

(No Model.)

W. L. RICHARDS.

TERMINAL ATTACHMENT FOR FLEXIBLE CONDUCTORS.

No. 536,655.

Patented Apr. 2, 1895.

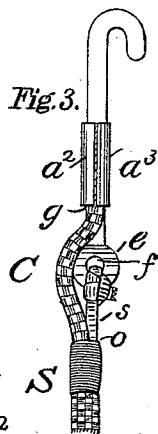
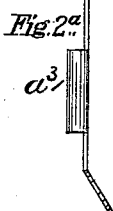
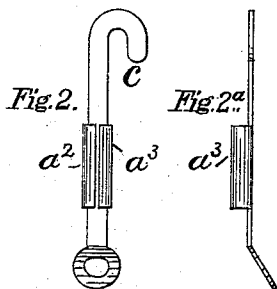
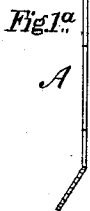
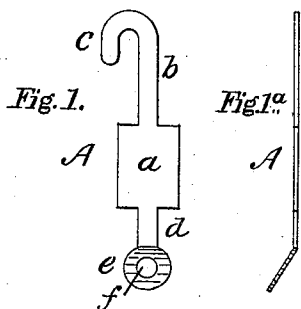


Fig. 4.

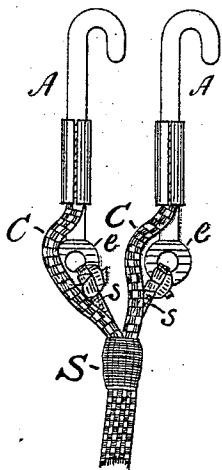


Fig. 5.

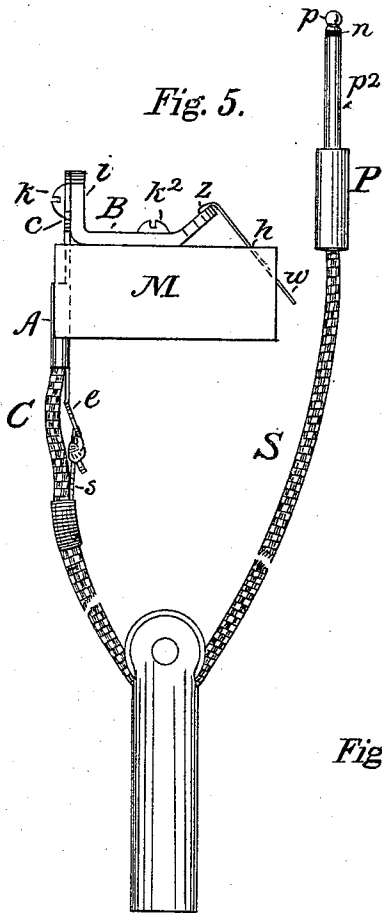


Fig. 7.

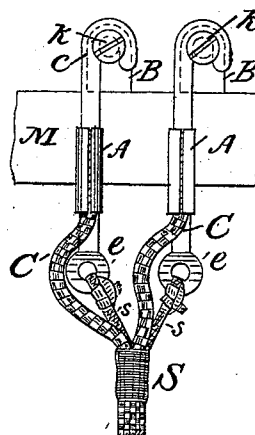


Fig. 8.

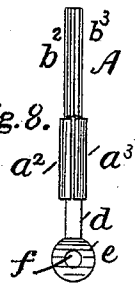
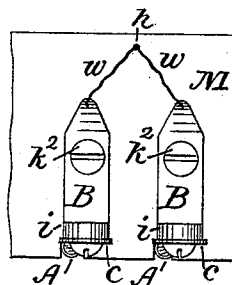


Fig. 6.



Attest.

Joseph A. Gately
S. W. Miller

Inventor.

Wilton L. Richards

UNITED STATES PATENT OFFICE.

WILTON L. RICHARDS, OF MALDEN, ASSIGNOR TO THE AMERICAN BELL
TELEPHONE COMPANY, OF BOSTON, MASSACHUSETTS.

TERMINAL ATTACHMENT FOR FLEXIBLE CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 536,655, dated April 2, 1895.

Application filed September 10, 1894. Serial No. 522,619. (No model.)

To all whom it may concern:

Be it known that I, WILTON L. RICHARDS, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Terminal Attachments for Flexible Conductors, of which the following is a specification.

This invention relates to flexible conductors and it consists in an improved terminal attachment and fastener for flexible switch cords whereby all strain is removed from the conductor, and whereby a reliable terminal is secured which can be easily attached to, or detached from, any desired fixed conductor, such as a metal bracket.

It consists also in a switch cord provided with such a terminal, and in the combination of the cord, its terminal, and the form of bracket to which preferably it is to be secured.

In the drawings which accompany this specification, Figures 1, 1^a, 2, and 2^a represent the successive formative steps in the manufacture of my improved switch cord terminal previous to its application to the flexible cord. Fig. 3 shows a single conductor fitted with the said terminal. Fig. 4 shows a double conductor cord, each of its conducting members being similarly provided. - Figs. 5 and 6 are side and plan views, and Fig. 7 is a front view of the cord, its terminal and attaching bracket, the full length of the said flexible conducting cord together with the switch plug with which its free end is provided being shown in Fig. 5.

In the manufacture of my switch cord terminal, I first form a blank of suitable sheet metal, shaped as in Figs. 1 and 1^a. I find that German silver, or a metal, or alloy having similar properties, is well adapted to this purpose and that the blank may be struck or stamped out. I have in practice employed sheet German silver having a thickness of .032 of an inch. As shown, the blank A has a rectangular middle part *a*, of full width, a narrow strip *b*, extending from one end and terminating in a curved or hooked portion *c*, and another and shorter strip extension, *d*, projecting from the opposite end, having a circular terminal, *e*, with a central hole, *f*, drilled through it. Fig. 1^a shows the circular terminal bent at its neck to an angle from the body of the blank.

Of course the blank A, and consequently the terminal attachment when completed, can be of any desired size. I have made them with a length from end to end, of one and five-eighths inches, and with proportions substantially as in the drawings, and have found such a size convenient.

Figs. 2 and 2^a, indicate the only additional step necessary to fit the blank for its connection with the switch cord. This is to bend over to the front the two side wings *a*² and *a*³ of the rectangular portion, *a*, and thus form an approximately cylindrical chamber into which the conductor of the flexible switch cord, usually formed of tinsel, is inserted. The wings *a*² and *a*³, and the perforated heel extension *e* are preferably bent over on opposite sides of the blank A.

The connection of a single conductor cord and its terminal attachment and fastening device is shown in Fig. 3, in which C is the independently insulated conductor of the switch cord S. The bared end, *g*, of the tinsel or other insulated conductor, C, is placed within the overlapping wings *a*² and *a*³ between which, if desired, it may be compressed; after which the connection so made between the said wings and the end, *g*, of the conductor, is soldered. The purpose of the perforated circular heel extension *e* is now evident. It is a familiar practice (first disclosed as I believe in Letters Patent No. 215,837, granted to Hilborne L. Roosevelt, May 27, 1879) to associate with a flexible insulated conductor a non-conducting strand or auxiliary suspension cord which is shorter than the corresponding conducting strand. This suspension cord is contained mainly within, and is secured to the external covering of protective fabric, and by fastening its loose and free end to a fixture any strain which may be brought to bear upon the flexible cord is assumed by the non-conducting strand, and thereby prevented from injuriously affecting the more fragile conducting strand, or strands. Such a non-conducting auxiliary strand, or cord is illustrated in Fig. 3, and indicated by *s*. It emerges from the braided external covering S at *o*, and is passed through the hole, *f*, in the circular extension *e*, and is there securely knotted, or otherwise secured,

and being shorter than the protruding conducting strand C, the strand C is by it relieved from all strain. The backward bend of the extension *e* enables the auxiliary strand to be kept out of the way, and free from a tendency to entanglement with the conducting strands. Although this construction aims at the same result of taking all strain from conducting parts, so far as I know, such result has never before been attained by securing the non-conducting suspending strand to the rigid terminal of the conducting strand; and to so secure it, is distinctly advantageous, as it dispenses with much of the work of connection and disconnection.

Fig. 4 shows a double conductor cord, S, each of its conducting members C being provided with the improved terminal or tip piece A, attached in the manner already sufficiently described.

Although it is not essential that each conductor A shall have an associate non-conducting strand, *s*, inasmuch as one such strand is sufficient to take the strain from both, I have shown an auxiliary strand *s* for each, and either arrangement may at will be adopted.

Referring now to Figs. 5, 6 and 7, it will be seen that for the purpose of uniting the flexible cord conductors S provided with my improved terminal to other portions of a circuit, I mount suitably formed metal brackets B, one for each conductor, on a baseboard or bar M and secure them thereto by screws *k*². The preferred form of these brackets is best shown in Fig. 5, and their front ends, *i*, are seen to present a plane vertical surface in which is a screw *k*. If desired, a washer or burr may be placed between the screw head and the bracket face. The bracket being fixed in position, the hook or bend, *c*, of the cord terminal is slipped over the shank of the screw, *k*, and beneath its head the opening of the bend, being preferably turned to the right so that the circular extension to which is secured the non-conducting strand shall point rearwardly, as shown, and the screw, *k*, is then tightened up, after which the connection is complete. A recess may be cut into the front of the base M for the reception of the terminal A. Both terminals of a double conductor cord are by preference attached in the same way, whereby the openings of the bend *c* are on the right side.

The continuation conductors, *w*, are soldered or otherwise attached to the brackets, as shown at *z*, and may be led through the holes, *h*, at the rear of the base block and therefrom to any desired point.

In Fig. 5 the most frequent arrangement of the outer end of the conducting cord S is shown, the said flexible conductor being provided with an automatic take up, and a terminal switch plug P, the tip *p* and sleeve *p*² of the shank of said plug being, in a manner well understood insulated from each other by a non-conducting ring or bushing *n*.

Prior to my invention, it was customary to

stiffen the conducting strands C of switch cords and their inclosed tinsel conductors with a winding or serving of fine brass wire, and in attaching them to the continuation conductors *w*, to pass them through a hole placed in the front of the bracket B at a position now occupied by the screw, *k*, and then to fasten them by a screw at the rear of said bracket. When this attachment as was usual, was made at the rear side of a large switch-board, it was necessarily difficult of access, and difficult in manipulation; and consequently involved a liability to imperfect work; whereas by my invention, all changeable attachments are perfectly accessible and easy to handle, either in making connections or disconnections; and afford no excuse for faulty construction.

Fig. 7 shows my cord terminal attachment adapted for use as an ordinary tag for insertion in a binding screw, say of an electro magnetic instrument. In order that it may be so adapted, either one of two processes may be adopted. If desired, sheet metal slightly thicker than that stated herein to be preferred, may be used, the curved or bent end *c* is omitted, and the shank *b* would be made sufficiently narrower to give it a square cross section, the width then being equal to the thickness. I prefer however to strike out the blank exactly as described herein, except that the curved end *c* is omitted, and then to compress the shank or stem *b* until as indicated in Fig. 7 its two edges *b*² *b*³ are folded over together, forming a stiff and substantially homogeneous tag.

I claim as my invention—

1. The hereinbefore described terminal attachment for switch cords, formed from sheet metal, and consisting of a strip having one end constructed to engage a binding screw; the other end provided with a perforated extension forming a suspension fastener for a non-conducting cord suspending strand; and fitted at its central part with wing pieces adapted to overlap and grasp the conducting member of the said switch cord, and to form a permanent electrical connection therewith.

2. The combination with a flexible conducting switch cord; of an improved terminal attachment and fastener therefor, consisting of a sheet metal strip having its central part provided with wing pieces adapted to fold over and compress the bared end of the conductor of said cord; a hook formed fastener at its outer end adapted for ready attachment to, or detachment from a binding screw; and a perforated extension at its inner end adapted for attachment to the non-conducting covering of the switch cord, or a strand thereof, and to serve as a support therefor, relieving thereby the conductor from strain; substantially as specified.

3. The combination substantially as hereinbefore described, of a switch cord provided at its stationary end with a conducting strand adapted for connection with a continuation

conductor, and an auxiliary non-conducting suspension strand; a terminal attachment and fastener therefor, described herein, having central clamp attachments for the end of said
5 conducting strand, a perforated heel extension for attachment to the said non-conducting suspension strand, and a hook shaped end for attachment to a binding screw; and
10 a fixed conducting bracket constituting the terminal of said continuation conductor, and formed as described with a vertical face and a binding screw mounted therein, to form an electrical connection with the said hook shaped attachment.

15 4. The combination with a flexible switch cord having conducting and non-conducting

terminal strands; of a rigid terminal attachment therefor, combining in itself a fastening device for the said conducting strand, and a suspension support for the said non-conducting or auxiliary strand, relieving the electrical conductor from all strain; substantially
20 as specified.

In testimony whereof I have signed my name to this specification, in the presence of
25 two subscribing witnesses, this 1st day of September, 1894.

WILTON L. RICHARDS.

Witnesses:

GEO. WILLIS PIERCE,
JOSEPH A. GATELY.