(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 005 108 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
31.05.2000 Bulletin 2000/22

(51) Int Cl.[7]: **H01R 4/64**, H01R 4/24

(21) Application number: **99309452.3**

(22) Date of filing: **26.11.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **26.11.1998 US 110043 P**

(71) Applicant: **Thomas & Betts International, Inc.**
Sparks, Nevada 89431 (US)

(72) Inventors:
- **Moran, Thomas T.**
  Cincinati, Ohio 45213 (US)
- **Coll, Gene**
  Cranford, New Jersey 07016 (US)
- **Dinh, Cong Thanh**
  Memphis, Tennessee 38119 (US)

(74) Representative: **Howick, Nicholas Keith**
CARPMAELS & RANSFORD
43 Bloomsbury Square
London WC1A 2RA (GB)

(54) Universal ground clip assembly

(57) A universal ground clip assembly (10) for electrically connecting interchangeable messenger clamps (131, 13b, 13c, 13d) to a cable messenger strand (11) strung between utility poles. A saddle shaped grounding clip (17) having a generally U-shaped cross-section with opposing first and second side members (19,21) is positioned over the insulation jacket (14) of the messenger strand and includes at least one pointed prong (22) for penetrating the messenger strand insulation jacket (14) and engaging the messenger strand conductor (11). Compression of the grounding clip causes the prong (22) to penetrate the insulation jacket (14) thereby establishing an electrical connection with the messenger strand conductor (11). The clip assembly (10) may further include a variety of interchangeable messenger clamps (13a, 13b, 13c, 13d), such as a ground or span clamp, capable of engaging the grounding clip (17). Upon engagement, the interchangeable messenger clamps (131, 13b, 13c, 13d) establish an electrical connection with the grounding clip (17). During assembly and installation, the grounding clip (17) is preferably positioned and compressed on the messenger strand (11) prior to installation of the interchangeable messenger clamps.

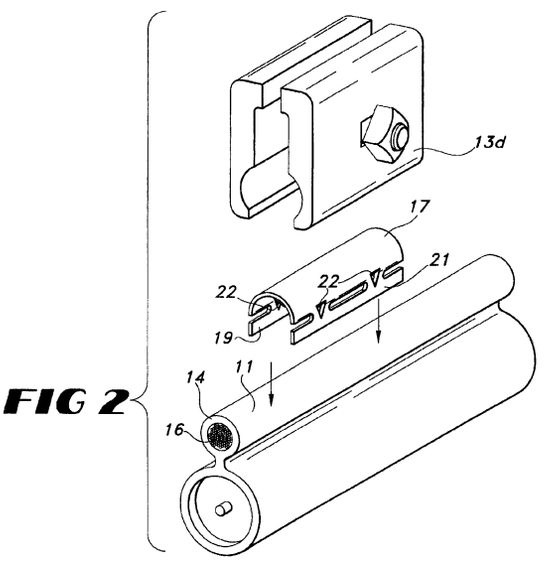

FIG 2

EP 1 005 108 A2

Description

Cross-Reference To Related Applications

[0001] This application claims priority under 35 U.S. C. §119(e) to provisional patent application serial number 60/110,043 filed November 26, 1998, the disclosure of which is incorporated herein by reference.

Field of the Invention

[0002] The present invention relates generally to devices and methods for implementing a ground connection between a conductor of a cable messenger strand and a cable clamp. In even greater particularity, the present invention is directed to a universal ground clip assembly comprising a unique ground clip that may be utilized with interchangeable messenger clamps which have jaws that are typically clamped over the insulation jacket of the cable messenger strand. The present invention also pertains to the method of installing the universal ground clip assembly.

Background of the Invention

[0003] A multitude of approaches have been taken to address the problem of grounding a cable clamp to a cable messenger strand. Some approaches involve stripping the insulation from the messenger strand to effect a ground connection using conventional grounding techniques. For instance, once the insulation has been removed, a cable clamp is positioned around the strand, a ground wire is positioned in contact with the messenger strand conductor between the conductor and the strand, and the clamp is secured to the strand thus effecting the ground connection. Such conventional techniques, however, are time consuming. Moreover, stripping of the insulation may be hazardous to personnel and can adversely affect the integrity of the cable and strand.

[0004] Another approach for grounding a cable clamp to a cable messenger strand has focused on including teeth on the jaws of a ground clamp which are intended to pierce the insulation of the messenger strand in order to make the ground connection with the conductor. This specific type of ground clamp including its multiple components is typically positioned around the messenger strand in an attempt to align the teeth so that they make adequate contact with the messenger strand conductor when the clamp is tightened. However, it is recognized that such approach is tedious. Combining the functions of clamping to the messenger strand and making a ground connection with the strand conductor requires precise positioning and securing of the clamp. Any misalignment could adversely affect the integrity of the support function itself and/or the grounding connection.

[0005] Accordingly, in view of the foregoing drawbacks with currently available cable clamps and grounding techniques, an improved clamping and grounding device assembly and method are needed to simplify installation procedures in the field.

Summary of the Invention

[0006] In accordance with the purposes of the invention as embodied and broadly described herein, the present invention addresses the above needs by providing a universal ground clip assembly whose primary object or purpose is to electrically connect interchangeable messenger clamps to a cable messenger strand strung between utility poles. The messenger strand typically includes an insulation jacket for insulating a conductor. In one embodiment of the present invention, the ground clip assembly comprises a grounding clip positioned over the insulation jacket of the messenger strand. The grounding clip includes a penetration means for penetrating the messenger strand insulation jacket and engaging the messenger strand conductor wherein compression of the grounding clip on the messenger strand causes the penetration means to penetrate the insulation jacket thereby establishing an electrical connection with the messenger strand conductor. In addition, this embodiment of the clip assembly includes a variety of interchangeable messenger damp means, such as a ground or span clamp, capable of engaging the grounding clip. Upon engagement, the interchangeable messenger clamp means establishes an electrical connection with the grounding clip. The interchangeable messenger clamp means may further include a ground connection means for electrically connecting the interchangeable messenger clamp means to a ground. During assembly and installation, the grounding clip is preferably positioned and compressed on the messenger strand prior to installation of the interchangeable messenger clamp means. Moreover, the grounding clip preferably comprises a saddle clip having a generally U-shaped cross-section with opposing first and second side members. The penetration means may either comprise a pointed prong formed in at least one of the first and second side members or at least one pointed prong formed in each of the first and second side members.

[0007] The present invention also addresses the above needs in another embodiment by providing a universal ground clip whose primary object or purpose is to establish electrical connection with a cable messenger strand strung between utility poles. Again, the messenger strand typically includes an insulation jacket for insulating a conductor. In this particular embodiment, the ground clip comprises a generally U-shaped saddle body having opposing first and second side members and a length sufficient to accommodate a variety of interchangeable messenger clamp means. The saddle body positioned over the insulation jacket of the messenger strand. The clip further includes a penetration means for penetrating the messenger strand insulation jacket and engaging the messenger strand conductor.

Compression of the saddle body on the messenger strand causes the penetration means to penetrate the insulation jacket thereby establishing an electrical connection with the messenger strand conductor. Preferably, the saddle body is positioned and compressed on the messenger strand prior to installation of the interchangeable clamp means while the penetration means comprises a pointed prong formed in at least one of the first and second side members or at least one pointed prong formed in each of the first and second side members.

[0008] Furthermore, the present invention addresses the above needs in another embodiment by providing a method for electrically connecting interchangeable messenger clamps to a cable messenger strand strung between utility poles wherein the messenger strand includes an insulation jacket for insulating a conductor. In a preferred embodiment, the method comprises the steps of: (a) forming a grounding clip out of sheet metal; (b) further fashioning the grounding clip to include a penetration means for penetrating the messenger strand insulation jacket and engaging the messenger strand conductor; (c) positioning the grounding clip over the insulation jacket of the messenger strand; (d) compressing the grounding clip so as to cause the penetration means to penetrate the insulation jacket thereby establishing an electrical connection with the messenger strand conductor; and (e) selectively attaching interchangeable messenger clamp means to the grounding clip thereby establishing an electrical connection with the grounding clip. Preferably, the step of compressing the grounding clip is accomplished using a conventional hand tool, such as a pair of plyers, and occurs prior to the step of selectively attaching interchangeable messenger clamp means. Also, the interchangeable messenger damp means preferably comprises a ground or span clamp and may further include a ground connection means for electrically connecting the interchangeable messenger clamp means to a ground. As with the previous embodiments, the grounding clip preferably comprises a saddle clip having a generally U-shaped cross-section with first and second side members. The penetration means may either comprise a pointed prong formed in at least one of the first and second side members or at least one pointed prong formed in each of the first and second side members. These and other objects, features, and advantages of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

Brief Description of the Drawings

[0009] In order to more fully understand the manner in which the above-recited and other advantages and objects of the invention are obtained, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. Note particularly that the appended drawings are not necessarily drawn to scale. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention and its presently understood best mode for making and using the same will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

FIG. 1 is a perspective view of a first and second embodiment of a universal ground clip assembly shown installed on a cable messenger strand embodying features of the present invention;

FIG. 2 is an exploded perspective view of a third one embodiment of a universal ground clip assembly embodying features of the present invention;

FIG. 3 is an exploded end view showing an integrated "figure-8" messenger cable and a ground clip embodying features of the present invention;

FIG. 4 is a perspective view showing a ground clip being compressed onto a cable messenger strand using a convention tool embodying features of the present invention;

FIG. 5 is a perspective view of a ground clip embodying features of the present invention;

FIG. 6 is a perspective view of a ground clamp embodying features of the present invention; and

FIGS. 7 - 9 are end views illustrating successive steps on how to install a universal ground clip assembly.

Detailed Description

[0010] Referring to the drawings, a representative universal ground clip assembly, embodying various features the present invention, is generally indicated throughout the figures by reference character 10. As illustrated, and more fully described below, clip assembly 10 is preferably utilized in the aerial installation of a conventional cable messenger strand 11 or the like that is strung between utility poles 12.

[0011] In a preferred embodiment of the present invention, as most clearly shown in Figs. 1 and 2, one purpose of clip assembly 10 is to electrically connect a variety of conventional interchangeable messenger clamps, denoted as 13a, 13b, 13c, 13d throughout the figures, to the messenger strand 11. The messenger strand 11 typically includes an insulation jacket 14 for insulating a conductor 16. In order to establish electrical connection with the messenger strand 11, a grounding clip 17 formed from sheet metal is positioned over the insulation jacket 14 of the messenger strand 11. The grounding clip 17 includes a penetration means for penetrating the messenger strand insulation jacket 14 and engaging the messenger strand conductor 16 wherein compression of the grounding clip 17 on the messenger strand 11 causes the penetration means to penetrate

the insulation jacket 14 thereby establishing an electrical connection with the messenger strand conductor 16. Compression of the grounding clip 17 is preferably accomplished through the use of a conventional hand tool 18, such as plyers. The grounding clip 17 preferably comprises a saddle clip having a generally U-shaped cross-section with opposing first 19 and second 21 side members and a length sufficient to accommodate a variety of interchangeable messenger clamp means. The penetration means may either comprise a pointed prong 22 formed in at least one of the first 19 and second 21 side members or at least one pointed prong 22 formed in each of the first 19 and second 21 side members.

[0012] The clip assembly 10 may further include the variety of interchangeable messenger clamp means, such as a ground clamp 13b, 13d, span clamp 13a, or any other type 13c of clamp for messenger strands, capable of engaging the grounding clip 17. Upon engagement, the interchangeable messenger clamp means establishes an electrical connection with the grounding clip 17. The interchangeable messenger clamp means may further include a ground connection means, such as a ground wire 23, for electrically connecting the interchangeable messenger clamp means to a ground (not shown). During assembly and installation, the grounding clip 17 is preferably positioned and compressed on the messenger strand 11 prior to installation of the interchangeable messenger clamp means 13a-d.

[0013] Figures 7-9 illustrate a method for electrically connecting interchangeable messenger clamps 13a-d to the cable messenger strand 11 strung between utility poles. In a preferred embodiment, the method comprises the steps of: (a) forming a grounding clip 17 out of sheet metal; (b) further fashioning the grounding clip to include a penetration means 22 for penetrating the messenger strand insulation jacket 14 and engaging the messenger strand conductor 16; (c) positioning the grounding clip 17 over the insulation jacket 14 of the messenger strand 11; (d) compressing the grounding clip 17 so as to cause the penetration means 22 to penetrate the insulation jacket 14 thereby establishing an electrical connection with the messenger strand conductor 16 ; and (e) selectively attaching interchangeable messenger clamp means 13a, 13b, 13c, or 13d to the grounding clip 17 thereby establishing an electrical connection with the grounding clip 17. Preferably, the step of compressing the grounding clip 17 is accomplished using a conventional hand tool, such as a pair of plyers 18, and occurs prior to the step of selectively attaching interchangeable messenger clamp means.

[0014] Although preferred embodiments of the present invention has been described above by way of example, it will be understood by those skilled in the field that modifications may be made to the disclosed embodiments which are within the scope of the invention as defined by the appended claims.

Claims

1. A universal ground clip assembly for electrically connecting interchangeable messenger clamps to a cable messenger strand strung between utility poles, the messenger strand having an insulation jacket for insulating a conductor, said ground clip assembly comprising:

   (a) a grounding clip positioned over the insulation jacket of the messenger strand, said grounding clip including penetration means for penetrating the messenger strand insulation jacket and engaging the messenger strand conductor, wherein compression of said grounding clip on the messenger strand causes said penetration means to penetrate the insulation jacket thereby establishing an electrical connection with the messenger strand conductor; and
   (b) interchangeable messenger clamp means capable of engaging said grounding clip, said interchangeable messenger clamp means establishing an electrical connection with said grounding clip upon engagement.

2. The universal ground clip assembly of claim 1, wherein said interchangeable messenger clamp means comprises a ground clamp.

3. The universal ground clip assembly of claim 1, wherein said interchangeable messenger clamp means comprises a span clamp.

4. The universal ground clip assembly of claim 1, wherein said interchangeable messenger clamp means further includes ground connection means for electrically connecting said interchangeable messenger clamp means to a ground.

5. The universal ground clip assembly of claim 1, wherein said grounding clip is positioned and compressed on the messenger strand prior to installation of said interchangeable messenger clamp means.

6. The universal ground clip assembly of claim 5, wherein said grounding clip comprises a saddle clip having a generally U-shaped cross-section with opposing first and second side members.

7. The universal ground clip assembly of claim 6, wherein said penetration means comprises a pointed prong formed in at least one of said first and second side members.

8. The universal ground clip assembly of claim 6, wherein said penetration means comprises at least

one pointed prong formed in each of said first and second side members.

9. A universal ground clip for establishing electrical connection with a cable messenger strand strung between utility poles, the messenger strand having an insulation jacket for insulating a conductor, said ground clip comprising:

(a) a generally U-shaped saddle body having opposing first and second side members and a length sufficient to accommodate a variety of interchangeable messenger clamp means, said saddle body positioned over the insulation jacket of the messenger strand; and
(b) penetration means for penetrating the messenger strand insulation jacket and engaging the messenger strand conductor, wherein compression of said saddle body on the messenger strand causes said penetration means to penetrate the insulation jacket thereby establishing an electrical connection with the messenger strand conductor.

10. The universal ground clip of claim 9, wherein said saddle body is positioned and compressed on the messenger strand prior to installation of said interchangeable clamp means.

11. The universal ground clip of claim 9, wherein said penetration means comprises a pointed prong formed in at least one of said first and second side members.

12. The universal ground clip of claim 9, wherein said penetration means comprises at least one pointed prong formed in each of said first and second side members.

13. A method of electrically connecting interchangeable messenger clamps to a cable messenger strand strung between utility poles, the messenger strand having an insulation jacket for insulating a conductor, said method comprising the steps of:

(a) forming a grounding clip out of sheet metal;
(b) further fashioning said grounding clip to include penetration means for penetrating the messenger strand insulation jacket and engaging the messenger strand conductor;
(c) positioning said grounding clip over the insulation jacket of the messenger strand;
(d) compressing said grounding clip so as to cause said penetration means to penetrate the insulation jacket thereby establishing an electrical connection with the messenger strand conductor; and
(e) selectively attaching interchangeable messenger clamp means to said grounding clip thereby establishing an electrical connection with said grounding clip.

14. The method of claim 13, wherein said step of compressing said grounding clip occurs prior to said step of selectively attaching interchangeable messenger clamp means.

15. The method of claim 13, wherein said step of compressing said ground clip is accomplished using a conventional hand tool.

16. The method of claim 13, wherein said interchangeable messenger clamp means comprises a ground clamp.

17. The method of claim 13, wherein said interchangeable messenger clamp means comprises a span clamp.

18. The method of claim 13, wherein said interchangeable messenger clamp means further includes ground connection means for electrically connecting said interchangeable messenger clamp means to a ground.

19. The method of claim 13, wherein said grounding clip comprises a saddle clip having a generally U-shaped cross-section with first and second side members.

20. The method of claim 19, wherein said penetration means comprises a pointed prong formed in at least one of said first and second side members.

21. The method of claim 19, wherein said penetration means comprises at least one pointed prong formed in each of said first and second side members.

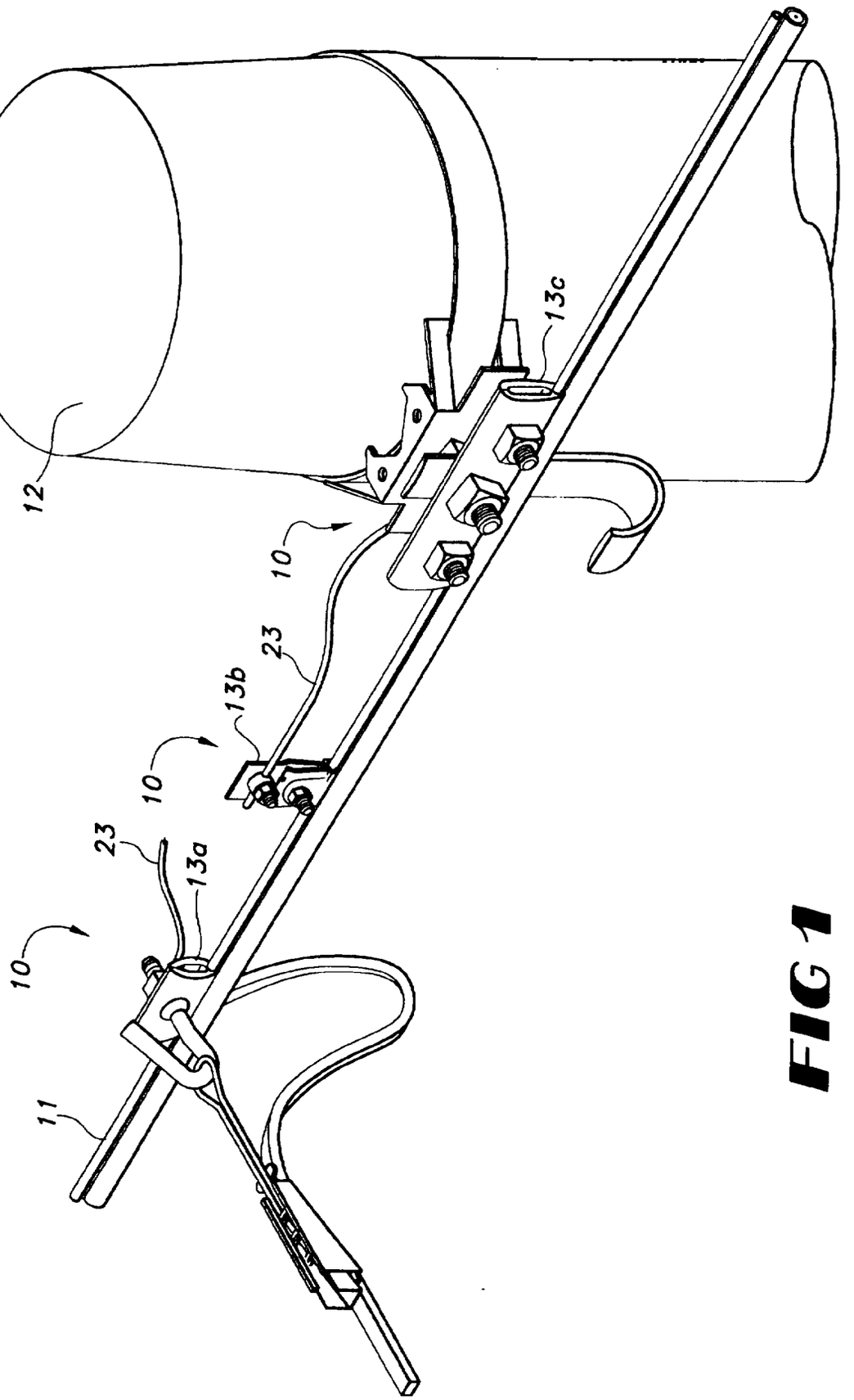

FIG 1

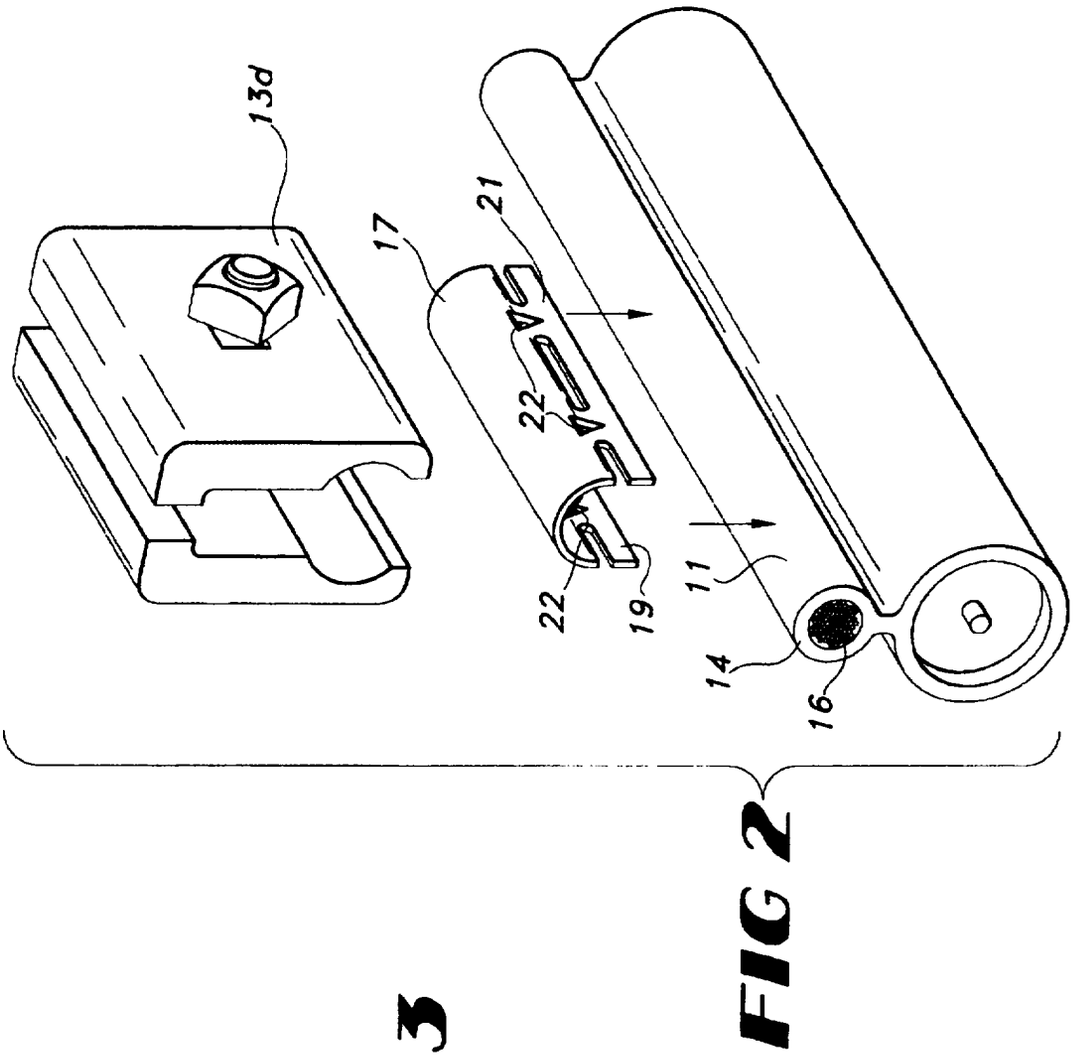

FIG 2

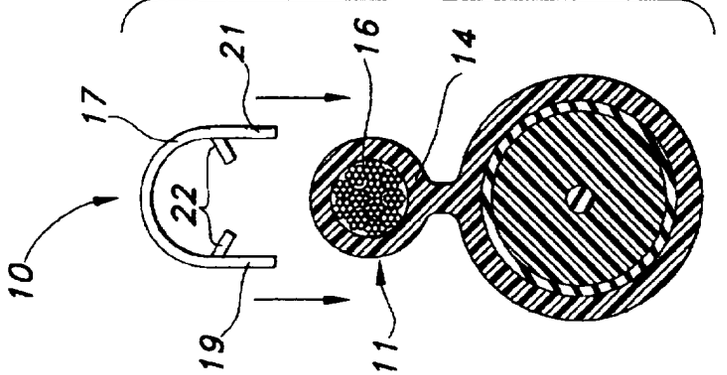

FIG 3

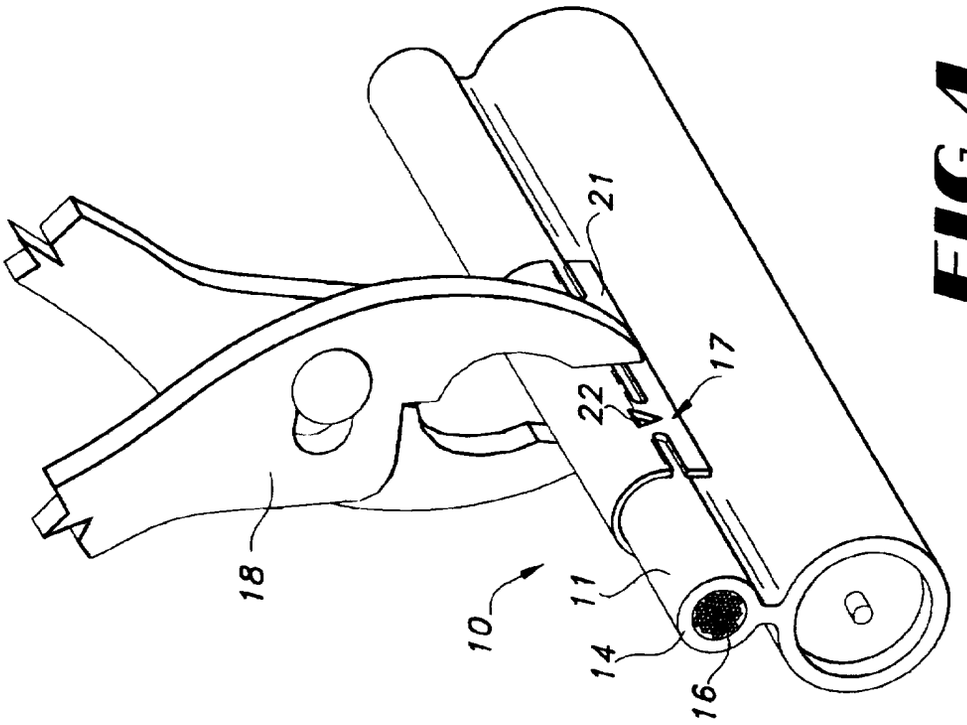

FIG 4

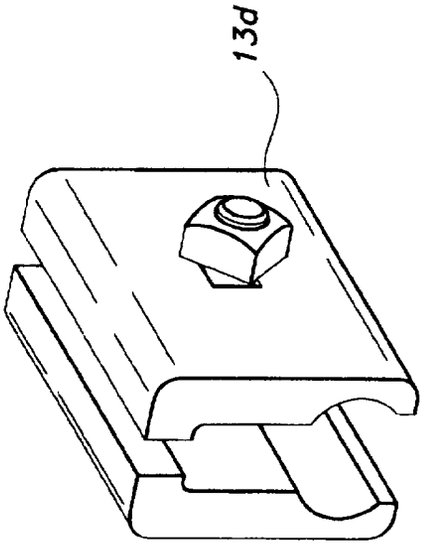

FIG 6

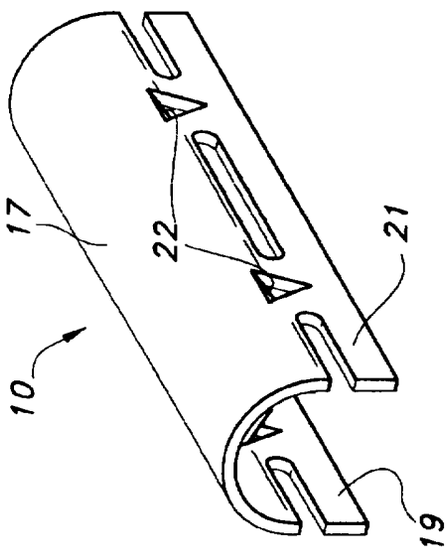

FIG 5

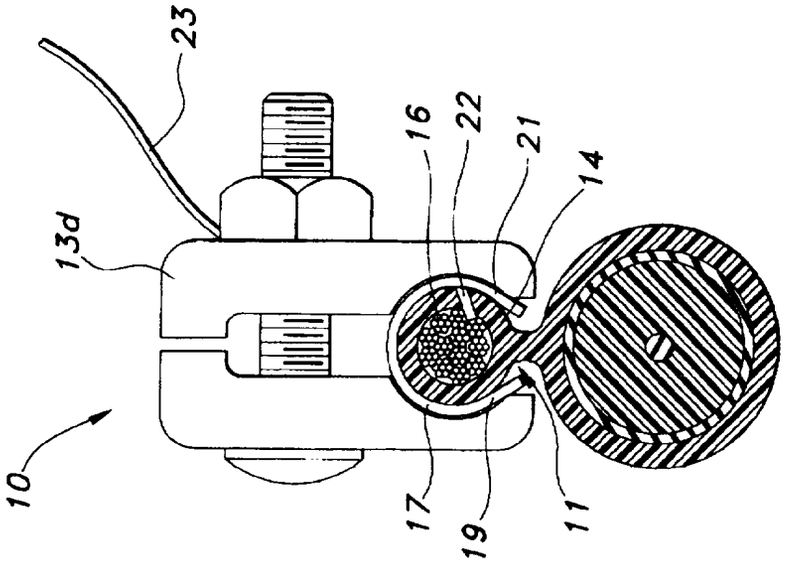

FIG 9

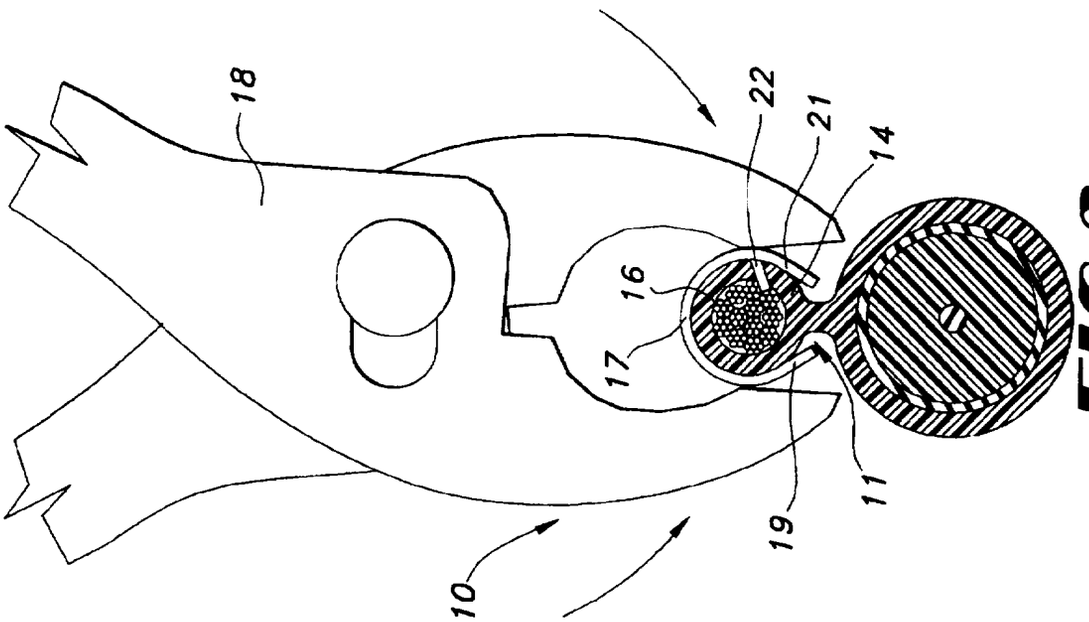

FIG 8

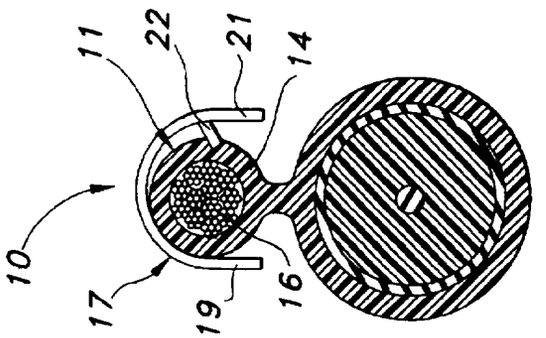

FIG 7