

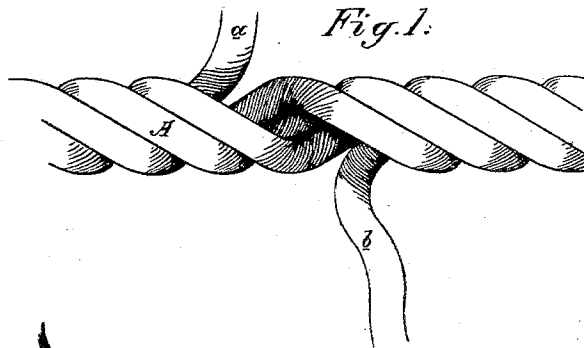
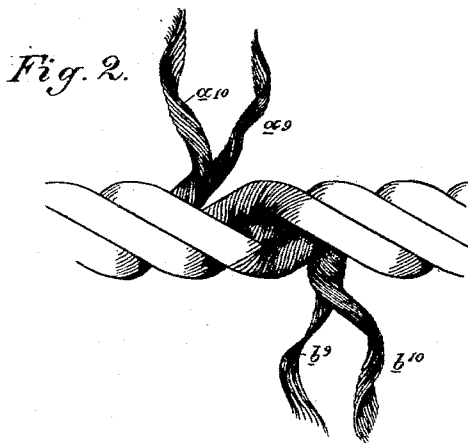
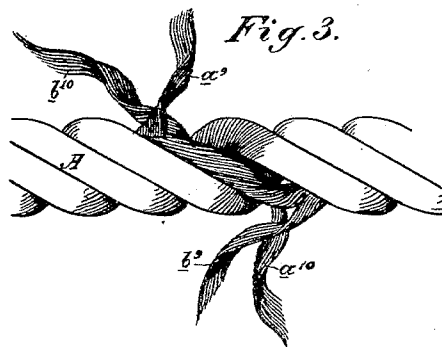
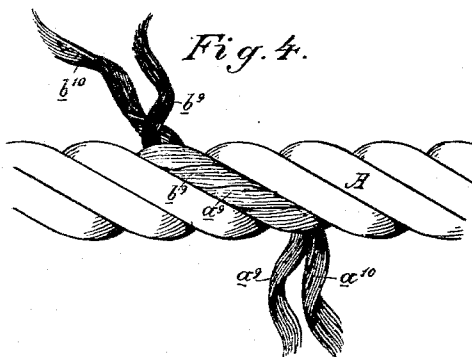
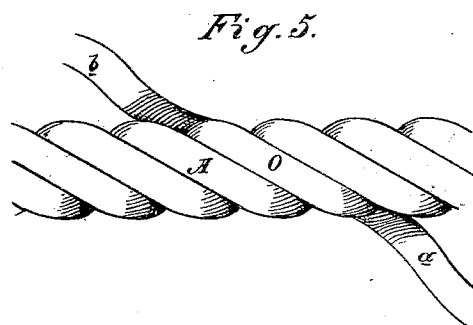
(No Model.)

3 Sheets—Sheet 1.

J. COLLINS.
ART OF SPLICING CABLES.

No. 369,435.

Patented Sept. 6, 1887.



Witnesses,
Geo. H. Strong,
J. H. House.

Inventor,
John Collins,
By Dewey & Co.
attys

(No Model.)

3 Sheets—Sheet 2.

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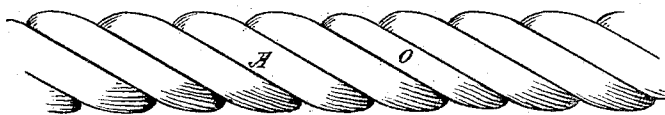


Fig. 6.

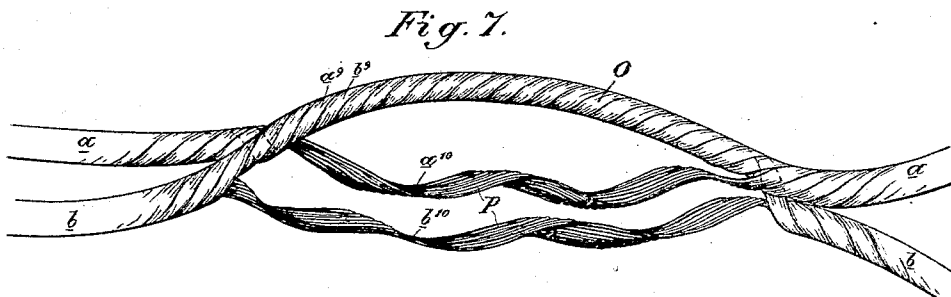


Fig. 7.

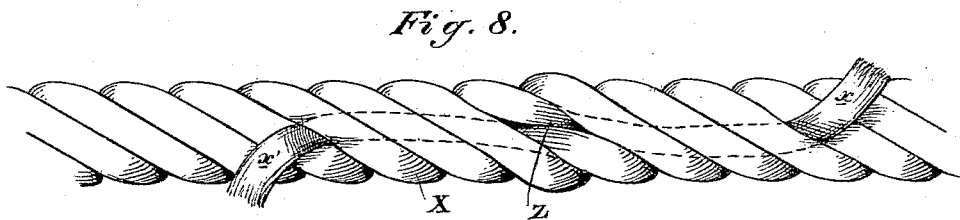


Fig. 8.

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3 Sheets—Sheet 3.

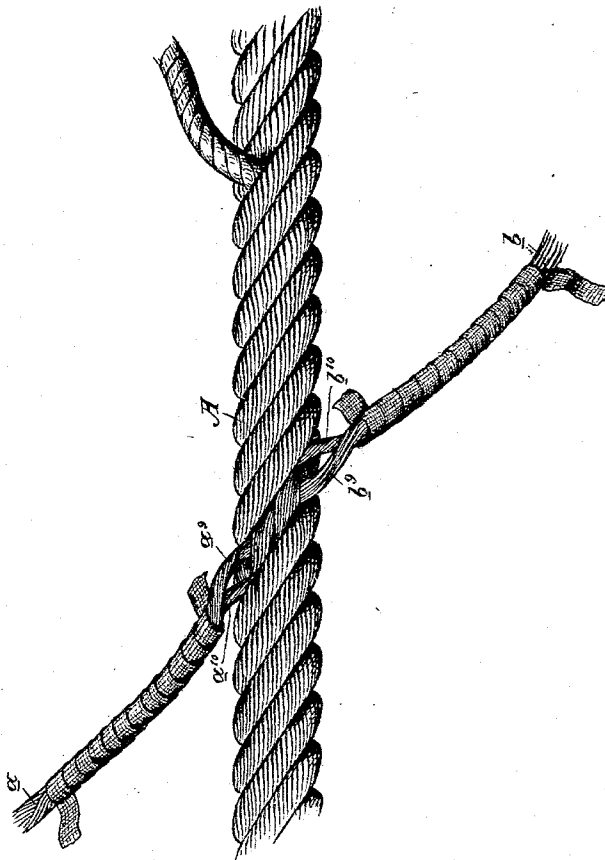
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Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN COLLINS, OF OAKLAND, ASSIGNOR OF ONE-HALF TO SQUIRE V. MOONEY, OF SAN FRANCISCO, CALIFORNIA.

ART OF SPLICING CABLES.

SPECIFICATION forming part of Letters Patent No. 369,435, dated September 6, 1887.

Application filed March 18, 1887. Serial No. 231,459. (No model.)

To all whom it may concern:

Be it known that I, JOHN COLLINS, of Oakland, Alameda county, State of California, have invented an Improvement in the Art of Splicing Cables; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the art of splicing cables; and my invention consists in the hereinafter-described novel mode or method of treating and disposing of the opposing strand ends or tucks.

My invention has to do with and is an improvement on the common form of splice known as the "inlaid" splice, in which the opposing strand ends or tucks are brought up in their respective cores to a meeting point, whence each is laid into the center, taking the place of the soft core previously removed. This splice is one well known and almost universally resorted to, especially in the cables of cable roads or tramways.

To fully understand my improvement, I deem it necessary to partially illustrate this common splice, in order to point out its disadvantages and to distinguish my improvement from it.

I refer, therefore, to Figure 8 for this explanation. I do not consider it necessary to describe particularly the various preliminary steps in the art of splicing, by which the strand ends or tucks are brought up to oppose each other, for these steps are always taken and are well known to those skilled in the art. It is sufficient in this connection to state that the opposing strands are first interlocked and alternate ones from each side are laid back to different points, the opposing strands from the other side being laid up in the scores thus formed until along the whole length of the splice at intervals are presented opposing strand ends, which are called the "tucks," and the problem is to properly dispose of these tucks. In contradistinction to that method which seeks to dispose of these tucks in the vicinity of the periphery of the cable is that method which places them in the center, to take the place of the previously-removed soft core, and from which the splice derives its name of "inlaid."

As before stated, my present improvement is in this inlaid class of splice.

In Fig. 8, which shows the old form, X is the cable, and x is one strand end or tuck, x' being the other. Z is the point where they meet, and as they come together in the same single score it is obvious that at that point where each is directed inwardly to the center there is of necessity a double thickness composed of the two strands lying side by side. Thus in a nineteen-wire-strand cable there will be at the point Z a thickness due to thirty-eight wires. The tucks are carried along in opposite directions in the center of the cable, from which the soft core has been removed, to their ends, though in Fig. 8 I have shown them, for the sake of clearness, inlaid but a portion of their length, their ends sticking out; but the point Z is that to which I wish to direct attention, for, on account of the double thickness in a single score at that point, there follows an enlargement of the cable which is the fruitful source of that injury to the cable known as "stranding." In cable roads where grips are employed to connect the car above with the traveling cable below this stranding is a frequent and serious matter, and it always is occasioned by the enlargement at the point Z. Otherwise this splice is much favored, and, as before stated, is in common use. The cause of this stranding is mainly due to the chipping of the grip upon the enlargement and the crystallization of the wires at that point and in the vicinity.

It is the object of my invention to improve on the inlaid splice by avoiding the enlargement at Z, and also to make a shorter splice than is required by the old method just referred to.

Referring now to the accompanying drawings, Fig. 1 is a view of a cable, showing the opposing strand ends or tucks. Fig. 2 is a view showing the splitting of these tucks. Fig. 3 is a view showing one division from each strand end or tuck laid into the cable, either straight and side by side or with one or more half-turns, though in this figure they are shown with a half-turn. Fig. 4 is a view showing the remaining opposing divisions laid up with one or more turns directly on top of

the inlaid divisions and forming an approximately complete strand lying in the score of the cable, their ends being in proximity to the ends of the divisions from which they have previously been separated. Fig. 5 is a view showing the laying up or reuniting of the separated divisions. Fig. 6 is a view of the completed splice, showing the position at O of the single newly-formed strand. Fig. 7 is a view of the tucks removed entirely from the cable and showing their relationship when laid together, the heart divisions being straight. Fig. 8 is the view heretofore referred to of the old splice partially completed. Fig. 9 is a view showing the wrapping of the strand ends or tucks with burlap before laying them into the heart of the cable to take the place of the previously-removed soft core.

A is the cable. a is one strand end or tuck, and b is the other, Fig. 1. When these tucks are separated by a short distance, I proceed to divide or split each, as shown in Fig. 2.

The division I prefer in a nineteen-wire-strand is into ten and nine, and, for the sake of clearness, I designate these divisions, as shown in Fig. 2, by a^9 a^{10} on one side and b^9 b^{10} on the other side. I now take a^{10} from one side and b^{10} from the other side and bring them together into the heart of the cable, from which the soft core has previously been removed, either allowing them to pass in opposite directions straight and side by side, or giving them one or more turns with the lay, as I see fit, the former being shown in Fig. 7 and the latter in Fig. 3. I now take a^9 and b^9 and bring them together, making one or more half-turns with the lay, meaning thereby that they are so crossed and put together that each shall twist into the other in the spaces left by the untwisting of the wires which had been formerly laid up with each. This twist forms an approximately complete strand, which occupies, as shown in Fig. 4, the single score designed for it, and just outside of the inlaid divisions, said strand being designated as a whole by the letter O in Fig. 6. I now lay up or reunite a^9 with a^{10} , the two coming together perfectly, for they are the divisions into which strand a has originally been split. I do the same with b^9 and b^{10} , all as shown in Fig. 5. Now, I inlay the reunited a and b in the heart of the cable up to their ends, whereby the completed splice is made as shown in Fig. 6. Before thus introducing them into the cable I prefer to wrap them with burlap or similar substance, as shown in Fig. 9, for two reasons—first, to slightly increase their diameter as they take the place of the soft core, which is always a little greater in diameter than the strand, and, second, to serve as a cushion and prevent the contact of metal with metal.

Fig. 7 gives a clear idea of the temporary separation and reuniting of the divisions of the strands, the part marked O being the new strand formed by a^9 and b^9 , and the part marked P being the newly-formed core for that distance and composed of a^{10} and b^{10} , which in

the figure are shown straight, instead of laid up, as in Fig. 3.

An advantage in passing a^{10} and b^{10} through straight and laying them side by side is to give a little softness just under the newly-formed strand O, and this, in connection with the fact that said strand in the division described of 9 and 9 is composed of only eighteen wires for that short distance, causes said strand to be a little depressed. Therefore, instead of the old way of having at the point Z, Fig. 8, a thickness of thirty-eight wires, and a consequent enlargement, I have only a thickness of eighteen wires and a slight depression, thus entirely avoiding the disadvantage of the old splice. The continuation of the newly-formed splice-strand on each side is of course the regular nineteen wires of the strands a and b , back of the splitting-point. By thus splitting and laying up the two strand ends it is obvious that I obtain all the required tenacity with a much shorter splice than by the old method.

The principle of my improvement, it will be seen from the foregoing description, is that part of each strand is carried into the heart of the cable before the strands meet, while the remaining part of each, after being laid up together to fill the score, is then inlaid to be reunited with its previously-separated part in the heart of the cable. Though I have herein described the inlaying of opposing divisions as taking place previous to the laying up together of the remaining divisions to form the strand in the score of the cable, it is obvious that where I permit the inlaid divisions to pass through straight, as in Fig. 7, I may direct them under the newly-formed strand after the latter has been made.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In the art of splicing cables, the herein-described method of treating the opposing strand ends or tucks, consisting of splitting or dividing each strand end or tuck, passing or laying in the heart of the cable and in opposite directions one division from each strand end or tuck, and laying up together in the score of the cable over the inlaid divisions the remaining divisions to form a strand for said score, substantially as herein described.

2. In the art of splicing cables, the herein-described method of treating the opposing strand ends or tucks, consisting in splitting or dividing each strand end or tuck, passing or laying in the heart of the cable and in opposite directions one division from each strand end or tuck, laying up together in the score of the cable over the inlaid divisions the remaining divisions to form a strand for said score, and disposing of said last-named divisions by tucking them into the cable, substantially as herein described.

3. In the art of splicing cables, the herein-described method of treating the opposing strand ends or tucks, consisting in splitting or

dividing each strand end or tuck, passing or
laying in the heart of the cable and in oppo-
site directions one division from each strand
end or tuck, and laying up together in the
5 score of the cable over the inlaid divisions
the remaining divisions to form a strand for
said score, reuniting the divisions of the
original strand ends or tucks to form again a
complete strand end, and tucking said strand

ends in the heart of the cable, substantially as is
herein described.

In witness whereof I have hereunto set my
hand.

JOHN COLLINS.

Witnesses:

S. H. NOURSE,
H. C. LEE.