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(54) Clamp arrangement

(57) An earth clamp assembly for clamping an earth rod to a conductor includes a clamp member 10 formed from metal strip to receive the earth rod 26 and the conductor 28. End portions 12,16 of the clamp member 10 each include an aperture 14,18, the end portions 12,16 overlapping so that the apertures 14,18 are substantially

aligned. Holding portions 24,25 of the clamp member 10 hold a nut 30 in line with the apertures 14,18, and a bolt 32 passes through the apertures 14,18 and the nut 30 to operate on the conductor 28 and earth rod 26 to clamp them together in electrical contact with each other.

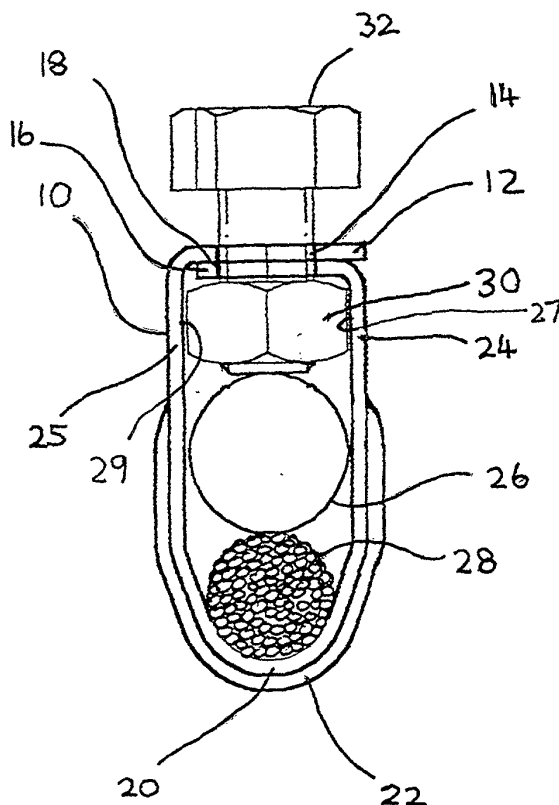


FIG 1

EP 1 271 696 A1

Description

[0001] The present invention relates to clamp arrangements, especially but not exclusively earth clamps.

[0002] Lightning conductors from electrical installations or lightning protection are fixed to earth rods by means of clamps. The conductors may consist of a copper strip or tape or copper cable. Traditionally, the clamp is a casting defining an aperture through which the earth rod and the cable or tape run. A bolt or screw engages with a threaded aperture in the casting to act upon the conductor and the earth rod, urging them together to ensure good contact. Castings are relatively expensive, and labour intensive to produce.

[0003] According to the present invention, there is provided an earth clamp assembly for clamping an earth rod to a conductor, the assembly comprising a clamp member for receiving the earth rod and the conductor, the clamp member including holding means for holding a first threaded member, a second threaded member engageable with the first threaded member, the second threaded member operable upon the earth rod and conductor to clamp the earth rod and the conductor to the clamp member in electrical contact with each other.

[0004] Preferably, the first threaded member is a nut. The nut may be removably held by the holding means. Preferably, the holding means substantially limits rotation of the nut when the nut is held thereby.

[0005] Preferably, the clamp member includes first and second opposite end portions and an intermediate body portion therebetween. The holding means may include holding portions arranged between each end portion and the intermediate body portion. Conveniently the holding portions include opposed substantially parallel, spaced-apart faces, and the nut may be securely held between the faces.

[0006] Preferably the opposite end portions overlap each other to provide the holding means. Preferably each end portion includes an aperture, such that the apertures are substantially aligned with each other when the end portions are overlapped. Preferably the second threaded member is located through the apertures to engage the first threaded member. The second threaded member may be a bolt.

[0007] Preferably the body portion is shaped to fit closely around the conductor and earth rod, and may include a shoulder portion to reduce the spaced apart dimension of the body portion to that of the holding portions. Conveniently, the body portion includes reinforcing means. The reinforcing means may include an elongate formation extending the length of the body portion. The formation may define a recess on the inside of the body portion and a corresponding raised region on the outside of the body portion. Preferably the recess has a radius which is approximately the same as the thickness of the material of the body portion. Preferably the reinforcing means extends substantially the whole length of

the body portion.

[0008] Embodiments of the present invention will now be described by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 shows a side view of an earth clamp in use with the conductor and an earth rod and looking along the line of axis of the earth rod;

Fig. 2 shows a front sectional view of the earth clamp in use with the earth rod and the conductor;

Fig. 3 shows a view similar to Fig. 1 of another earth clamp in use with a conductor and earthing rod.

[0009] Fig. 1 shows an earth clamp 10 formed from a strip of metal e.g. stainless steel. The strip includes two opposite end portions 12, 16, holding portions 24, 25 and an intermediate body portion 20. The end portions 12, 16 each define an aperture 14, 18 respectively. To form the clamp 10, the intermediate body portion 20 is shaped as shown in Fig. 1 to have a substantially U-shape, and the end portions 12, 16 overlap each other such that the apertures 14, 18 are aligned.

[0010] The holding portions 24, 25 as shown in Fig. 1 are substantially mutually parallel and spaced apart from each other and are each arranged between the respective end portions 16, 18 and the intermediate body portion 20. The holding portions 24, 25 each include an inwardly directed face 27, 29, and the distance between the said faces of the holding portions 27, 29 is such as to accommodate a nut 30 without allowing rotation of the same. The apertures 14, 18 are adjacent and substantially aligned with each other, allowing a threaded fastener such as a bolt 32 or screw to be inserted through the apertures 14, 18 to threadably engage with the nut 30 held between the holding portions 24, 25.

[0011] Figs. 1 and 2 show the clamp assembly 10 in use. The clamp assembly 10 is fitted over the earth rod 26 so that the earth rod protrudes through the clamp assembly. The conductor 28 is inserted into the clamp assembly 10 alongside the earth rod 26. The shape of the body portion 20 is such that it fits closely around the earth rod and conductor, holding and containing the conductor and the earth rod substantially in alignment with the bolt 32. The bolt 32 is then screwed into the nut 30. As the bolt is tightened, the nut 30 is prevented from rotating by the holding portions 24, 25 and the bolt bears against the earth rod 26, urging the earth rod 26 against the conductor 28 to ensure good electrical contact.

[0012] As shown in Fig. 1, the conductor is a multi-strand cable. Another common type of conductor is a strip or tape. Fig. 3 shows an alternative embodiment of the clamp for use with tape. The clamp 110 includes two end portions 112, 116, holding portions 124, 125 and an intermediate body portion 120. The end portions 112, 116 each include apertures 114, 118 respectively and overlap so that the apertures 114, 118 are adjacent and substantially aligned with each other. The shape of the clamp closely fits around the earth rod 126 and the tape

128, holding and containing the tape and the earth rod.

[0013] The holding portions 124, 125 are substantially mutually parallel and spaced apart to accommodate a nut 130 without allowing rotation.

[0014] The intermediate body portion 120 includes shoulder portions 136 which adjust the spacing of the sides of the clamp 110 from that required to fit around the tape to that required at the holding portions to accommodate the nut. A threaded fastener 132 such as a bolt is inserted through the apertures 114, 118 to engage nut 130.

[0015] The method of use is substantially as described before, although it will be noticed that in Figs. 1 and 2 the bolt 32 bears on the earth rod 26 urging the earth rod against the conductor 28; in Fig. 3, the bolt 132 bears on the conductor 128 urging it against the earth rod, the principle is the same in that the bolt operates to urge the rod and the conductor together.

[0016] Conveniently the clamp may be manufactured from steel, by pressing methods, and preferably for corrosion resistance from stainless steel. To improve stiffness of the finished item, the steel strip may be swaged during pressing resulting in a reinforcing means 22, 122 in the form of an elongate formation such as a rib or ribs extending the length of the intermediate body portion 20, 120, and in the case of the embodiment shown in Fig. 3, continuing over the shoulder portions 136. The elongate formation 22, 122 defines a recess 23 in the internal surface of the clamp and a corresponding raised area 21 on the outside of the body portion, the recess 23 being substantially semicircular in cross-section and having a radius similar to the thickness of the steel from which the strip is formed.

[0017] Normally, the strip which forms the clamp assembly would be shaped and assembled before fitting as described above. However, the clamp assembly may, if necessary or convenient, be shaped and assembled in situ, for instance, if replacing an existing clamp or installing an additional clamp on an existing installation. In this case, without the bolt in position, the end portions, holding portions and sides of the intermediate body portions may be opened away from each other allowing the clamp assembly to be positioned around a rod and conductor. The same portions may then be brought back together, the nut positioned between the holding portions, the bolt inserted through the apertures, engaging the nut and tightened to bear upon the conductor or rod to clamp them together.

[0018] Various modifications may be made without departing from the scope of the invention. The clamp may be made of any suitable material, and sized to fit any combination of earth rod and conductor. The nut may be loose or fixed in place by some means such as, for example, spot welding, gluing, or crimping of the holding portions.

[0019] Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be un-

derstood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims

1. An earth clamp assembly for clamping an earth rod to a conductor, **characterised in that** the assembly comprises a clamp member (10) for receiving the earth rod (26) and the conductor (28), the clamp member (10) including holding means (12,16,24,25) for holding a first threaded member (30), a second threaded member (32) engageable with the first threaded member (30), the second threaded member (32) operable upon the earth rod (26) and conductor (28) to clamp the earth rod (26) and the conductor (28) to the clamp member (10) in electrical contact with each other.
2. An earth clamp assembly according to claim 1, **characterised in that** the first threaded member (30) is a nut.
3. An earth clamp assembly according to claim 2, **characterised in that** the nut (30) is removably held by the holding means (12,16,24,25).
4. An earth clamp assembly according to claim 2 or 3, **characterised in that** the holding means (12,16,24,25) substantially limits rotation of the nut (30) when the nut (30) is held thereby.
5. An earth clamp assembly according to any of the preceding claims, **characterised in that** the clamp member (10) includes first and second opposite end portions (12,16) and an intermediate body portion (20) therebetween.
6. An earth clamp assembly according to claim 5, **characterised in that** the holding means (12,16,24,25) includes holding portions (24,25) arranged between each end portion (12,16) and the intermediate body portion (20).
7. An earth clamp assembly according to claim 6, **characterised in that** the holding portions (24,25) include opposed substantially parallel, spaced-apart faces (27,29).
8. An earth clamp assembly according to claim 7, **characterised in that** the first threaded member (30) is securely held between the faces (27,29).
9. An earth clamp assembly according to any of claims 5 to 8, **characterised in that** the opposite end por-

tions (12,16) overlap each other to provide the holding means (12,16,24,25).

10. An earth clamp assembly according to claim 9, **characterised in that** each end portion (12,16) includes an aperture (14,18), such that the apertures (14,18) are substantially aligned with each other when the end portions (12,16) are overlapped. 5
11. An earth clamp assembly according to claim 10, **characterised in that** the second threaded member (32) is located through the apertures (14,18) to engage the first threaded member (30). 10
12. An earth clamp assembly according to claim 11, **characterised in that** the second threaded member (32) is a bolt. 15
13. An earth clamp assembly according to any of claims 5 to 12, **characterised in that** the body portion (20) is shaped to fit closely around the conductor (28) and earth rod (26). 20
14. An earth clamp assembly according to any of claims 5 to 13, **characterised in that** the body portion (120) includes a shoulder portion (136) to reduce the spaced apart dimension of the body portion (120) to that of the holding portions (124,125). 25
15. An earth clamp assembly according to any of claims 5 to 14, **characterised in that** the body portion (20,120) includes reinforcing means (22,122). 30
16. An earth clamp assembly according to claim 15, **characterised in that** the reinforcing means (22,122) includes an elongate formation (22,122) extending the length of the body portion (20,120). 35
17. An earth clamp assembly according to claim 16, **characterised in that** the formation (22,122) defines a recess (23) on the inside of the body portion (20,120) and a corresponding raised region (24) on the outside of the body portion (20,120). 40
18. An earth clamp assembly according to claim 17, **characterised in that** the recess (23) has a radius which is approximately the same as the thickness of the material of the body portion (20,120). 45
19. An earth clamp assembly according to any of claims 15 to 18, **characterised in that** the reinforcing means (22,122) extends substantially the whole length of the body portion (20,120). 50

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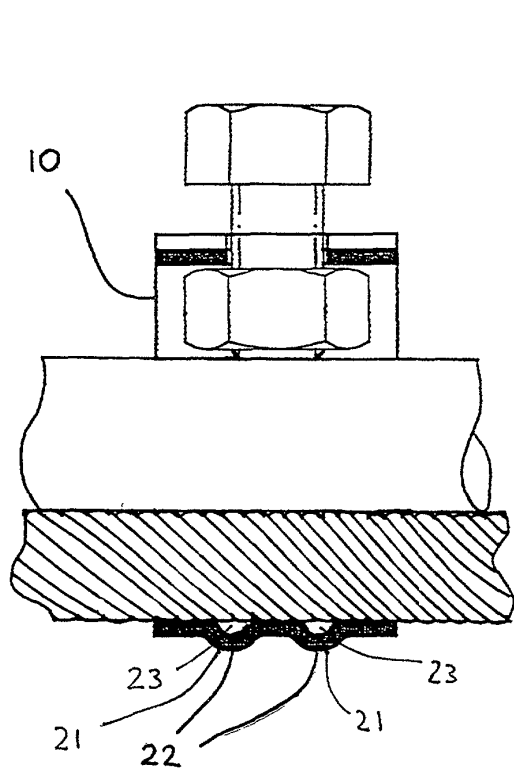


FIG 2

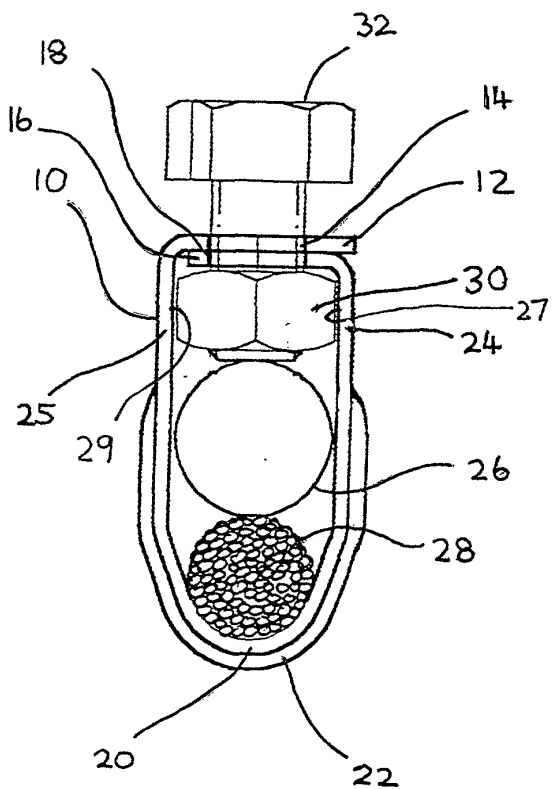


FIG 1

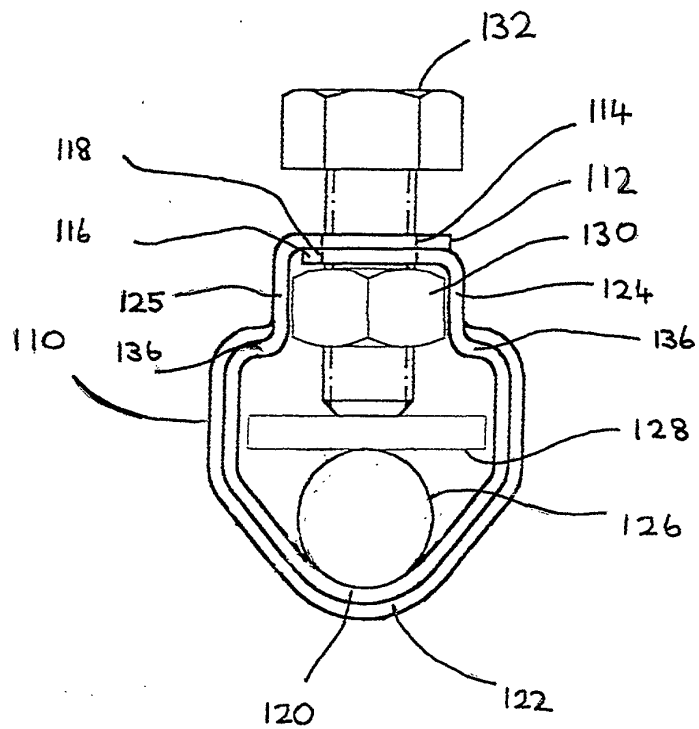


FIG 3



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 30 5627

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	GB 1 268 162 A (COMPAGNIE GENERALE D'ENTREPRISES ELECTRONIQUES) 22 March 1972 (1972-03-22) * page 1, column 2, line 53 - page 2, column 1, line 26; figures *	1-13, 19	H01R4/36
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X	US 3 742 431 A (KOBYNER H) 26 June 1973 (1973-06-26) * column 1, line 58 - column 4, line 35; figures 1, 7 *	1, 5, 14-16, 19	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) H01R
Place of search MUNICH		Date of completion of the search 16 November 2001	Examiner Langbroek, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 5627

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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16-11-2001

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