

(No Model.)

2 Sheets—Sheet 1.

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MACHINE FOR LAYING IN THE STRANDS OF WIRE CABLES.

No. 458,672.

Patented Sept. 1, 1891.

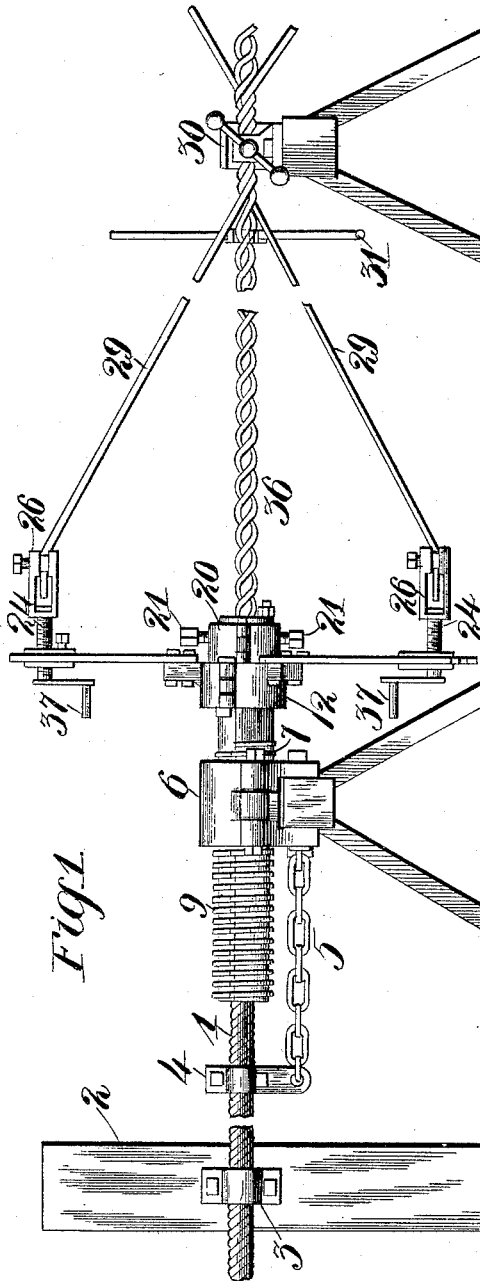


Fig. 1.

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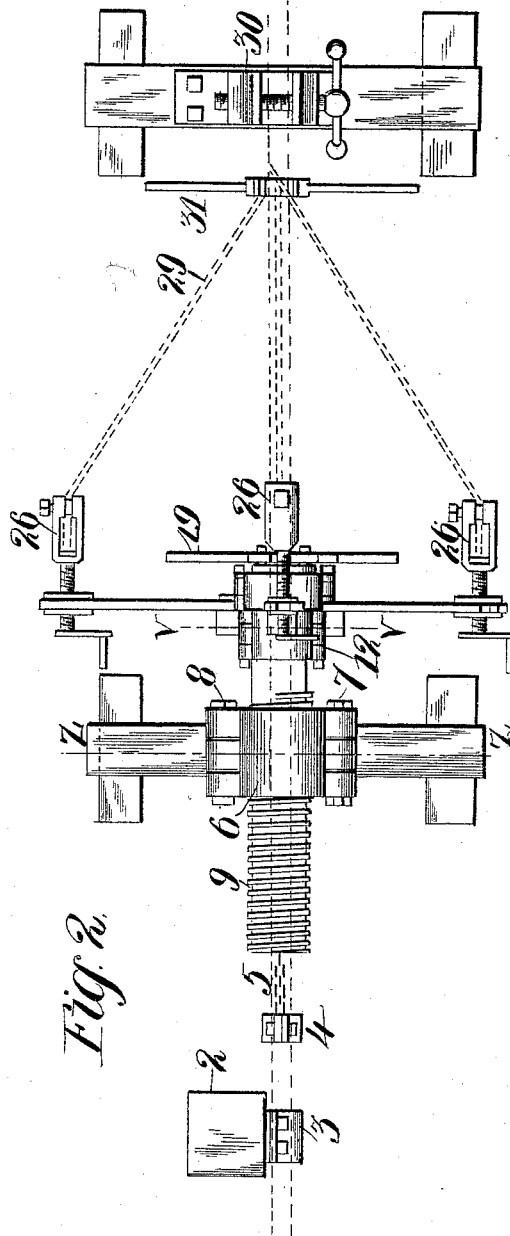


Fig. 2.

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# UNITED STATES PATENT OFFICE.

THEODORE F. BORRMAN, OF ST. LOUIS, MISSOURI.

## MACHINE FOR LAYING IN THE STRANDS OF WIRE CABLES.

SPECIFICATION forming part of Letters Patent No. 458,672, dated September 1, 1891.

Application filed January 30, 1891. Serial No. 379,732. (No model.)

*To all whom it may concern:*

Be it known that I, THEODORE F. BORRMAN, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Machines for Laying in the Strands of a Wire Cable, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in machines for laying in the strands of a wire cable; and it consists in the novel arrangement and combination of parts, as will be more fully hereinafter described, and designated in the claims.

In the drawings, Figure 1 is a side elevation of my complete invention, showing the same as applied in laying and twisting the strands of the cable. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical cross-section taken on the line *vv* of Fig. 2. Fig. 4 is a longitudinal cross-section taken on the line *xx* of Fig. 5. Fig. 5 is a cross-section taken on the line *yy* of Fig. 4. Fig. 6 is a perspective view of a sliding plate. Fig. 7 is a front elevation of a laying-in and twisting device which I employ for laying and twisting the strands. Fig. 8 is a front elevation of a collar detached. Fig. 9 is a front elevation of a longitudinally-sectionized cylinder, showing the manner in which the sections are fitted together. Fig. 10 is a top plan view of a sectionized cylinder with the sections partly open. Fig. 11 is a perspective view of a lever which I employ in revolving the cylinder. Fig. 12 is an enlarged cross-section of the sectionized cylinder. Fig. 13 is a vertical cross-section taken on the line *zz* of Fig. 2. Fig. 14 is a perspective view of a collar and bifurcated arms, and Fig. 15 is a perspective view of a portion of a cable.

The object of my invention is to construct a device for laying in and twisting the strands of a wire cable without resorting to the ordinary means as heretofore employed, which are to wit: The strands were first laid in by hand in their appropriate spiral crevices, which required the employment of one man for each operation in laying in a strand, and then the strand had to be beaten in with a hammer, and at the free end of said strand an additional man was required to carry the strand around and prevent it from being

twisted and knotted in the solid portion of the cable. By the old arrangement to lay in a single strand required three men to each end of the strand, or where the wire was wrapped in two directions it would require six men to lay in one strand, while in my invention it requires only two men at each end, or four in all, to lay in a single strand, or the same number (four men) can lay in two or three strands as easily and with as much rapidity as they can one.

To achieve economy in the number of men employed, as well as to facilitate the laying in the strands, I employ the following-described apparatus and device, as will be more specifically hereinafter pointed out.

Referring to the drawings, 1 represents an ordinary endless cable which necessitates repair, or the same device may be employed and practically the same operation gone through with, if it is desired, to splice the ends of a new cable in joining them together.

2 indicates a solid post or pillar, to which said cable is rigidly secured by means of a clamp 3.

4 represents an additional clamp, which is rigidly secured to cable 1, to which clamp a chain 5 is secured, and to said chain a trestle, which supports most of the operative mechanism of my device, is also secured. This chain is rendered necessary to secure the trestle, inasmuch as the laying in of the strands, as hereinafter described, would have a tendency to draw the trestle away from the pillar. To said trestle a hinged collar 6 is rigidly and permanently secured. Said collar is provided on its base or lower surface with perforated ears, through which, and likewise the trestle, bolts are adapted to pass, thereby holding the said collar and trestle rigidly and permanently together, as above stated. Said collar is composed of two sections hinged together by means of a horizontal bolt 7, which passes through corresponding perforations made in said sections, thereby holding them in a hinged position. When said sections are closed or brought together in use, they are held in said position by means of a similar bolt 8. Both sections of said collar are provided on their internal surface with screw-threads.

9 indicates a cylinder which is composed of

two sections. Said sections are united by a tongue-and-groove joint, as shown in Fig. 12. The top section 10 of said cylinder may be slipped out of the lower section 11, thereby forming such an opening that the wire cable 1 may be placed in said cylinder. As the wire cable is generally endless, it is necessary to have this sectionized cylinder, so that the cable may be placed in the same. When the cable has been placed in said cylinder, section 10 can be pushed and placed back in its normal position in section 11. Said sections are provided with left-hand screw-threads, and said cylinder is adapted to be screwed in the screw-threaded collar 6.

12 indicates another hinged collar, which is adapted to fit over cylinder 9 and revolve on the same. Said collar 12 is likewise composed of two sections, which are hinged together in any suitable and mechanical manner, preferably, however, as shown in the drawings. Said collar is provided with projections 13, which projections are provided with perforations 14, and to said projections 13 bifurcated arms 15 are permanently and rigidly secured by means of nut-bolts passing through said perforations and also said bifurcated arms. The object of having said collar 12 hinged is to permit the opening of the sections thereof, so that the wire cable can be passed between said sections and ultimately reach the center of cylinder 9. Said collar may be rigidly secured to said cylinder by means of thumb-screws 16. When said collar is rigidly secured to said cylinder by the means as above stated, said cylinder can be revolved by the application of power to arms 15 without the assistance of any other leverage. The end of cylinder 9 is provided with projections 18, over which a lever 19 may be applied, by the aid of which said cylinder may be revolved.

20 indicates another hinged collar, which is adapted to be rigidly secured over the end of cylinder 19, the function of which when so rigidly secured by means of thumb-screws 21 is to prevent collar 12 from slipping off from cylinder 9.

22 indicates grooved plates which are adapted to slip upwardly and downwardly between the bifurcations of arms 15. Said plates are held in their desired adjustment by means of thumb-screws 23. Said plates are likewise provided with screw-threaded perforations, into which are adapted to be screwed or inserted screw-threaded bolts 24, one end of which bolts are provided with an angular extension or surface 25<sup>a</sup>, and the opposite end thereof is provided with a head 25. Said bolts are adapted to be inserted in suitable perforations formed in the swivel-links 26. The open ends of said swivel-links are provided with clamps 27, which clamps are adapted to be operated by means of set-screws 28. Said swivel-links provided with clamps, as hereinbefore stated, are adapted to hold the free ends of the strands of the cable.

If it is desired to lay and twist in one strand, of course there would be need only for one arm and its attachments; but I preferably construct my device provided with three arms 15, providing said arms with attachments, as hereinbefore stated. With three arms one operator can manipulate and twist around the free ends of three strands as easily as he could one.

29 represents, as shown in Figs. 1 and 2, the strands of a wire cable which are to be inserted in a fractured cable. For instance, if it is desired to put in a twenty-foot strand the middle part or the part ten feet from each end is rigidly secured in a vise 30, which vise is of the usual construction and mounted upon any suitable support. Whenever said strand is rigidly secured to the body of the cable—for instance as shown in Fig. 1—the ends are wrapped in an opposite direction, which of course will necessitate the use of another device similar to the one shown in the drawings; or, for instance, if the free ends of the wire, as shown in Fig. 1, are to be wrapped toward the operator of course the free ends of the other half of the strands would be wrapped from the operator by means of a similar device.

31 indicates a laying and twisting in device which I employ in laying and twisting in the strands of the cable. Said device consists of an approximately U-shaped portion 32, which portion is provided with perforations, in which arms 33 may be suitably secured. Said arms are provided near the said U-shaped portion with curved portions 34, in which curved portions the strands are adapted to fit and will not work out when the device 31 is operated. The U-shaped portion 32 is adapted to fit over the solid portion of the cable or the strands which are suitably secured together and need no repair.

In Fig. 1 the application of a laying and twisting device is shown and the method of applying it. In this figure it is shown that the U-shaped portion 32 fits over the solid portion of the cable 36, one strand 29 resting on each arm. When the device 31 is revolved, (which is done by hand,) of course it will carry the strands with it and draw them into their proper spiral crevices or the crevices formed between the solid strands of the cable. Whenever the strands have been coiled, of course they will consequently become shorter, and to allow this contraction or shortening of the strands by being wrapped in their appropriate crevices the cylinder 9 may be unscrewed by means of the lever 19, or the collar 12 may be rigidly secured to the cylinder 9 by means of the set-screws 16, and the revolution of the arms to wrap the strands will then at the same time unscrew the cylinder. The free ends of the strands are secured by means of clamps 27, which are located in swivel-links 26, and to regulate the tension of said strands—for instance, if one is shorter than the other—it can be let out or drawn up

by means of a crank 37, which fits over the ends of the screw-bolts 24. Of course as the strands are wrapped and become shorter the free ends should be brought closer to the solid portion 36 of the cable. This adjustment is effected by lowering the grooved plates 22.

Having given an explicit description of the mechanical parts and the construction of my device, I will now proceed to describe its functional use. In the first place the cable in which the strand or strands are to be inserted and secured is placed in cylinder 9 and its attachments, practically as hereinbefore stated. Then the strand or strands, as the case may be, is firmly bound to the solid portion of the cable by means of vise 30, as shown in Fig. 1. The free end of said strand or strands, as the case may be, is secured to the swivel-link 26 by clamp 27. The first step in laying in the strands is then accomplished by the laying-in and twisting device 31, which can be operated effectively by one person, and one person can revolve arms 15, and consequently simultaneously carry around the free ends of the strands as the same are twisted on the solid portions of the cable by means of the device 31. The device 31, operated with the assistance of the revolving arms 15 and their attachments, the latter being also operated, will simultaneously lay in and wrap the strands in their appropriate spiral crevices.

My device is equally useful in splicing the terminal portions or ends of a wire cable as in laying in strands for repairing the same. Whenever it is desired to join the ends of the terminal portions of the cable, the operator should first take out a number of the strands and untwist the remaining strands of said portions and then bring said portion together with the untwisted strands in an intertwined position, and then said strands may be laid in and twisted in their proper crevices in the manner as heretofore set forth.

Having fully described my invention, what I claim is—

1. A device for laying in the strands of a wire cable, consisting of a sectionized collar provided with internal screw-threads, a support for said collar, a longitudinally-sectionized externally-screw-threaded cylinder adapted to be screwed in said collar, a sectionized revolving collar mounted on said cylinder, and arms secured to said collar, substantially as set forth.

2. A device for laying in the strands of a wire cable, consisting of a hinged collar provided with internal screw-threads, a support for the same, a longitudinally-sectionized externally-screw-threaded cylinder the sections whereof are longitudinally tongued and grooved together and are adapted to be screwed in said collar, a sectionized collar revolvably mounted on said cylinder, and arms secured to said collar, substantially as set forth.

3. A device for laying in the strands of a wire

cable, consisting of a hinged collar provided with internal screw-threads, a support for the same, a longitudinally-sectionized externally-screw-threaded cylinder the sections whereof are tongued and grooved together and one section whereof is adapted to be slipped out of the other to allow the insertion of the cable, said cylinder being adapted to be screwed into said internally-screw-threaded collar, a hinged collar revolvably mounted on said cylinder, and arms secured to said collar, substantially as set forth.

4. A device for laying in the strands of a wire cable, consisting of a hinged collar provided with internal screw-threads, a support for the same, a longitudinally-sectionized externally-screw-threaded cylinder adapted to be screwed in said collar, a hinged collar revolvably mounted on said cylinder and also adapted to be rigidly mounted on the same by means of set-screws, and arms secured to said collar, substantially as set forth.

5. A device for laying in the strands of a wire cable, consisting of a hinged collar provided with internal screw-threads, a support for the same, a longitudinally-sectionized externally-screw-threaded cylinder adapted to be screwed in said collar, a hinged collar revolvably mounted on said cylinder and also adapted to be rigidly mounted on the same by means of set-screws, and bifurcated arms secured to said collar, substantially as set forth.

6. A device for laying in the strands of a wire cable, consisting of a hinged collar provided with internal screw-threads, a support for the same, a longitudinally-sectionized externally-screw-threaded cylinder adapted to be screwed in said collar, a hinged collar revolvably mounted on said cylinder and also adapted to be rigidly mounted on the same by means of set-screws, bifurcated arms secured to said collar, adjustable sliding plates secured in said arms, screw-threaded bolts adapted to be screwed through said plates, and swivel-links secured to said bolts, to which the strands may be secured, substantially as set forth.

7. A device for laying in the strands of a wire cable, consisting of a hinged collar provided with internal screw-threads, a support for the same, a longitudinally-sectionized externally-screw-threaded cylinder adapted to be screwed in said collar, a hinged collar revolvably mounted on said cylinder and also adapted to be rigidly mounted on the same by means of set-screws, bifurcated arms secured to said collar, adjustable sliding plates secured to said arms, screw-threaded bolts adapted to be screwed through said plates, swivel-links secured to said bolts, and clamps secured in said swivel-links for clamping and holding the end of the strands while in operation, substantially as described.

8. A device for laying in the strands of a wire cable, consisting of a hinged collar provided with internal screw-threads, a support

for the same, a longitudinally-sectionized externally-screw-threaded cylinder adapted to be screwed into said collar, a hinged collar provided with projections and revolubly mounted  
5 on said cylinder, and arms secured to said projections, substantially as set forth.

9. A device for laying in the strands of wire cables, consisting of a hinged collar provided with internal screw-threads, a support for the  
10 same, a longitudinally-sectionized externally-screw-threaded cylinder adapted to be screwed in said collar, a hinged collar provided with projections and revolubly mounted on said cylinder and also adapted to be rigidly mounted  
15 ed on the same by means of set-screws, a similar hinged collar adapted to be rigidly mounted on said cylinder for securing said revolubly-mounted collar in its normal position on said cylinder, and arms secured to said pro-  
20 jections, substantially as set forth.

10. A device for laying in the strands of a wire cable, consisting of a hinged collar provided with internal screw-threads, a support for the same, a longitudinally-section-  
25 ized externally-screw-threaded cylinder provided on one end with projections and adapted to be screwed in said collar, a hinged collar provided with projections and revolubly mounted on said cylinder and also adapted  
30 to be rigidly mounted on the same by means of set-screws, a similar hinged collar adapted to be rigidly secured on said cylinder for securing said revolubly-mounted collar in its normal position on said cylinder, arms se-  
35 cured to said projections on the collar, and a lever provided with perforations adapted to be placed over the projections formed on the end of said sectionized externally-screw-threaded cylinder for revolving and adjust-  
40 ing the same, substantially as set forth.

11. The combination of a longitudinally-sectionized externally-screw-threaded cylinder, an internally-screw-threaded hinged col-  
45 lar in which said cylinder is mounted, a second collar revolubly mounted on said cylinder, arms secured to said collar for carrying

around the free ends of the strands adapted to be secured to said arms, with a laying and twisting in device consisting of radial arms against which said strands are adapted to  
50 press when the same are operated, thereby laying and coiling said strands in their proper spiral crevices, substantially as set forth.

12. The combination of a longitudinally-sectionized externally-screw-threaded cylinder, an internally-screw-threaded hinged col-  
55 lar in which said cylinder is mounted, a second collar revolubly mounted on said cylinder, arms secured to said collar for carrying around the free ends of the strands adapted  
60 to be secured to said arms, with a laying in and twisting device consisting of a U-shaped portion in which the solid portion of the cable may loosely fit, and radial arms secured to said  
65 U-shaped portion, against which said strands are adapted to press when the same are operated, thereby laying and coiling said strands in their appropriate spiral crevices, substan-  
tially as set forth.

13. The combination of a longitudinally-sectionized externally-screw-threaded cylinder, an internally-screw-threaded hinged col-  
70 lar in which said cylinder is mounted, a second collar revolubly mounted on said cylinder, arms secured to said collar for carrying around the free ends of the strands adapted  
75 to be secured to said arms, with a laying and twisting in device consisting of a U-shaped portion in which the solid portion of the cable may loosely fit, and radial arms, each provided  
80 with a depression, in which depressions said strands are adapted to fit when the same are operated, thereby laying and coiling said strands in their proper spiral crevices, sub-  
stantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

THEODORE F. BORRMAN.

Witnesses:

EDWARD EVERETT LONGAN,  
H. C. JOHNSON.