

DESCRIPTION

STRAND BENDING JIG AND METHOD FOR BENDING STRAND

Technical Field

[0001] The present invention relates to a strand bending jig used for bending an end portion of a strand of a wire rope provided in an elevator, etc., and a method for bending a strand.

Background Art

[0002] FIG. 3 illustrates an operation for bending a strand of a wire rope which has been conventionally and generally performed, and FIG. 4 illustrates an operation for fixing a socket to bended strands which has been conventionally and generally performed. Generally, a wire rope provided in an elevator, etc. is formed by a plurality of twisted strands. Each of the end portions of the plurality of strands is bended and a socket is fixed to the bended end portions.

[0003] That is, as illustrated in FIG. 3, an operator separates strands 3 at an end portion 2a of a wire rope 2 that is wound around a drum 1 into each one strand by, for example, pliers 4, and bends the respective separated end portions by the pliers 4. In this state, as illustrated in FIG. 4, a socket 5 is arranged at the end portion 2a of the wire rope 2 so as to accommodate all the bended end portions therein, and Babbitt metal 7 stored in a container 6 is poured into the socket 5. In this way, the socket 5 is fixed to the end portion 2a of the wire rope 2 via the Babbitt metal 7.

[0004] As explained above, an operation for bending the end portions 3a of the strands 3 in order to fix the socket 5 to the end portion 2a of the wire rope 2 has been conventionally manually performed by using the pliers 4. Accordingly, an operator is required to apply large force in order to bend the end portions 3a of the strands 3 and to repeat an operation for bending for the number of the strands 3. That is, conventionally, the operation for bending the end portions 3a of the strands 3 tends to make an operator feel exhausted. In

order to solve the problem above, a processing device used for performing a strand bending operation without requiring human effort is provided in JP 2004-36033 A (Patent document 1).

[0005] A conventional processing device disclosed in Patent document 1 comprises: a fixing means configured, for example, by a vise, which is arranged on a stand and is used to fix a wire rope; a positioning means for determining a bending position of strands of the wire rope; a pressing means that is attached to an end portion of the positioning means and is configured to hold end portions of the strands in a state where they are separated into each one end portion; an attaching member arranged on the stand so as to face the fixing means; a pressing piston for pressing the end portions of the strands which are held by the pressing means to bend them; and a hydraulic cylinder that is supported by the attaching member and is configured to actuate the pressing piston.

[0006] According to the conventional processing device above, the end portions of the strands of the wire rope which are fixed by the fixing means are pressed by the pressing piston that is actuated by the hydraulic cylinder, and thereby, it is possible to bend the end portions of the strands without requiring human effort.

Prior Art Document

Patent Document

[0007] Patent Document 1: Japanese Patent Application
Laid-Open No. 2004-36033 A

Summary

Problems to be solved by the Invention

[0008] In the conventional processing device according to Patent document 1 described above, while it is possible to reduce burden on an operator in an operation for bending a strand, there is a problem that cost for manufacturing the device increases because it requires the large number of components. In addition, because the device becomes large and heavy, the device requires large-scaled operation when it is transported. In this way, restriction concerning a place where an operation

for bending a strand is performed becomes another problem, such as, difficulty to carry the device to an installation site of an elevator.

[0009] The present invention was made in view of such problems stemming from the conventional techniques described above, and an object of the present invention is to provide a strand bending jig that can minimize human effort when bending an end portion of a strand, reduce the number of components, and realize a compact and light body, and a method for bending a strand. Means for solving the problem

[0010] In order to achieve the object described above, the present invention provides a strand bending jig used for bending end portions of a plurality of strands forming a wire rope in order to fix a socket thereto, comprising: a cylindrical member; a rod-like member that is inserted into the cylindrical member, whose one of the end portions which is projectable from the cylindrical member includes a locking portion for locking the strand and whose outer periphery is formed by a screw portion; and a nut that is formed on a position opposite to the locking portion on the rod-like member and is formed to be screwed with the screw portion.

[0011] Furthermore, the present invention provides a method for bending a strand, comprising the steps of: fixing the strand bending jig according to the present invention to a predetermined portion; locking the end portion of the strand by the locking portion of the rod-like member; and bending the end portion of the strand such that the locking portion of the rod-like member where the end portion of the strand is locked is pulled in an inside of the cylindrical member by rotating the nut by an electric tool.

Effect of the Invention

[0012] According to a strand bending jig and a method for bending a strand of the present invention, excluding a manual operation in which end portions of strands of a wire rope are manually separated into each one end portion, it is possible to automatically bend the end portions of the strands by an

operation in which a nut is rotated by an electric tool in the state where the separated end portion of the strand is locked by a locking portion of a rod-like member. That is, according to the present invention, it is possible to bend the end portions of the strands while minimizing human effort. Furthermore, according to the present invention, it is possible to reduce the number of components because it only requires a cylindrical member, the rod-like member, and the nut. Consequently, producing cost thereof can be reduced more than the cost for manufacturing the conventional device. Still further, according to the present invention, it is possible to provide a compact and light body. Consequently, the strand bending jig can be easily carried and release restriction concerning a place where an operation for bending a strand is performed more than the conventional device.

Brief Description of Drawings

[0013] [FIG.1] FIG. 1 is a sectional side view of a main part of an embodiment of a strand bending jig according to the present invention.

[FIG. 2] FIG. 2 illustrates an embodiment of a method for bending a strand which is performed by using a strand bending jig according to the embodiment illustrated in FIG. 1.

[FIG. 3] FIG. 3 illustrates an operation for bending a strand of a wire rope which has been conventionally and generally performed.

[FIG. 4] FIG. 4 illustrates an operation for fixing a socket to bended strands which has been conventionally and generally performed.

Description of Embodiments

[0014] Hereinafter, an embodiment of a strand bending jig and a method for bending a strand according to the present invention will be described with reference to the drawings.

[0015] FIG. 1 is a sectional side view of a main part of an embodiment of a strand bending jig according to the present invention. FIG. 2 illustrates an embodiment of a method for bending a strand which is performed by using a strand bending

jig according to the embodiment illustrated in FIG. 1.

[0016] As illustrated in FIG. 1, an embodiment according to a strand bending jig of the present invention is provided with a cylindrical member 10, a rod-like member 11 that is inserted into the cylindrical member 10, and a nut 12. One of the end portions of the rod-like member 11 which is projectable from the cylindrical member 10 includes a locking portion for locking an end portion 3a of a strand 3 of a wire rope 2, and an outer periphery of the rod-like member 11 is configured by a screw portion 11b. The nut 12 is arranged on a position opposite to the locking portion on the rod-like member 11 and is formed to be screwed with the screw portion 11b.

[0017] At least one of the end portions of the cylindrical member 10, for example an end portion positioned on the left side of FIG. 1, is provided with an opening 10a whose diameter decreases from an outer peripheral direction to an inner peripheral direction so as to form an incline in the inside of the opening 10a.

[0018] The locking portion of the rod-like member 11 is configured by, for example, a cutout portion 11a. The rod-like member 11 is arranged such that the cutout portion 11a of the rod-like member 11 can project from the opening 10a of the cylindrical member 10.

[0019] The nut 12 is arranged on a side of the end portion opposite to the opening 10a of the cylindrical member 10, that is, near the end portion positioned on the right side of FIG. 1.

[0020] When bending an end portion of the strand 3 of the wire rope 2 by using a strand bending jig according to the present embodiment illustrated in FIG. 1, an operator carries the strand bending jig according to the present embodiment with a drum 1 around which a rope 2 is wound, for example, to an installation site of an elevator.

[0021] As illustrated in FIG. 2, at the installation site of an elevator, the strand bending jig according to the present embodiment is fixed to the drum 1 via a steel frame clamp 20.

The steel frame clamp 20 can be easily obtained in the installation site of an elevator because it is generally used in such an installation site.

[0022] In this state, as illustrated in FIG. 3, the operator separates the end portions 3a of the strands 3 into each one end portion 3a by pliers 4. As illustrated in FIG. 2, one of the separated end portions 3a of the strands 3 is locked by the cutout portion 11a of the rod-like member 11.

[0023] Here, an engaging portion 21a of an electric tool 21 having strong clamping force, such as an impact wrench, is engaged with the nut 12.

[0024] In this state, the operator drives the electric tool 21 so as to rotate it in one direction, the engaging portion 21a of the electric tool 21 rotates and then the nut 12 rotates accordingly. This operation moves the rod-like member 11 in the right direction of FIG. 2, and the end portion 3a of the strand 3 which has been locked by the cutout portion 11a of the rod-like member 11 is pulled in the inside of the opening 10a of the cylindrical member 10. Consequently, the end portion 3a of the strand 3 is bended along the incline in the opening 10a.

[0025] After the end portion 3a of the strand 3 is bended, when the operator drives the electric tool 21 so as to rotate it in the opposite direction, the rod-like member 11 is moved in the left direction of FIG. 2 by rotation of the engaging portion 21a of the electric tool 21 and that of the nut 12. Consequently, the end portion 3a of the strand 3 which has been locked by the cutout portion 11a of the rod-like member 11 is pushed from the opening 10a of the cylindrical member 10. A series of the operations described above is repeated for the number of the strands 3.

[0026] After the operation for bending the end portions 3a of all the strands 3 is completed, as illustrated in FIG. 4, a socket 5 is arranged on an end portion 2a of the wire rope 2 so as to accommodate all the bended end portions therein, and Babbitt metal 7 stored in a container 6 is poured into the socket

5. In this way, the socket 5 is fixed to the end portion 2a of the wire rope 2 via the Babbitt metal 7.

[0027] According to a strand bending jig and a method for bending a strand of the present embodiment configured above, excluding a manual operation in which the end portions 3a of the strands 3 of the wire rope 2 are manually separated into each one end portion 3a by the pliers 4, it is possible to automatically bend the end portions 3a of the strands 3 by an operation in which the nut 12 is rotated by the electric tool 21 in the state where the separated end portion 3a of the strand 3 is locked by the cutout portion 11a of the rod-like member 11. That is, according to the present embodiment, it is possible to bend the end portions 3a of the strands 3 while minimizing human effort.

[0028] Furthermore, according to the present embodiment, it is possible to reduce the number of components because it only requires the cylindrical member 10, the rod-like member 11, and the nut 12. Consequently, producing cost thereof can be reduced.

[0029] Furthermore, according to the present embodiment, it is possible to provide a compact and light body. Consequently, the strand bending jig can be easily carried and release restriction concerning a place where an operation for bending a strand is performed.

[0030] In addition, because the strand bending jig according to the present embodiment is configured such that an operation for bending a strand is performed through the opening 10a of the cylindrical member 10 which includes the incline therein, it is possible to smoothly push the bended end portion 3a of the strand 3 to an outside of the opening 10a along the incline of the opening 10a by an operation in which the nut 12 is rotated by driving the electric tool 21. Consequently, a stable operation for bending the strand 3 can be realized.

[0031] In the method for bending a strand according to the present embodiment, an operation for bending a strand is performed by fixing the strand bending jig according to the

present embodiment to the drum 1 via the steel frame clamp 20, on the other hand, the operation may be performed by, for example, fixing it to a bracket disposed in a hoistway, without fixing it to the drum 1.

[0032] Still further, in the method for bending a strand according to the present embodiment, an operation for bending a strand is performed at an installation site of an elevator, on the other hand, the operation is not necessarily performed at the installation site but may be performed in a place where a sufficient operation space can be secured.

Explanation of References

[0033]

- 1 drum
- 2 wire rope
- 2a end portion
- 3 strand(strands)
- 3a end portion(end portions)
- 10 cylindrical member
- 10a opening
- 11 rod-like member
- 11a cutout portion (locking portion)
- 11b screw portion
- 12 nut
- 20 steel frame clamp
- 21 electric tool
- 21a engaging portion

What is claimed is:

1. A strand bending jig used for bending end portions of a plurality of strands forming a wire rope in order to fix a socket thereto, comprising:

a cylindrical member;

a rod-like member that is inserted into the cylindrical member, whose one of the end portions which is projectable from the cylindrical member includes a locking portion for locking the strand and whose outer periphery is formed by a screw portion; and

a nut that is formed on a position opposite to the locking portion on the rod-like member and is formed to be screwed with the screw portion.

2. The strand bending jig according to Claim 1, wherein an opening whose diameter decreases from an outer peripheral direction to an inner peripheral direction so as to form an incline in an inside of the opening is provided on at least one of the end portions of the cylindrical member,

the locking portion of the rod-like member is formed by a cutout portion, and

the rod-like member is arranged such that the cutout portion of the rod-like member can project from the opening of the cylindrical member.

3. A method for bending a strand, comprising the steps of: fixing the strand bending jig according to Claims 1 or 2 to a predetermined portion;

locking the end portion of the strand by the locking portion of the rod-like member; and

bending the end portion of the strand such that the locking portion of the rod-like member where the end portion of the strand is locked is pulled in an inside of the cylindrical member by rotating the nut by an electric tool.

4. The method for bending a strand according to Claim 3, wherein

the wire rope is formed by a wire rope provided in an elevator, and

the strand bending jig is fixed to a drum around which the wire rope is wound, via a steel frame clamp.