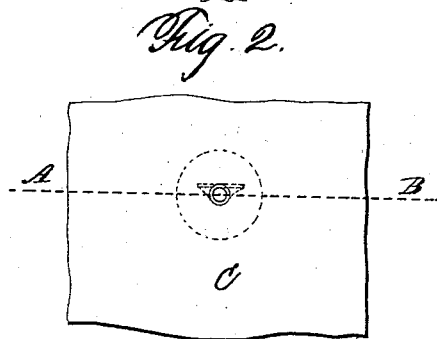
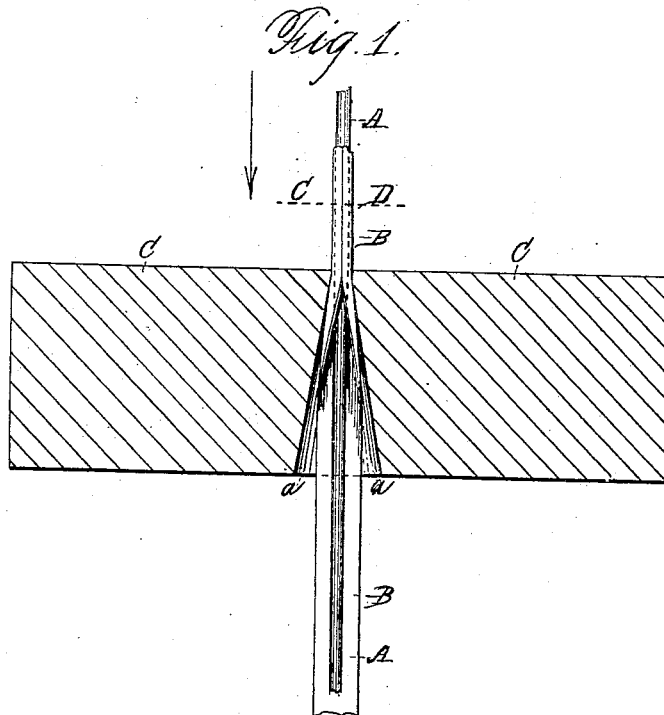


W. E. RICE.

COMPOUND TELEGRAPH-WIRE.

No. 187,175.

Patented Feb. 6, 1877.



WITNESSES;

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WILLIAM E. RICE, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN COMPOUND TELEGRAPH-WIRE.

Specification forming part of Letters Patent No. **187,175**, dated February 6, 1877; application filed August 17, 1876.

To all whom it may concern:

Be it known that I, WILLIAM E. RICE, of the city and county of Worcester and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Compound Wire for Telegraph Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a section of a piece of my compound wire for telegraph and other purposes as it appears at one stage of the process of its manufacture, as will be hereafter more fully described, the drawing-die being shown in section on line A B, Fig. 2. Fig. 2 represents an end view of a central portion of the entire die shown in Fig. 1, looking in the direction of arrow 1, Fig. 1; and Fig. 3 represents, upon an enlarged scale, a section of my improved compound wire, on line C D, Fig. 1.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, the part marked A represents a solid copper wire, and B a flat metal band formed or rolled by preference from steel wire. C is a drawing-die, which may be made in the usual manner, having a hole through it, the rear of the opening being made conical or tapering, as shown at *a*, whereby when the parts A and B are drawn through the die, the metal band or ribbon B is turned and wrapped closely about the copper wire A, as indicated in Figs. 1 and 3 of the drawings, while at the same time the copper wire is reduced in size by the action of the solid drawing-die C, the iron or steel covering being also reduced, but not in the same proportion as the soft copper center.

It will be understood that in the construction of the die C the opening *a* is made larger than the size of the parts A and B, when first the band A is wrapped about the copper part A; but that the opening at the other side of the die is made smaller, so that when the parts A and B are drawn through a reduction in size takes place.

After the compound wire has been reduced to the desired size it may be galvanized or tinned, thereby uniting the parts more closely together, and also rendering the same less subject to rust and corrosion from exposure to the weather or other conditions inducing rust.

A very good article of compound wire for telegraph and other purposes may be made by making the band B of iron; but a still better article can be produced by making it from steel wire, and properly tempering it, either before or after it has been wrapped about the solid core.

The copper part affords a great conducting body, while the iron or steel part affords the necessary tensile strength, and those skilled in the art to which my invention belongs will readily appreciate the great practical value of my invention, since the compound wire can be made in great length and of great uniformity of strength and conducting capacity, while the latter function is not liable to be injured by handling or rubbing of the wire, either in shipping or in use.

I am aware that prior to my invention it had been proposed to roll down an ingot composed of copper and steel or iron. The objection to this mode of forming telegraph wires consists of the constant liability of the copper being stripped or torn from the iron or steel core, when the copper is upon the outside, while, when the relative position of the parts is reversed, then there is a liability of the hard metal, iron, or steel, being forced in so as to entirely separate, in places, the copper case, and so difficult and uncertain, in a practical point of view, is this mode of forming a telegraph-wire, composed of copper and iron or steel, that it has never been carried into successful operation.

I am also aware that prior to my invention telegraph-wire had been made by coiling about an iron or steel wire a band or thin strip of copper. This plan, too, has failed of giving satisfaction, for the reasons that the spiral coil of copper was liable to open or separate by reason of the swaying of the wires, and also by the abrasion of the wire, if it happened to come in contact with any resisting object. Still, again, in splicing this form of wire, it

was found that in twisting the ends together the copper coils were separated and forced out from the iron or steel core.

I do not wish to be understood as laying any claim to either of the above modes of construction, which are disclaimed. By my mode of making telegraph-wires, while obviating the objections to the old modes referred to above, I, in addition, am able to manufacture both parts separately, whereby they can be carefully tested and examined, and rolled up into large coils before being combined together, and when combined together they are united, when stretched and drawn out taut in a longitudinal direction; consequently when put up for use the strain of the wire does not tend to separate the copper from the steel or iron. Then, again, by my mode of operation the wire can be manufactured very rapidly, and in a perfect and uniform manner. Then, again, by my mode of making the wire the action of the hard iron or steel casing B upon the soft copper core or center A, during the drawing

and reducing process, is to abrade, rub, or press off fine or small particles or filaments of copper from the outer surface of the copper center, and these particles are closely confined between the center core and the inner surface of the steel or iron casing, and form additional conducting medium.

Having described my improved compound wire for telegraph and for other purposes, what I claim therein as new, and of my invention, and desire to secure by Letters Patent, is—

As a new manufacture, a compound telegraph-wire, made in the manner and by the process herein set forth—that is to say, by incasing a copper core, with a longitudinal iron or steel ribbon or strip, and then wire-drawing the same, substantially as herein shown and described.

WILLIAM E. RICE.

Witnesses:

THOS. H. DODGE,
EDWIN E. MOORE.