

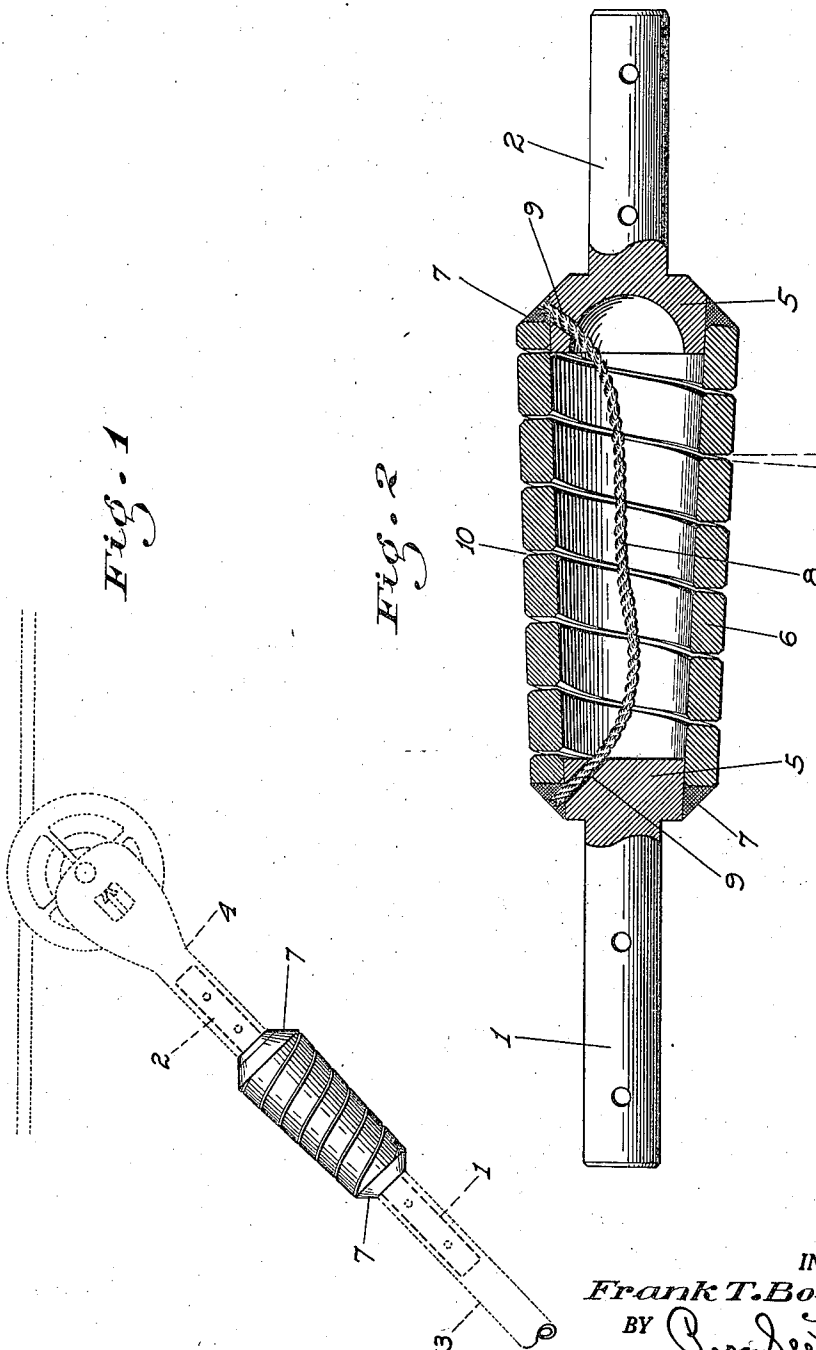
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FLEXIBLE ATTACHMENT FOR TROLLEY POLES

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FLEXIBLE ATTACHMENT FOR TROLLEY POLES.

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To all whom it may concern:

Be it known that I, FRANK T. BOGARD, a citizen of the United States, residing at Oakland, county of Alameda, State of California, have invented certain new and useful Improvements in Flexible Attachments for Trolley Poles; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in trolley pole construction and is particularly an improvement over the device shown in United States Patent No. 1,371,557, dated March 15th, 1921, on a trolley pole.

The principal object of the present invention is to provide a means for preventing the pole-wheel from so readily jumping or leaving the wire at crossings, splices, curves and may be attached to any standard trolley pole without making any changes in the latter other than the cutting out of a section of the necessary length.

A further object is to provide such a device as will have the greatest possible strength and flexibility, encompassed in the minimum of space and which forms a complete unit of itself, which may then be attached to the pole in very short order.

Another object is to provide a simple means for insuring that the passage of the current through the attachment will not be interrupted under any conditions of operations.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side elevation of the attachment, as applied to a trolley pole.

Fig. 2 is a sectional view of the attachment itself.

Referring now more particularly to the characters of reference on the drawing, the device comprises a pair of longitudinally

spaced and alined stems 1 and 2, the former being adapted to be inserted into and rigidly secured to the standard hollow pole 3 by riveting or otherwise, and the other stem being similarly adapted to be fixed to the harp end 4 of the pole, the pole being cut in two, and if necessary a certain portion of its length removed, near the harp, as shown in Fig. 1. These two stems will therefore be hereinafter referred to as the pole-stem and harp stem respectively.

The adjacent ends of these stems have enlarged portions or heads 5, which form stops for the pole sections and over which are fitted for about half the length of these heads the corresponding ends of a closely coiled helical spring 6.

The spring and stems are then securely and permanently connected by electric or other form of welding, the end faces of the spring and the peripheral surface of the heads outwardly of the spring forming the area of contact for the welding metal, which forms a continuous ring of preferably triangular cross-section as shown at 7.

Before this welding is done however, a flexible copper cable 8 is extended between the stems inside the spring, the ends passing through holes 9 drilled through the heads 5, at an angle, the outer ends of these holes being outwardly of the spring-ends. The cable-ends protrude from the holes somewhat, so that when the welding operation aforementioned is carried out, the cable-ends are likewise embedded in the welding-metal, insuring a positive and unbroken path for the passage of the current from stem to stem.

After considerable experimentation, I have found that the spring, in order to give the best results as to wear and efficiency of operation, should be constructed in the following manner:

It should be very closely coiled, somewhat greater in diameter at the harp-stem end than at the pole-stem end.

The spring-coils in cross section are substantially trapezoid-shaped, with the corners rounded or chamfered as shown at 10, and the two parallel sides being the outer and inner peripheries of the coils, while the outer face is somewhat narrower than the inner, as will be plainly seen in Fig. 2.

In considering the action of this spring,

it is to be understood that it is not used for tension or compression purposes, but for bending or oscillating flexibility.

The particular cross-section used is not only to gain the maximum strength in the smallest area of length and circumference of spring, but so that when the spring-coils are brought together on the under side with the bending of the spring due to the upward tension of the pole, when the trolley wheel is engaging its wire, the adjacent side-faces of the under portion of the coils will abut against each other throughout their width, thereby forming a continuous and compact surface from one end of the spring to the other, which tends to prevent breakage.

By increasing the diameter of the spring from the pole to the harp end, the resistance of the coils is less at the outer end, which is a desirable feature, since it insures uniformity of flexible bending from one end to the other, the principle involved being somewhat similar to that of a lever, which is made heaviest at its fixed or pivoted end.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

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

1. A flexible attachment for trolley poles comprising a pair of separated stems, a spring whose ends project over the adjacent ends of the stems, a separate current conducting cable extending between the stems inside the spring, the ends of said cable being passed to the outside of the stems be-

yond the spring-ends through holes bored through said stems, the spring and cable ends being then welded to the stems, the welding-metal being placed about the corners formed between the spring-ends and the surface of the stems outwardly thereof.

2. A flexible attachment for a trolley pole, the latter being cut in two transversely, comprising a pair of separated stems adapted to fit into the cut ends of the pole, heads on the stems forming stops for the pole-sections, and a helical spring whose ends project over the heads and welded thereto.

3. A flexible attachment for trolley poles comprising a pair of separated stems and a closely coiled helical spring of rectangular cross-section into which the adjacent ends of the stems project, and which is welded to the stems.

4. A flexible attachment for trolley poles comprising a pair of separated stems, heads on the adjacent ends thereof, and a helical spring into which the heads partly project, the heads and spring ends being then welded together.

5. A flexible attachment for trolley poles comprising a helical spring adapted to be connected to and between separated sections of the pole, the spring having less resistance at its upper than at its lower end.

6. A flexible attachment for trolley poles comprising a helical spring adapted to be connected to and between separated sections of the pole, the diameter of the spring being greatest at its upper end.

7. A flexible attachment for trolley poles comprising a helical spring adapted to be connected to and between separated sections of the pole, the spring-coils being quadrilateral in cross section, with the outer periphery narrower than the inner, said spring being closely coiled.

In testimony whereof I affix my signature.
FRANK T. BOGARD.