims 1 to 11, wherein the protective casing (110) includes a first opening for exposing the attachment surfaces (121, 131) of the first and second brackets (120, 130) and a second opening for the clamper (140) to be outwardly extended therefrom.
- 30 13. The mount assembly according to any one of claims 1 to 12, wherein the plurality of telecommunication equipment (1) are remote radio heads or remote radio units.