

May 3, 1966

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3,249,376

CAP SCREW CONNECTOR

Filed Sept. 9, 1963

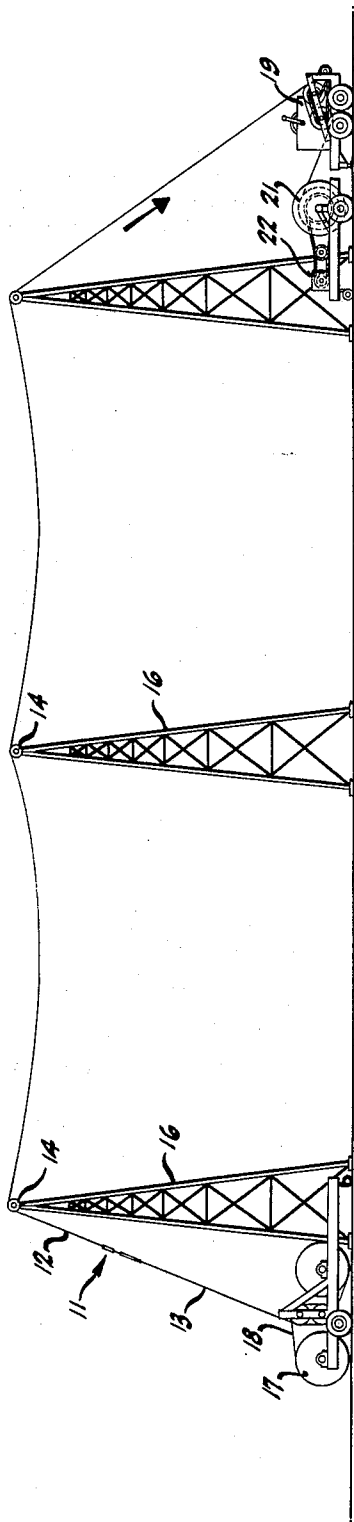


FIG. 1

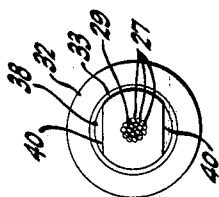


FIG. 3

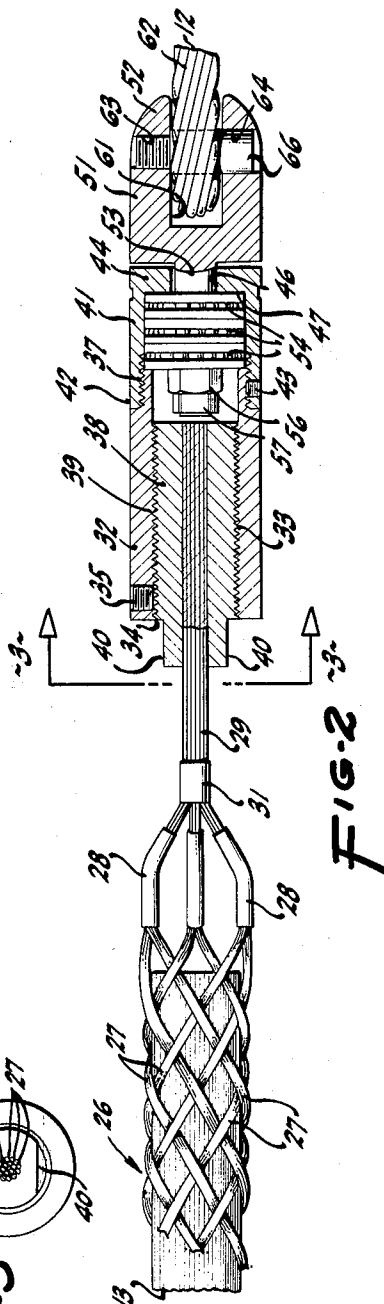


FIG. 2

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3,249,376

CAP SCREW CONNECTOR

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Filed Sept. 9, 1963, Ser. No. 307,642

6 Claims. (Cl. 287-91)

This invention relates to a new and improved cap screw connector. More particularly, the present invention relates to a stocking grip cable puller resembling a well-known conventional stocking type cable grip wherein the wires of the grip are gathered together in a central bundle which is received inside the hollow body of a swivel connector. The end of the bundle of wires is swedge-connected to a deformable sleeve which fits inside the hollow body of said swivel connector. The swivel connector has a second portion which is rotatable relative to the first mentioned part and this portion is connected to the eye splice of a pulling cable. Hence, the pulling cable may swivel relative to the conductor being pulled by the stocking type grip.

The connector hereinafter described in detail is particularly useful during tension stringing of electrical conductors. A pulling line of wire rope is attached to the sheaves attached to the cross-arms of poles or towers, leading end of the conductor and is run through stringing. Any damage which may occur by reason of contact with the ground is absorbed by the pulling rope. The function of the pulling line is to pull the conductor through the pulling sheaves. In the course of the operation, a pair of bull wheels is used, one at each end of the line. The conductor is wound from its reel through the tension bull wheel which applies a braking force to the pulling of the conductor while the wire rope is rewound through a puller bull wheel and then back on to a reel for reuse. The bull wheel of the puller is equipped with power for turning with a force greater than the braking action at the other end of the line, and hence if the equipment is properly operated the conductor never touches the ground at any time during the stringing operation. Damage to the conductor and consequent corona loss and radio interference at high voltages is avoided. Further, the use of the tension-stringing avoids obstructions such as pre-existing power and telephone lines, roads, streets and railroad tracks which must be transversely by the line being strung.

The pulling wire rope and the conductor being of quite different construction, tend to turn about the central axis relative to each other and this turning may cause damage either to the conductor or to the rope. To avoid transmitting the turning motion of one of the wires to the other, a swivel is installed between the rope and conductor to permit the two to turn freely in opposite directions or at different speeds in the same direction. The present invention provides an improved swivel connection for this important purpose.

A further feature of the invention is the fact that the wire strands of a conventional Kellem's type stocking cable grip are gathered together in a single, central, forwardly-projecting bundle which is attached at its forward end to a compression sleeve, the compression sleeve being received in the interior of a hollow swivel body. Heretofore, other means were employed to attach the stocking grip to the swivel connector, one of the most common being the formation of an eye in the end of the cable grip which eye was received in a slot in the swivel connector and secured in place by a transverse pin through the eye. The present invention eliminates the necessity of forming the eye in the strands of the grip.

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A principal feature of the present invention is the fact that a cable grip of the "Kellem's" type is formed with a bundle of forwardly extending wires which is received in a compression type sleeve which, after being attached to the bundle of wires, is externally threaded. A swivel type connector is formed with an internally threaded bore to receive the externally threaded compression sleeve. When the two members are in threaded engagement, the swivel connector is directly connected to the stocking grip.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

FIG. 1 is a schematic view showing a tension-stringing operation with which the present invention may be used.

FIG. 2 is an enlarged sectional view through the connector of the present invention.

FIG. 3 is a transverse sectional view taken substantially along the line 3-3 of FIG. 2.

As shown in FIG. 1, there is provided a swivel connector 11 installed between a cable 12 and a conductor 13. At the commencement of the tension-stringing operation, cable 12 is run through sheaves 14 on transmission tower 16 or the like. The rearward end of pulling rope 12 is connected by connector 11 to the forward end of conductor 13. Conductor 13 is received wound on its reel 17 which passes through a cable tensioner machine 18 which applies a braking force to paying out of the conductor. The forward end of the wire rope 12 is received in a tension bull wheel puller machine 19 which applies a pulling force greater than the braking force of machine 18 and the wire is then rewound on a receiving reel 21 by means of reel winder 22. The details of machines 18, 19 and 22 form no part of the present invention and are well-known in this art.

One of the purposes of the present invention is to permit rotation of wire rope 12 relative to conductor 13 by means of a swivel connection so that the rotation of one member is not transmitted to the other with consequent damage to one or the other of the wires. A further and fundamental purpose of the invention is to transmit the pulling force from the rope 12 to the conductor 13 without damage to the conductor or the rope and without danger of disengagement of the two members.

A conventional means of pulling conductors, such as conductor 13, is a cable grip known in the trade as a "Kellem's" grip or stocking grip 26. Such a grip 26 is formed of reticulated wires 27 woven, as shown in the accompanying drawings, in helical patterns which intersect in diamond-shaped interstices. As shown in the accompanying drawings, there are only single strands of wire 27 but it will be understood that pluralities of wires may be stranded together as is well understood in this art. A feature of grip 26 is that an endwise pull applied to the grip tends to lengthen the grip and as it lengthens its construction causes a reduction in the internal diameter of the grip. Accordingly, the greater the tension applied to the grip in an axial direction, the tighter it tends to grip the conductor 13 over which it is installed. Another feature of this type grip is the fact that if the rear end thereof is forced toward the forward end, the grip expands in internal diameter permitting it to be slipped over the end of the conductor. Release of the inward pressure on the trailing end of the grip causes it to contract and to engage the exterior face of the conductor. Pulling of the forward end of the grip then results in a firmer attachment of the grip to the conductor.

In accordance with the present invention, pluralities of strands of wire 27 are secured together by means of first sleeves 28. As shown herein, there are two strands 27 in each sleeve 28 but the number thereof is subject to wide variation. The pluralities of strands held by sleeves 28 are brought together in a single, central bundle 29 extending axially forwardly and prevented from splaying outwardly by second sleeve 31. Thus, there is a forwardly extending bundle of wires 29 of fairly extended length at the forward end of grip 26, said bundle replacing the conventional eye formed on stocking grips heretofore used.

First casing section 32 is substantially cylindrical and has an internally threaded bore 33. Bore 33 is open at rearward end 34. The forward end of first casing section 32 is of reduced diameter and externally threaded as indicated by reference numeral 37. A compression sleeve 38 is swedged on to the forward end of bundle 29 and is firmly secured thereto. The exterior of compression sleeve 38, after being swedged on to bundle 39, is formed with external threads 39 which are threaded into bore 33. To facilitate such movement flats 40 are formed in the rearward end of compression sleeve 38. A set screw 35 in section 32 prevents rotation of sleeve 38 relative to casing 32 after it is threaded in position.

The second casing member 41 has its rearward end 42 internally threaded to engage threaded end 37 of first casing section 32. A set screw 43 holds the two parts against rotation relative to each other when in assembled position. Casing section 41 is also hollow and has a flat transverse forward end 44 formed with an aperture 46. A shoulder 47 is provided at the forward end of the hollow in casing section 41.

The third casing section 51 is solid having a cylindrical body and a spherical forward end 52. Rearwardly of body 51 is a stem 53 which passes through aperture 46 and extends interiorly in the hollow of casing section 41. The rearward end of stem 53 is threaded. A plurality of thrust roller bearings 54 is received in the bore of casing section 41 and abuts shoulder 47, the outer races of the bearings being fixed for rotation with case 41 (and 32). A nut 56 and lock nut 57 on the threaded rearward end of stem 53 secure the inner races of bearings 54 for rotation with casing section 51. Thus, casing section 51 may swivel or rotate relative to casing sections 41 to 32, but the thrust of the pull exerted on section 51 is absorbed by the thrust bearings 54.

A preferred means of securing the connector to rope 12 is the formation of a longitudinal slot 61 in the forward end of casing section 51 being dimensioned large enough to receive an eye splice 62 on the rearward end of rope 12. Transversely to slot 61 is a threaded hole 63 and, on the opposite side of slot 61 a counter bore hole 64. A pin 66 extends through bore 64, through the eye 62 in rope 12, thereby bridging across the slot 61 and is threaded into hole 63. When thus in place, pin 66 secures the rope 12 to the splice.

In assembly of the apparatus, the end of bundle 29 is connected to sleeve 38 by swedging and sleeve 38 is then externally threaded. Sleeve 38 is screwed into bore 33 and held in place by set screw 35. After the swedge 39 is in place, as shown in FIG. 2, the forward casing section 42 is assembled and set screw 43 is engaged.

As pull is transmitted to rope 12 and braking action to conductor 13, the cable grip 26 firmly engages the conductor 13. The pull on the rope 12 is transmitted first through pin 66 to third casing 51 thence through the thrust bearings 54 to casing members 41 to 32, thence through sleeve 39 through the bundle 29 and to the cable grip 26. The rope 12 may rotate relative to conductor

13 without interference, and rotation of the two members 12 and 13, relative to each other, is not cross-transmitted.

Although the foregoing invention has been described in some detail, by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A swivel connector comprising a stocking grip formed of a plurality of wires braided in a reticulated pattern sleeve whereby upon application of tension in a longitudinal direction said sleeve contracts to grip a cable within said sleeve, said wires at one end of said grip extending forward in an elongated bundle of substantially lesser cross-section than said sleeve, a compression sleeve of annular shape fixed to the forward end of said bundle, said compression sleeve being threaded on its exterior, and a swivel connector receiving said compression sleeve in threaded engagement, said connector having a hollow first member threaded to receive said compression sleeve, a hollow second member non-rotatively fixed to said first member, said hollow member and said compression sleeve being non-rotative in assembled position of said connector, a third member rotatable relative to said first and second members, said third member having means for attachment to a pulling cable, a stud extending into said second member, and thrust bearing means within said second member rotatively supporting said stud in said second member.

2. A connector according to claim 1, in which said first and second members are detachably threadedly connected together.

3. A connector according to claim 1, in which means is provided to prevent relative rotation of said compression sleeve relative to said first casing member.

4. A connector according to claim 1, in which said compression sleeve extends rearwardly of said first casing member with means on the extending portion of said compression sleeve for turning said compression sleeve relative to said first member.

5. A swivel connector comprising a compression sleeve of annular cross-section apertured for connection to the forward end of a pulling instrumentality, said compression sleeve threaded on its exterior, a hollow first member threaded interiorly to receive said compression sleeve, said first member and compression sleeve non-rotative in assembled position, a hollow second member non-rotatively fixed to said first member, a third member rotatable relative to said first and second members, said third member having means for attachment to a pulling cable, a stud extending into said second member, and thrust bearing means within said second member rotatively supporting said stud in said member.

6. A connector according to claim 5, in which means is provided to prevent relative rotation of said compression sleeve relative to said first casing member.

References Cited by the Examiner

UNITED STATES PATENTS

127,177	5/1872	Luther	59—95
2,503,814	4/1950	Flagler	287—91 X
2,766,501	10/1956	Kellems	24—123.5

FOREIGN PATENTS

240,655	5/1946	Switzerland.
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