

L. E. HEATON.
 Tip for Flexible Electric Conducting Cords.
 No. 199,827. Patented Jan. 29, 1878.

Fig. 1.

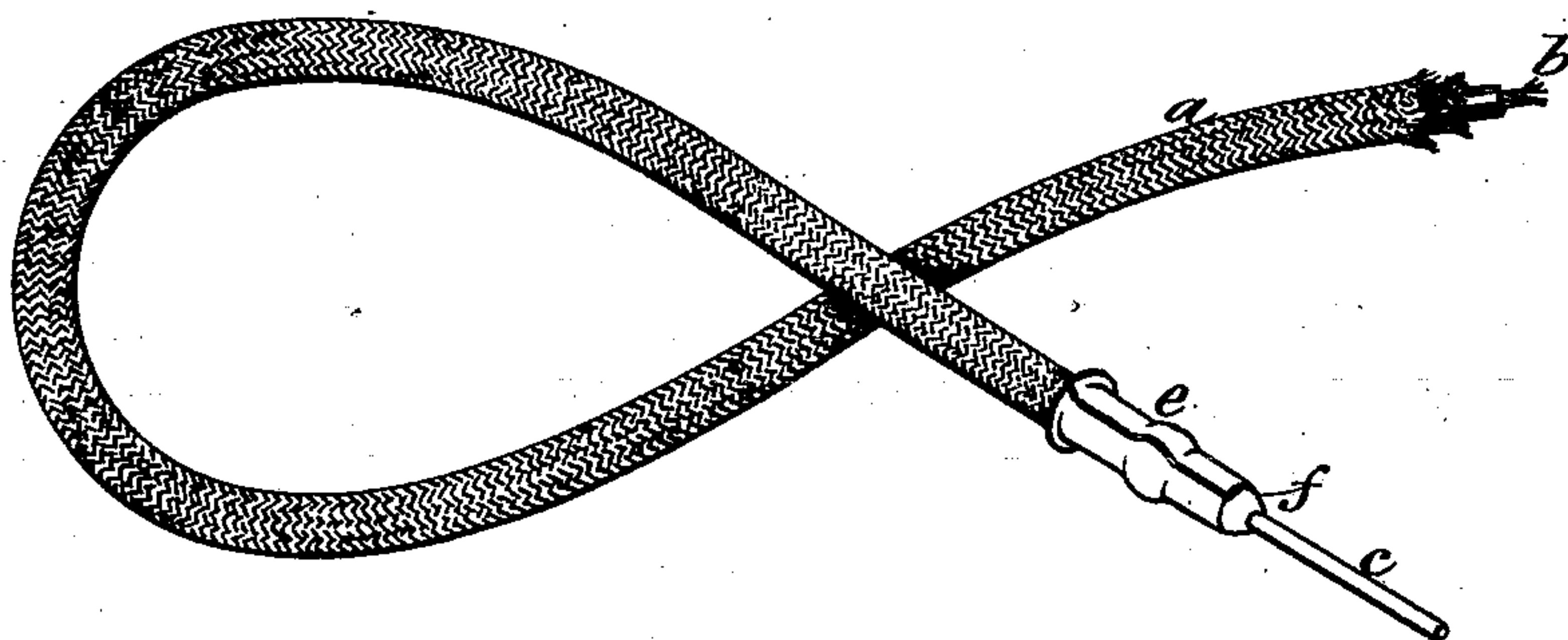


Fig. 2.

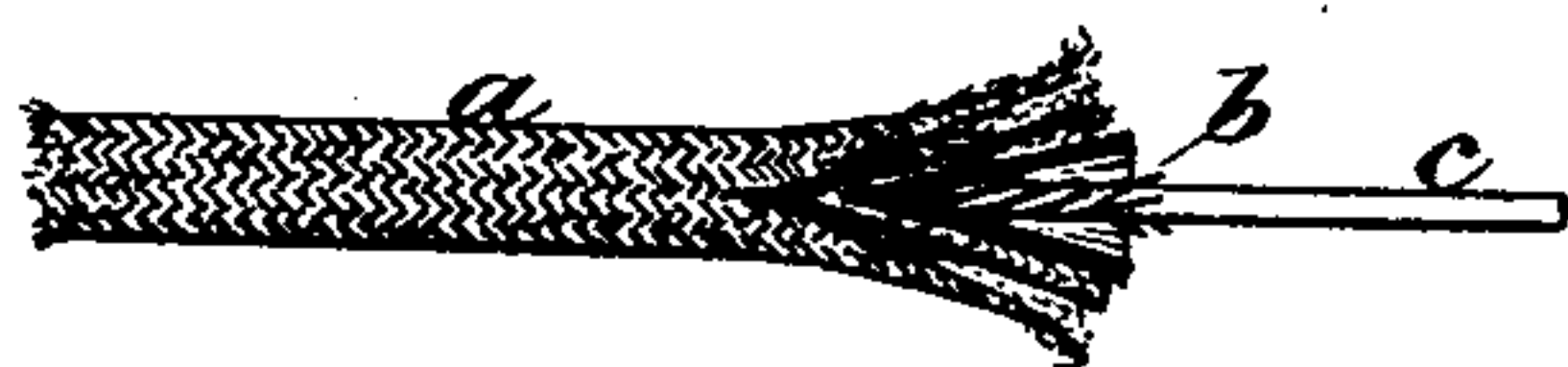


Fig. 3.



Fig. 4.



Witnesses:
Philip F. Garner
A. B. Caldwell

Inventor.
Lewis E. Heaton
By Wm. B. Wood
Attorney

UNITED STATES PATENT OFFICE.

LEWIS E. HEATON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO EUGENE F. PHILLIPS, OF SAME PLACE.

IMPROVEMENT IN TIPS FOR FLEXIBLE ELECTRIC CONDUCTING-CORDS.

Specification forming part of Letters Patent No. **199,827**, dated January 29, 1878; application filed December 7, 1877.

To all whom it may concern:

Be it known that I, LEWIS E. HEATON, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Tips for Flexible Electric Conducting - Cords, &c.; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description thereof.

My tips are well adapted for use on telegraphic switch-cords, and also on flexible cords for therapeutic electrical apparatus; but they have been specially designed for use with flexible conductors for use in connection with vocal telephones. The usage to which telephonic cords and their tips are subjected is very severe, the telephone being frequently dropped, so as to cause a sudden, quick strain upon the cords and tips; and if the cords be kinked at any time, it is common for the users to pull on them heavily for the purpose of straightening, and under these circumstances the tips are frequently detached and the cord rendered useless. Whatever may be the character of the conductor, it is essentially insulated and protected by a suitable jacket or jackets, and it is equally essential that the tip-wire be in as perfect electric contact with the conductor as is possible; and as the conductor is usually of comparatively little tensile strength, it is important that the tip-wire be properly connected with the conductor, and at the same time securely connected with the insulating-jacket, on which reliance is placed for the requisite tensile strength in the cord.

To these ends my invention consists in the combination, with an electric conductor inclosed within an insulating and strengthening jacket, the same constituting a flexible electric cord, of a wire tip embedded with the conductor within the jacket, a compressing-binder outside of the jacket, for securing close contact of the tip-wire with the conductor, as well as to afford an annular boss or shoulder outside the jacket, and a metallic shell, which encircles the cord and tip-wire at their junction, is compressed upon and around the binder, and secured at its end to the tip-wire.

To more particularly describe my invention,

I will refer to the accompanying drawings, in which—

Figure 1 represents a piece of electric cord with my improved tip attached. Fig. 2 represents the end of a piece of cord, with its jacket split to the conductor and a tip-wire inserted for contact. Fig. 3 represents the jacket closed upon the tip-wire and the compressing-binder applied. Fig. 4 represents a blank from which a tip-shell is made.

The insulating-jackets are shown at *a*, of which, in this instance, there are three, the two outer ones being of braided fabric and the inner one of vulcanized rubber. Any form of insulating-jacket may be employed, provided it have sufficient tensile strength to protect the conductor *b* against tensile strain and has the proper insulating capacity. The conductor is usually of soft copper, sometimes in a single length of wire, finely coiled, sometimes in numerous lengths of straight fine wire; and it is also made in other forms too numerous to mention. Whatever may be the form of the conductor, the tip-wire *c* must have its inner end in good electric contact therewith. If the conductor be a coiled wire, I insert the tip-wire within the coil, and if the conductor be composed of fine wires, I embed the tip-wire among them, if possible, so that it will be well surrounded. Access to the conductor may be readily attained by slitting the jackets, as shown. After the tip-wire has been thus inserted the compressing-binder *d* is applied with as much pressure as will cause the conductor and tip-wire to be in close and perfect contact.

The compressing-binder may be composed of numerous wraps of strong, fine wire, or tightly-spun cord, well waxed; or it may be in the form of a metallic open ring, which, when applied at the proper point with relation to the inner end of the tip-wire and the end of the jacket, (usually midway,) is heavily compressed and closed upon the cord. When the binder has been thus applied the tip-shell *e* is placed in position, with its outer end extended beyond the end of the jacket, and by means of clamping-dies it is closed in upon the cord under heavy pressure, and reduced in diameter on each side of the binder, as shown.

The shell may be made of sheet metal from a blank, as shown in Fig. 4, so that, when compressed, its edges will overlap; or it can be formed from a seamless tube of thin soft metal, in which case the compressing-dies will preferably have corrugated faces for corrugating the shell longitudinally, so as to take up readily the surplus metal. I prefer, however, a shell made from a blank, as shown.

However made, the inner end of the shell should be outwardly flanged, as shown, in order that the exterior-braided jacket shall not be cut or abraded in subsequent use.

After the compression of the shell it is solidly united to the tip-wire by soft solder, as at *f*, which closes the end of the shell and affords a neat finish.

It will be seen that the conductor cannot possibly be subjected to tensile strain, because the tip-wire is firmly secured to the shell, and

the shell is longitudinally secured to the jacket, because closed in upon and around the binder, and that if, perchance, the jacket should stretch slightly, the electric relations between the tip-wire and conductor would remain intact, without any possible injury to either.

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

The combination, with an electric cord or conductor, of a tip-wire, a compressing-binder, and a tip-shell which is compressed and closed down upon and around the binder and firmly secured to the tip-wire, substantially as described.

LEWIS E. HEATON.

Witnesses:

JOHN C. PURKIS,
GILMON E. JOPP.