Sept. 27, 1966 J. L. MIXON, JR 3,275,974

ELECTRICAL STIRRUP CONNECTOR

Filed April 6, 1964

FIG. 1

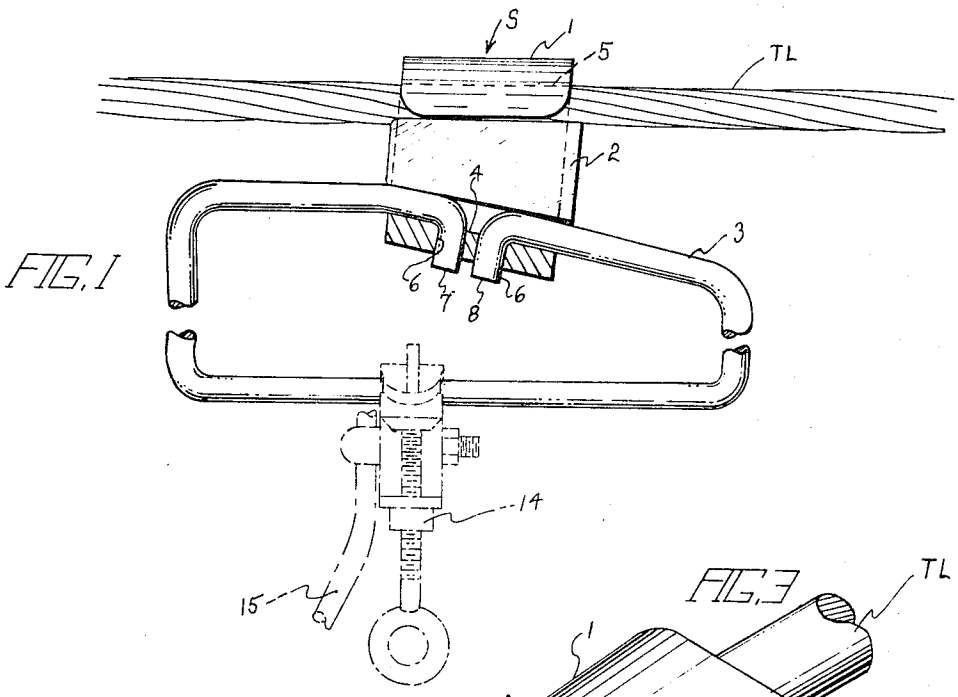


FIG. 3

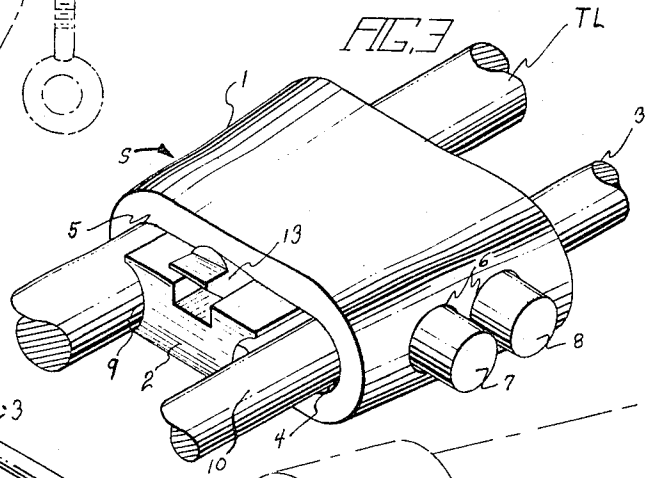
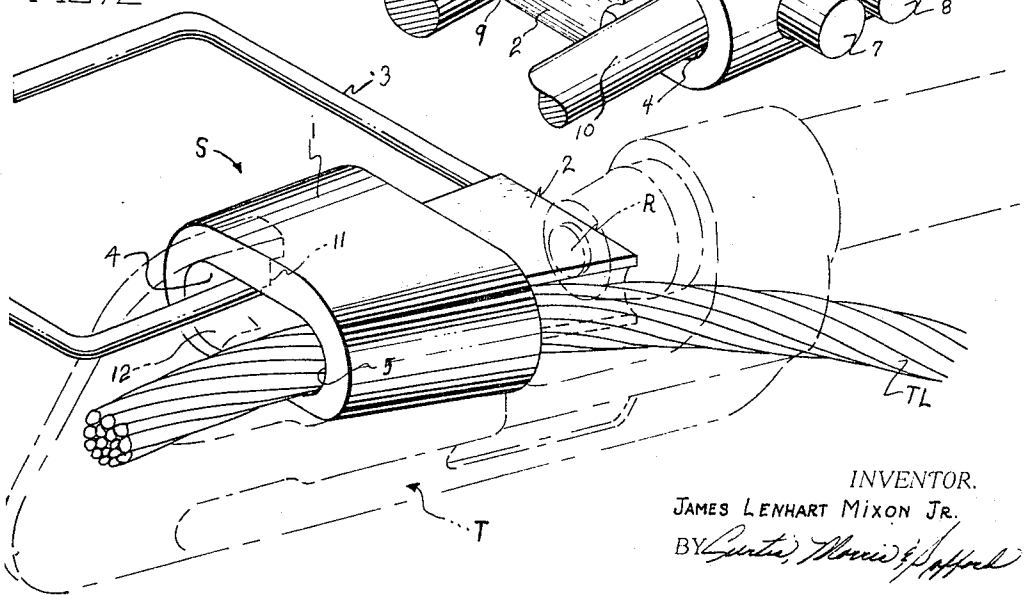


FIG. 2



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ELECTRICAL STIRRUP CONNECTOR

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This invention relates to an electrical connector and more particularly to an electrical stirrup connector or hot line connector.

In the electrical power industry, electrical stirrup connectors are used to connect tap wires from the energized electrical transmission line of high voltage to a transformer or other piece of equipment, form a branch line or provide other suitable connections. These connectors obviate connecting directly to the transmission lines and thereby preclude damaging them as a result of an arc which frequently occurs between the transmission lines and the connection thereto. Heretofore, electrical stirrup connectors or similar types of tap connectors have been applied to existing transmission lines by crimping, bolting and the use of spring clips. In the case of applying the tap connectors via crimping and bolting, a considerable amount of time is expended to clean the transmission lines at the points of connection and then apply the connectors thereat. Generally, a number of crimps are necessary and more than one bolt has to be tightened in order to provide a good mechanical and electrical connection. Also, the bolted connections are quite apt to become loose in service due to vibration as a result of wind moving the transmission lines thereby developing poor contact. As to spring clips, these are merely applied onto the transmission lines and the flexibility of the material forming these clips holds them onto the transmission lines in a manner less desirable than the crimp and bolt tap connectors.

It is, therefore, an object of the present invention to provide an electrical stirrup connector which is simple in design and easily installed on existing energized transmission lines with existing tools.

Another object of the present invention is to provide an electrical stirrup connector that does not require any cleaning of a section of the transmission line at which the connector is to be applied.

A further object of the present invention is the provision of an electrical stirrup connector that is secured at any angular disposition on a transmission line.

A still further object of the present invention is to provide an electrical stirrup connector that remains effective regardless of temperature and weather conditions and can be used on any combination of standard sizes of aluminum, copper, ASCR conductors, or the like.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration and principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIGURE 1 is a front elevational view partially in section of a stirrup connector engaged on a transmission line;

FIGURE 2 is a perspective view of the stirrup connector prior to engagement on the transmission line with parts in phantom; and

FIGURE 3 is a perspective view of the back of FIGURE 1.

Turning now to the drawings, TL is a high voltage transmission line which is generally in an energized condition. A stirrup connector S is shown as being secured to line TL and includes a C-shaped body member **1**, wedge-shaped member **2** and wire loop **3**. C-shaped body member **1** and wedge-shaped member **2** have the general configuration similar to that described in a copending U.S. patent application, Serial No. 172,183, filed February 9, 1962, now U.S. Patent 3,235,944 and assigned to the same assignee as the present invention.

C-shaped body member **1** has bights **4** and **5**. Bight **4** of member **1** has two spaced holes **6** therethrough. Wire loop **3** is preferably bent into a generally rectangular configuration with the ends **7** and **8** being bent substantially normal and then disposed within holes **6** so that sections of wire loop **3** are disposed within bight **4** of member **1**. Members **1** and **2** are more suitably made of aluminum while wire loop **3** is made of copper; however, other materials may be used. Wedge-shaped member **2** has arcuate-shaped sides **9** and **10** which engage line TL and the sections of wire loop **3** as shown in FIGURE 3.

Wedge-shaped member **2** can be driven into C-shaped body member **1** in a number of different ways, but the easiest and most effective will be described in conjunction with explosively-operated tool T described in copending U.S. patent applications, Serial Nos. 341,223 and 341,283, which were filed January 30, 1964, the present inventor being a joint inventor of the former application and both applications are assigned to the same assignee as the present invention.

In assembly, ends **7** and **8** of wire loop **3** are inserted within holes **6**, bight **5** of C-shaped body member **1** is placed on transmission line TL and wedge-shaped member **2** is placed within member **1** with arcuate-shaped sides **9** and **10** engaging line TL and wire loop **3**. Member **2** is tapped, as with a hammer or other tool, to partially assemble the connection as shown in FIGURE 2.

The partially assembled connection is completed by explosively-operated tool T. As can be discerned, from FIGURE 2, the part connecting the legs of member **1** is disposed against stepped portion **11** of the tool and ram R is brought into engagement with the end of member **2**. Tool T is operated in the manner set forth in Serial No. 341,283, and ram R drives member **2** completely within member **1**. The front end of member **2** forcefully strikes the sharp edge of swaging die **12** as fully explained in Serial No. 341,223 to strike upwardly portion **13** in member **2** in order to permanently secure member **2** within member **1** as shown in FIGURE 3. Thus, member **2** wedges line TL and the sections of wire loop **3** within member **1**, thereby effecting an excellent mechanical and electrical connection so that tap clamp **14** carrying tap wire **15** can be secured on wire loop **3**. If a great amount of arcing takes place during the application of clamp **14** and wire **15** onto loop **3**, the transmission line will remain intact and the wire loop will burn off. The stirrup connector can easily be replaced.

In using explosively-operated tool T to effect the connection, member **2** moves at such a rapid rate of speed along line TL and the sections of wire loop **3** that the areas of line TL and the sections of wire loop **3** that it engages are cleaned of oxides and other matter as a result of pressure created between members **1** and **2**, thereby obviating having to clean these areas prior to the connection being made. Thus, connection can be made anywhere along transmission line TL in a rapid and effective manner.

Ends **7** and **8** are preferably disposed in holes **6** as indicated which precludes any turning movement of wire loop **3** after the connection has been effected so that when tap clamp **14** is placed on wire loop **3**, it can be done in a safe and non-hazardous manner. If desired, ends **7**

and 8 may be operated on by a hammer to rivet them securely within holes 6.

It should be pointed out, however, that the end sections of wire loop 3 could be placed within bight 4 in abutting relationship without placing them within holes 6.

As was pointed out in Serial No. 341,223, the part connecting the legs of member 1 may be swaged downwardly over the trailing edge of member 2 to effect double locking portions.

In applying stirrup connector S to transmission line TL, it can be disposed at any angular disposition with respect to the transmission line and once member 2 has been forcefully wedged in member 1, the stirrup connector will remain in the predisposed angular position.

The connection, when desired, can be disconnected in accordance with the disclosure in U.S. patent application, Serial No. 340,737, filed January 28, 1964, and assigned to the same assignee as the present invention. However, in most cases, once the connection has been made, it most generally will remain in place on the transmission line.

As can be discerned, there has been disclosed a novel stirrup connector which is readily applied to an existing energized transmission line and which remains permanently in position irrespective of vibration, changes in temperature or other weather conditions to provide an excellent mechanical and electrical connection.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiment of the invention, which is shown and described herein, is intended as merely illustrative and not as restrictive of the invention.

What is claimed is:

1. An electrical stirrup connector for making tap connections to an electric power line comprising: a connector body member adapted to engage a section of said electric power line, said connector body having an opening to permit said connector body to be placed on said electric power line, a wire loop having a part thereof for disposition in said connector body member, means for securing said part of said wire loop within said connector body to prevent any arcuate movement of said wire loop relative to said connector body, and a wedge-shaped member for engagement within said connector body member to wedge the section of said electric power line and the part of said wire loop between the inner surface of said connector body member and said wedge-shaped member to provide connection therebetween.

2. An electrical stirrup connector according to claim 1 wherein said connector body member is C-shaped which is provided with diametrical bights in which said section of the electrical power line and the part of the wire loop are respectively disposed.

3. An electrical stirrup connector according to claim 1 wherein said securing means includes the ends of said wire loop with one of the ends having a section bent in a direction substantially normal to the part and said connector body member containing a hole in which said section is disposable.

4. An electrical stirrup connector according to claim 1 wherein said securing means includes ends of said wire loop which define sections bent in a direction normal to the part and said connector body member containing spaced holes in which the sections are respectively disposed.

5. An electrical stirrup connector according to claim 1 wherein one end of said wedge-shaped member upon being wedged within said connector body member having a portion thereof moved outwardly from the axis of the wedge-shaped member and beyond the plane between the wedge-shaped member and the connector body member to rivet these members together.

6. An electrical stirrup connector comprising a connector body member having spaced bights therein, a wire loop having a section thereof including free ends of said wire loop for disposition within and along one of said bights while the other bight is to be disposed on a portion of an electric transmission line through an opening in said connector body means for securing said free ends of said wire loop within the one of said bights to prevent any arcuate movement of said wire loop relative to said connector body, and a wedge-shaped member to be forcefully driven between the bights of said connector body member to engage the section of the wire loop and to secure the portion of the transmission line between the wedge-shaped member and the connector body member.

7. An electrical stirrup connector according to claim 6 wherein said securing means includes one bight having spaced holes therein and the section of said wire loop has bent ends disposed respectively in said spaced holes.

8. An electrical stirrup connector according to claim 6 wherein one end of said wedge-shaped member or said connector body member has a section thereof when these members are wedged together moved outwardly from the surface thereof to overlie the other to rivet these members together.

9. In an electrical connection, a C-shaped body member having diametrical bights, a section of an electric power line disposed in one bight and the ends of a wire loop disposed in and along the other bight, means for securing the ends of said wire loop in the one bight to prevent any arcuate movement of said wire loop relative to said body member, and a wedge-shaped member having opposed sides securely wedging the section of the power line and the ends of the wire loop against the bights.

10. In an electrical connection according to claim 9 wherein said securing means includes the ends of the wire loop having sections bent substantially at right angles and the other bight has spaced holes in which the sections of the ends are respectively disposed.

11. In an electrical connection according to claim 9 wherein one end of said wedge-shaped member or said body member has a section thereof moved outwardly from the surface thereof to overlie the other to rivet these members together.

References Cited by the Examiner

UNITED STATES PATENTS

1,801,277	4/1931	Kelley	339—247
2,106,724	2/1938	Cope	339—247
2,698,422	12/1954	Turner	339—243 X
3,014,609	12/1961	Hobbs.	
3,091,838	6/1963	Hild et al.	339—220 X

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