(No Model.)

F. K. FITCH.

TELEGRAPH WIRE.

No. 268,478. Patented Dec. 5, 1882.

Fig. 1.

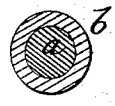
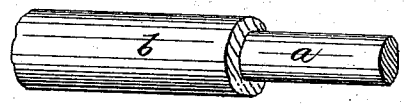


Fig. 2.



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UNITED STATES PATENT OFFICE.

FREDERICK K. FITCH, OF NEW YORK, N. Y., ASSIGNOR TO WILLIAM H. RITTER, OF SAME PLACE.

TELEGRAPH-WIRE.

SPECIFICATION forming part of Letters Patent No. 268,478, dated December 5, 1882.

Application filed September 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK K. FITCH, of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Telegraph-Wire; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a section of my improved wire enlarged. Fig. 2 is a side view of same.

This invention relates to an improved conductor for telegraph or telephone service, and has for its object the production of a wire of the greatest possible strength and the least possible weight while retaining a sufficient conductivity for the purpose intended.

Conducting-wires heretofore have been of two kinds—iron wire, and a compound wire consisting of a steel core and copper sheathing, forming a single wire. Iron wire is objectionable because, having about six times the resistance of copper, it must be made thick to serve the purpose, and affords a large surface for the accumulation of snow and rain—the former acting to break the line by excessive weight and the latter destroying the insulation. Oxidation of the iron is supposed to be prevented by galvanizing; but it is not a safe remedy, because the dews and rains form a voltaic couple between the iron and the zinc, and decomposition rapidly goes on to the destruction of the wire. The same galvanic action takes place in the compound wire of steel and copper, and as this eats away the steel core the copper shell only remains, not alone increasing the resistance, but also forming a weak point, which breaks under the slightest abnormal stress. My invention, on the contrary, aims at the production of a wire having all the above defects and disadvantages eliminated; and it consists in making the wire a compound wire, one part of which is of phosphor-bronze and the other of copper, whereby the bronze, being of enormous tensile strength, allows the section to be comparatively small, while its conductivity is about two and a half times that of iron or steel. Its conductivity is very largely increased by the copper portion, and the combination of copper and bronze does not give rise to the galvanic action which takes place in combinations of steel and copper or iron and zinc. For a given resistance the phosphor-bronze-copper wire may be made very small comparatively in cross-section, and consequently the amount of snow it can retain will not harm it. Its tensile strength is greater than that of the best steel, and therefore the number of poles required will be less than for any other wire. This is a result of much importance, as the less poles and insulators there are on a line the greater will be the insulation. Steel wire will stretch about ten per cent. before breaking, while phosphor-bronze-copper wire will not break under fifty per cent. of stretch.

In manufacturing I make a thin wire, *a*, of phosphor-bronze, and then coat it with copper, *b*, as shown in Figs. 1 and 2. The copper may be drawn with the bronze or may be deposited thereon by electrolysis. Such a wire compared with a steel wire has both greater tensile strength and conductivity, and also has the merit of being valuable even when it is taken off the poles after long use, while under similar circumstances iron or steel wire is valueless.

If such copper covering should become accidentally abraded or broken, so as to expose the bronze core to the weather, no ill effects follow, as no galvanic action sets up. This is in remarkable contrast to the effect on a wire of steel and copper or steel and bronze when abraded. In the latter case galvanic action sets in and the steel is rapidly oxidized; and to such an extent has this been known to take place that the conductor becomes a mere hollow shell of copper containing iron rust, having neither strength nor proper conductivity, and liable to break at any moment. My invention precludes all possibility of such injurious action.

I am aware that it has been proposed to make various combinations of wire—by covering a copper core with an iron shell, or, vice versa, by covering a steel core with copper or bronze, by braiding or twisting an iron and

a copper or a bronze wire to form a cable; but in all of these there is found iron or steel in contact with copper or bronze, which results in a rapid chemical decomposition by galvanic action when both elements become exposed to the atmospheric influence. I do not therefore claim any combination of iron or steel with bronze. Nor do I claim a phosphor-bronze wire alone, as such is not novel; but in my compound wire I use two metals of such character that, if any galvanic action does occur, it effects a chemical change so slow and so slight as to be inappreciable. Practically, the decomposition of either the copper or the bronze does not take place.

I claim as my invention—

A compound wire composed of a phosphor-bronze core and a covering of copper united thereto, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

FREDERICK K. FITCH.

Witnesses:

J. T. MURRAY,

G. A. CARDWELL.