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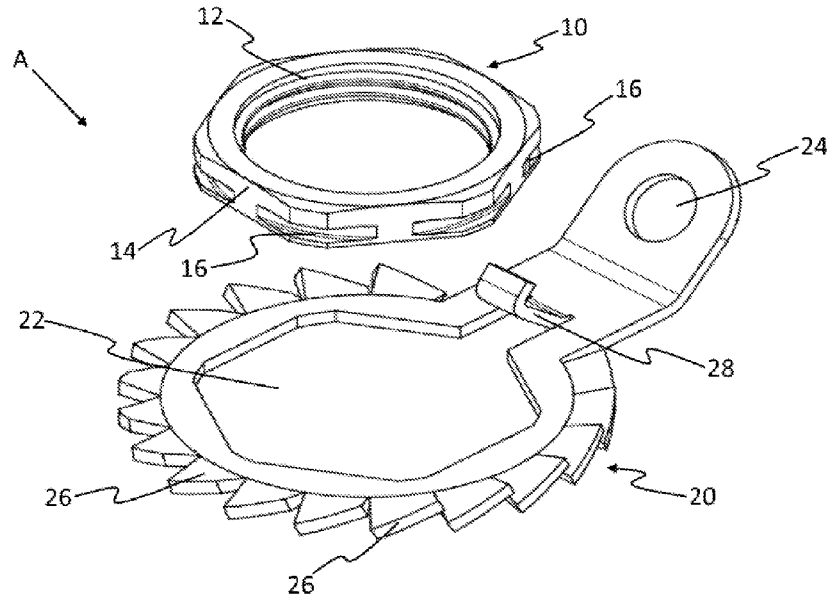


Figure - 1

(57) Abstract: The invention relates to an earthing assembly (A) comprising a locknut (10) with internal threads (12) mounted on the externally threaded body of a cable gland and an earthing tag (20) having at least one connection part (24) through which the earthing connection of said cable gland is made. The earthing assembly (A) is characterized in that comprising at least one locking arm (20) on the earthing tag (20) that prevents the lock nut (10) and the earthing tag (20) from moving independently of each other.



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CABLE GLAND ASSEMBLIES

Technical Field

5 The invention relates to cable glands for mounting cables through an opening of an enclosure.

In particular, the invention relates to cable glands for mounting EMC or armored cables through an opening on an insulating enclosure and to the earthing assemblies in these cable glands.

Background of the Invention

10 Cable glands are used for mounting cables on an enclosure. Cable glands provide sealing and mechanical and / or electrical connection between the cable and the enclosure. A cable gland generally consists of a lower body that is mounted to the enclosure, an upper body that is mounted to the lower body and provides compression of the cable armor, sealing elements to provide sealing, and a cap to compress the
15 insulating portion of the cable. For the safe and effective installation of armored cables, the cable gland should provide a good connection between earth and the cable armor. Therefore, considering the safety risks, the cable gland is able to fully transmit short circuit and leakage currents from the cable to earth.

20 Metal enclosures are generally preferred for armored cables. A part of the insulation of the armored cable is stripped off to reveal its armor and this part is mounted on the enclosure so that it remains within the cable gland. The armored cable and cable gland are connected to earth with the earthing of the enclosure. However, metal enclosures have some drawbacks. Metals have low corrosion resistance. For this reason, serious problems occur, especially in outdoor applications. In addition, plastic enclosures are
25 preferred in some cases to reduce component weight and economy. In this case, an earth tag is used between the cable gland and the enclosure to earth the armored cable.

The earth tag is placed between the enclosure and the cable gland to provide the earthing connection. The earth tag generally has a plate shaped body. It comprises a

first hole on the body through which the cable gland passes and a second hole through which the earthing connection is made. The second hole is smaller than the first hole.

In the state of the art, first, the serrated washer is mounted on the lower body of the cable gland and the enclosure during the assembly of the cable gland. Then, the earth tag is mounted and the lower body of the cable gland is fixed to the enclosure by a nut. For the assembly of the armored cable, the lower body of the cable gland is kept fixed with an assembly tool, and the assembly of the upper body of the cable gland is done with a separate assembly tool. This process has many disadvantages. First, three different assembly operations are performed for mounting the cable gland lower body only. This causes an increase in the assembly time. Secondly, two assembly tools are required to be used in the cable gland assembly and the inspection of the cable shield assembly. This situation both complicates the work of the installer and increases the assembly time. Third, investment in three different products is required for a single size cable gland, increasing the investment cost. On the other hand, the higher the number of assembled parts, the higher the risk of error by the operator.

GB2116784B describes an earth tag which provides an earthing connection between the enclosure and the cable gland. Here, a seal is placed in the opening through which the cable gland passes. Thus, when the earth tag is interposed between the enclosure and the cable gland, it provides sealing and earthing connection. These types of earth tags tend to rotate with the cable gland during cable gland assembly. The rotation of the earth tag results in its misplacement and obstructs its assembly. Especially, problems are encountered when the installation space is limited and the cable glands need to be installed close to each other.

EP1790053B1 discloses an earthing nut that is mounted on a threaded shaft. The earthing nut has a nut body that is threaded on the inside and compatible with a wrench on the outside. The nut body has at least one threaded opening extending into the interior of the nut body. A grub screw passes through the threaded opening and contacts a threaded shaft to which the earthing nut is mounted. Earthing is accomplished by fixing the end of an earthing connection to the earthing nut. The nut body has at least one second threaded opening extending into the interior of the nut. The earthing connection is fixed to the second threaded opening with the help of a screw. The earthing nut used for the earthing connection has relatively larger dimensions than a standard nut. This situation increases the amount of raw materials

used in the production of the earthing nut. The tightening torque of the earthing nut with relatively large dimensions is higher than that of the standard nut. The necessity of said openings in the earthing nut also increases the production cost.

5 EP1194990B1 describes an earth tag with tabs. The rotation of the earth tag is prevented by the friction force generated between the tabs and the enclosure. Here, a friction force occurs according to the tightening torque applied during the cable gland assembly. Therefore, in practice, it is not always possible to provide the desired friction force between the earth tag and the enclosure. When high tightening torque is applied to increase the friction force, the enclosure and the armored cable may perhaps be
10 damaged. In addition, two assembly tools are used to tighten the cable gland in practice. This makes the assembly process difficult and increases the assembly time. On the other hand, depending on the surface structure of the enclosure and external influences, the connection continuity between the enclosure and the earth tag may be interrupted.

15 As a result, due to above described disadvantages and inadequacy of existing solutions, it has been necessary to make development in the related art.

Purpose of the Invention

The invention has been developed with inspiration from existing situation and purposes to eliminate the above-mentioned disadvantages.

20 The main purpose of the invention is to develop an economical and simple earthing assembly to be used in cable glands that enable the mounting of armored cables to the opening on an enclosure. In the present invention, the earthing assembly comprises a lock nut and an earthing tag.

25 Another purpose of the invention is to provide quick and easy assembly of the cable gland. In the present invention, the cable gland and earthing assembly can be tightened using a single assembly tool. This provides quick and easy assembly, especially in situations where mounting space is limited and cable glands need to be mounted close to each other.

30 Another purpose of the invention is to prevent the earthing tag from rotating during the cable gland assembly. In the present invention, the angled protrusions on the earthing tag prevent the rotation of the earthing tag by increasing the friction between the

earthing tag and the enclosure. Thus, the position of the earthing tag relative to the earthing connection remains constant during assembly.

Another purpose of the invention is to provide the installation of the cable gland from the outside of the enclosure in cases where access to the interior of the enclosure is restricted. The locking arm on the earthing tag provides the locking of the earthing tag and the lock nut. Thus, the independent movement of the lock nut during cable gland assembly is prevented. The cable gland is mounted on the enclosure by tightening the lower body of the cable gland.

Another purpose of the invention is to provide low contact resistance and effective earthing. The earthing assembly allows the earthing connection to be established directly through the cable gland. Thus, the cable gland can fully transmit short circuit and leakage currents from the armored cable to the earth. An effective earthing is provided regardless of the material from which the enclosure is produced. Because short-circuit and leakage currents are fully transmitted to the earth without encountering the resistance of the enclosure.

To meet the above-mentioned purposes, the invention is an earthing assembly comprising a lock nut with internal threads is mounted on the externally threaded body of a cable gland and an earthing tag with at least one connection part through which the earthing connection of the cable gland is made in that, the earthing assembly comprises at least one locking arm, which is on the earthing tag and prevents the lock nut and the earthing tag from moving independently of each other.

The structural and characteristic features and all advantages of the invention will be clarified with the detailed description of the figures and the following description. Therefore, the evaluation should be done by taking into account these figures and detailed explanation.

Brief description of Figures

Figure 1: is an exploded view of the earthing assembly.

Figure 2: is a cross sectional view of the mounted earthing assembly.

Description of Part References

A. Earthing assembly

10. Lock nut

12. Internal thread

14. External portion

16. Groove

5 20. Earthing tag

22. Opening

24. Connection part

26. Protrusion

28. Locking arm

10 Detailed Description of the Invention

In this detailed description, the preferred embodiments of the earthing assembly (A) disclosed under the invention have been disclosed solely for the purpose of a better understanding of the subject.

15 Referring to Figure 1, the earthing assembly (A) comprises the lock nut (10) and the earthing tag (20). The earthing device (A) provides earthing of the cable gland. The externally threaded body of the cable gland provides mounting of the cable gland to the enclosure. The lock nut (10) has internal threads (12) that mount to the externally threaded body of the cable gland. The lock nut (10) ensures that the cable gland is fixed to the enclosure.

20 The earthing tag (20) provides the earthing connection of the cable gland. There is at least one connection part (24), where the earthing connection is made, on the earthing tag (20). In preferred embodiments of the invention, the earthing cable is connected to the connection part (24) by a screw. There is an opening (22) on the earthing tag (20) where the lock nut (10) is placed. The opening (22) has a similar geometry to the
25 external portion (14) of the lock nut (10). Thus, the lock nut (10) is easily placed into the opening (22) of the earthing tag (20). In preferred embodiments of the invention, the external portion (14) of the lock nut (10) and the opening (22) of the earthing tag (20) are in hexagonal geometry.

There is at least one groove (16) in the external portion (14) of the lock nut (10). The groove (16) prevents the lock nut (10) from falling out of the opening (22) of the earthing tag (20). For this purpose, the lock nut (10) is rotated in the opening (22) between 0 - 60°. In preferred embodiments of the invention, the lock nut (10) is rotated
5 30° to prevent it from falling out of the opening (22).

Referring to Figure 2, at least one locking arm (28) prevents the lock nut (10) and the earthing tag (20) from moving independently of each other. The locking arm (28) is pressed when the lock nut (10) is placed into the opening (22) of the earthing tag (20). In this way, the lock nut (10) and the earthing tag (20) do not move independently of
10 each other during the cable gland assembly.

There is at least one protrusion (26) on the earthing tag (20). The protrusion (26) extends outward from the surface of the earthing tag (20) at an angle. The protrusion (26) provides an increase in friction between the earthing tag (20) and the enclosure, thus preventing the earthing tag (20) from rotating during the cable gland assembly.
15 Therefore, the initial position of the connection part (24) is prevented from changing during assembly.

In the installation of the earthing assembly (A), the lock nut (10) is first placed in the opening (22) of the earthing tag (20). Then, the lock nut (10) placed in the opening (22) is rotated between 0 - 60°, preferably 30°, to a position where it will not come out of the
20 earthing tag (20). Next, the locking arm (28) is pressed. Thus, the earthing assembly (A) is formed by combining the lock nut (10) and the earthing tag (20).

The earthing assembly (A) provides an easy assembly of the cable gland with a single assembly tool. When the earthing assembly (A) is used in the cable gland assembly, the cable gland is mounted from the outside of the enclosure. The protrusions (26) on
25 the earthing tag (20) are clamped to the enclosure, ensuring that the earthing assembly (A) remains fixed during assembly. Thus, in cable gland assembly, the lower body of the cable gland can be tightened from the outside of the enclosure using an assembly tool. Another advantage of this situation is that it provides convenience during the inspection/ maintenance of the cable armor assembly in armored cables.

CLAIMS

- 5 1. An earthing assembly (A) comprising; a lock nut (10) with internal threads (12) is mounted on the externally threaded body of a cable gland; and an earthing tag (20) with at least one connection part (24) through which the earthing connection of the cable gland is made; characterized in that, the earthing tag (20) comprises at least one locking arm (28), which prevents the lock nut (10) and the earthing tag (20) from moving independently of each other.
- 10 2. An earthing assembly (A) according to claim 1, characterized in that the earthing tag (20) has an opening (22) which allows the locknut (10) to be placed on the earthing tag (20) and further which has a similar geometry to the outer part (14) of the locknut (10).
- 15 3. An earthing assembly (A) according to claim 1, characterized in that the lock nut (10) comprises at least one groove (16) located on its external portion (14), further which prevents the locknut (10) from falling out of the earthing tag (20) when the locknut (10) is rotated between 0 - 60° in the opening (22) of the earthing tag (20).
- 20 4. An earthing assembly (A) according to claim 1 or claim 3, characterized in that the lock nut (10) comprises at least one groove (16) located on its external portion (14), further which prevents the locknut (10) from falling out of the earthing tag (20) when the locknut (10) is rotated 30° in the opening (22) of the earthing tag (20).
5. An earthing assembly (A) according to claim 1 characterized in that the earthing tag (20) comprises at least one protrusion (26) that prevents to rotate the earthing tag (20) during the cable gland assembly by increasing the friction between the earthing tag (20) and the enclosure.

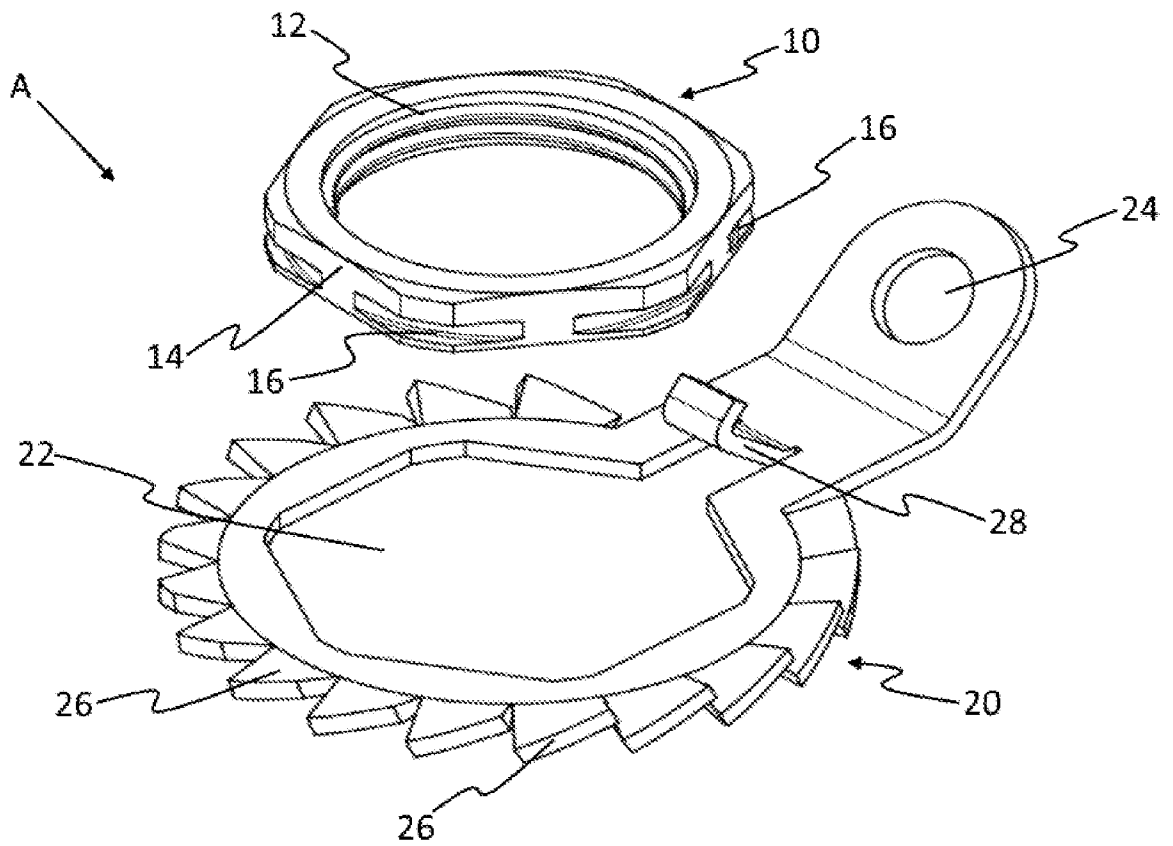


Figure - 1

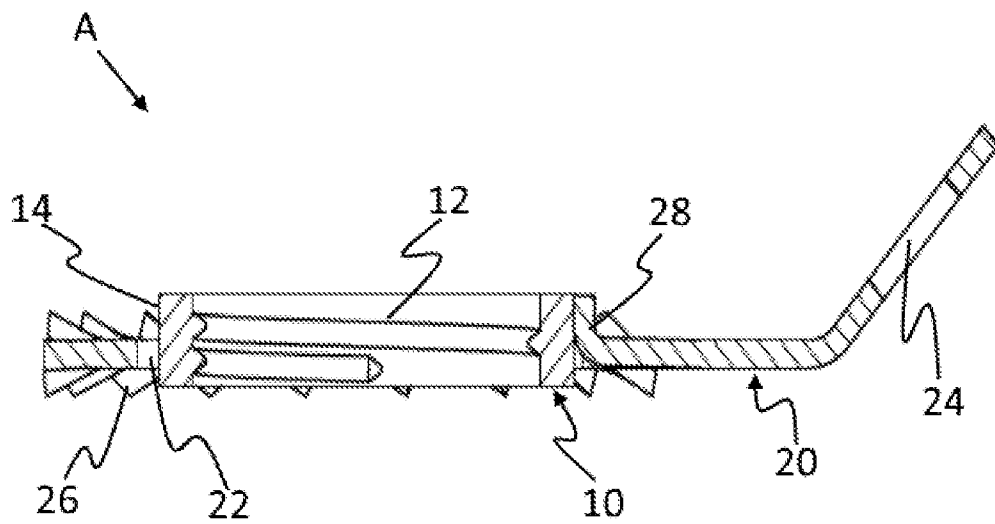


Figure - 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2021/051617

A. CLASSIFICATION OF SUBJECT MATTER H02G 3/16 (2006.01)i; H02G 3/22 (2006.01)i 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) H02G Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Turkish Patent And Trademark Office Patent Database Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 2021242698 A1 (CAPE IND LLC [US]) 02 December 2021 (2021-12-02) Paragraphs 122, 146; Figures 3A, 3B, 11A-11D, 20	1-2,5 3-4
X A	EP 0604117 A2 (ELKAY ELECTRICAL MGF [GB]) 29 June 1994 (1994-06-29) Paragraphs 16-30; Figure 3A, 3B, 5B, 6B,	1-2 3-5
A	GB 2446937 A (CABLE TERMINOLOGY LTD [GB]) 27 August 2008 (2008-08-27) Whole document	1-5
☐ 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 “D” document cited by the applicant in the international application “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 24 August 2022		Date of mailing of the international search report 24 August 2022
Name and mailing address of the ISA/TR Turkish Patent and Trademark Office (Turkpatent) Hipodrom Caddesi No. 13 06560 Yenimahalle Ankara Turkey Telephone No. +903123031000 Facsimile No. +903123031220		Authorized officer Ali Bulent Daloglu Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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