(No Model.)

J. E. HAMILTON.

TIP FOR FLEXIBLE CORD.

No. 257,865. Patented May 16, 1882.

FIG. 1.

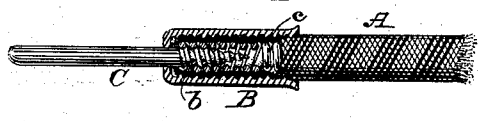


FIG. 2.



FIG. 3.

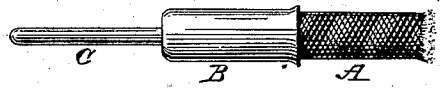


FIG. 4.

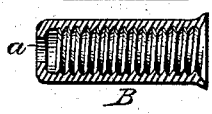


FIG. 5.

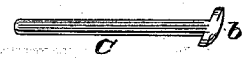


FIG. 6.

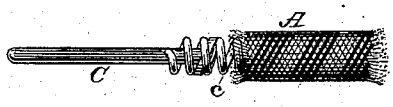


FIG. 7.

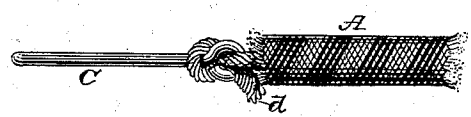


FIG. 8.



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UNITED STATES PATENT OFFICE.

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TIP FOR FLEXIBLE CORDS.

SPECIFICATION forming part of Letters Patent No. 257,865, dated May 16, 1882.

Application filed November 26, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. HAMILTON, of the city, county, and State of New York, have invented certain new and useful Improvements in Tips for Flexible Electric Cords; 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 of my invention.

Although applicable to flexible electric cords adapted to general uses, my improved tips have been specially devised for use with telephone-cords, and more particularly with that class thereof which embody a spiral conducting-wire. It is well known that the tips of telephone-cords are specially liable to injury, either by the breaking or bending of the stem or tip proper at or adjacent to the screw-posts or a complete stripping of the tip from the cord, and that it is therefore desirable that the tips be of such character that they may be furnished separately and be capable of use in replacing broken tips. So generally has this requirement been recognized that, with a view to meet the same, many tips have heretofore been devised; but so far as my knowledge extends they are either too expensive to render them practicable or they require special tools for applying them; and the object of my invention is to attain the desired ends at low cost, to obviate the necessity of using any tools whatever, and to enable the attachment of tips to be readily accomplished at the hands of inexperienced persons.

My novel tip embodies an internally-threaded shell, fully open at the rear end and centrally pierced in front, and a stem or tip proper, provided at its inner or rear end with a stub adapted to firmly engage with the flexible conducting-wire, the latter, when thus engaged with the stem, being, with its jacket or covering, screwed into the shell, the stem passing outward through the front end thereof.

My tip can be quickly and firmly applied without tools, and as readily displaced, if desired, without impairing or shortening the cord, because the cord, with the tip applied, is readily inserted into the shell by rotating the cord or the shell, while one of them is held stationary or revolved in the opposite direction.

In the United States Letters Patent No. 215,917, issued to me May 27, 1879, I disclosed a novel but complex form of screw-tip, which, while well adapted for switch-board service, is too expensive to warrant its application to flexible conductors suitable for general service with telephones or therapeutic electric apparatus. In said Letters Patent I also disclosed a simpler form of screw-tip, which is described and shown as applied to the end of the flexible conductor, and secured by means of a metal ferrule or a winding of silk.

The simplest form of tip embodying my present improvements consists of said simplest form of screw-tip, as shown in my said Letters Patent, and a shell which is internally threaded for its ready and secure attachment to the end of a cord, and perforated at its front end to admit of the protrusion of the stem or tip proper.

After a full description of several tips embodying my improvements, the features deemed novel will be specified in detail in the claims hereunto annexed.

Referring to the drawings, Figure 1 represents in longitudinal section a piece of electric cord having a tip embodying the main feature of my improvement. Fig. 2 represents a screw-tip having its threaded stub larger in diameter than the main portion thereof. Fig. 3 represents in side view one of my tips applied to a flexible cord. Fig. 4 represents the shell detached and in an enlarged longitudinal section. Fig. 5 represents the stem or tip in its preferred form detached, and also enlarged. Fig. 6 represents a spiral wire cord and a stem as connected prior to insertion into the shell. Fig. 7 represents a braided wire cord and a stem in a well-known form as connected to the wire prior to insertion into a threaded shell. Fig. 8 represents an eye-stub, with its two sides serrated.

The flexible cord A is insulated by means of the usual one or more jackets of seamless braided fabric. In all cases the metallic tip-shell B is an internally screw-threaded cylinder, preferably of drawn sheet metal, open fully at its

rear end, and at the other or front end it is centrally pierced, as at *a*, for the protrusion of the stem or tip proper, C. The interior of the shell should be internally proportioned in each case to the outside diameter of the flexible cord, so that the latter can be snugly screwed therein. The protruding portion of stem C is of such length as to afford convenient use with screw-posts of various kinds and of such diameter as to snugly occupy the opening *a* in the front end of the shell. At its rear or inner end the stem has a stub, *b*, which may be variably formed. As shown in Fig. 1, the stub of the tip or stem C is a tapering screw of no greater diameter than the protruding portion, and while this form of stem used with the internally-threaded shell B has much practical value it does not afford quite so secure a union as is sometimes found necessary in telephone service, wherein the instruments are sometimes dropped, exposing the tip to a severe jerking strain, and for attaining this additional security I have the threaded stub enlarged, as in Fig. 2, so that when the end of the stem is protruded through a hole in the front end of the stem just large enough to receive it the threaded portion cannot pass through said hole, and therefore the stem and shell are practically inseparable as against longitudinal strains. I find it, however, much cheaper and fully as serviceable to employ a narrow flattened head inclined to the axis of the stem, as shown in Fig. 5; but it may in some cases be a mere bulb or a ring, or a short thick stub externally threaded, and yet embody the main feature of my invention if employed in combination with an internally-threaded shell perforated at its front end for properly receiving said stem, and of such internal proportions that said shell may snugly and securely receive the electric cord when screwed therein. As shown in the drawings at Fig. 5, the stub is especially suitable for use either with a coiled conducting-wire or a series of fine conducting-wires massed or braided in a manner well known. In Figs. 1 to 6, inclusive, the conducting-wires *c* are of the spiral variety. The stub of the stem in Figs. 5 and 6 is inclined so that it is in fact spiraled, so as to occupy evenly a space between a convolution of the wire. Preparatory to applying these stems to the wire the braided covering is pulled back slightly for exposing the wire, and afterward, when the stem is inserted or connected, said jacket is drawn forward again into its normal position over the stub and to near the end of the conducting-wire. On inserting the tip or stem thus placed within the end of the spiral wire into and through the shell, the outer jackets of the cord being suitably trimmed off squarely a little back from the end of the wire, the end of the cord is then fully entered into the shell and rotated until the shell is forcibly filled. The thread in the shell should correspond generally with the convolutions of the wire, so that the latter will contribute to a firm binding of the braided jackets between the wire and shell. When thus applied the extreme end of the coiled wire is forced into good metallic contact with the inner surface of the shell at its front end, and the stub of the stem or tip proper is also closely pinched or compressed between the convolutions of the wire, thus insuring good electric connection of the wire with said stem.

In Fig. 7 the braided fine wires *d* are preferably passed through the eye in the stub of the stem, then passed once around the stem in front of the eye, thence back through the eye again, so that when the cord and stem are screwed into the shell a desirable compression of the wire near the front of the shell will be obtained as with the spiral conducting-wire.

In using my tip with a cord having other than the spiral conducting-wire the shell would ordinarily be of smaller interior diameter, and in all cases I prefer that the rear end of the shell be slightly flaring or bell-mouthed, as heretofore, for preventing the outer or finishing braid from undue abrasion against the rear end of the shell.

It will be seen that with one shell many stems or tips proper may be used from time to time in replacing broken ones, and that the cord may be retipped almost indefinitely without shortening it, and that the most inexperienced person may apply new stems without tools and without liability of imperfect electric connections.

The stem provided with the eye-stub shown in Fig. 7 is not new, and it has been long used not only without a shell, but also with shells which were mechanically compressed for effecting a union with the cord; but the particular stem shown in Fig. 5 is novel in that its stub is spiraled or equivalently inclined, and it has value for that reason, because it better co-operates with the internal thread of the shell, whether used with the spiral wire or a series of fine wires. The stem shown in Fig. 7 may, however, be provided with the spiraled feature by corrugating or serrating the outer surface of the eye on each side, as indicated in Fig. 8, and that construction is obviously preferable to having said eye smooth, as shown.

The tip-shells provided with the internal thread and a pierced front end for receiving the stem or tip, and also the stems of either variety shown, may be put up separately for the market, so that either stems or shells may be readily obtained for replacing such as are broken from time to time.

While I have shown other than the well-known spiral conducting-wire, I prefer the same to all others known to me because of its superior durability and its peculiar flexibility, and also because of the desirable co-operation of the convolutions thereof with the internal threads of my shell for obtaining a strong and reliable union of the cord and tip.

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

1. The combination, substantially as here-

inbefore described, of a flexible electric insulated conductor, an internally-threaded shell, and a stem or tip projecting through said shell, connected to the conductor, and compressed into close contact with the wire thereof by the screwing of the conductor into said shell, as set forth.

2. The combination of a flexible electric insulated conductor with an internally-threaded shell and a stem or tip provided with an enlarged stub at its inner end, which engages with the wire of the conductor and is compressed into close contact therewith by the screwing of the conductor into the shell, substantially as described.

3. The combination of an insulated spiral conducting-wire, an internally-threaded shell, and a stem or tip provided with a spiral stub for engaging internally with the wire between the convolutions thereof, substantially as described.

4. The stem or tip for flexible electric cords, provided with an enlarged flat spiraled stub at its inner end, substantially as described.

5. The cylindrical tip-shell internally threaded, open at its rear end and closed at its front end, with the exception of a central aperture for the reception of a tip or stem, substantially as described.

Signed by me this 21st day of November, A. D. 1881.

JAMES E. HAMILTON.

Witnesses:
E. T. RICE, Jr.,
MILLER C. EARL.