

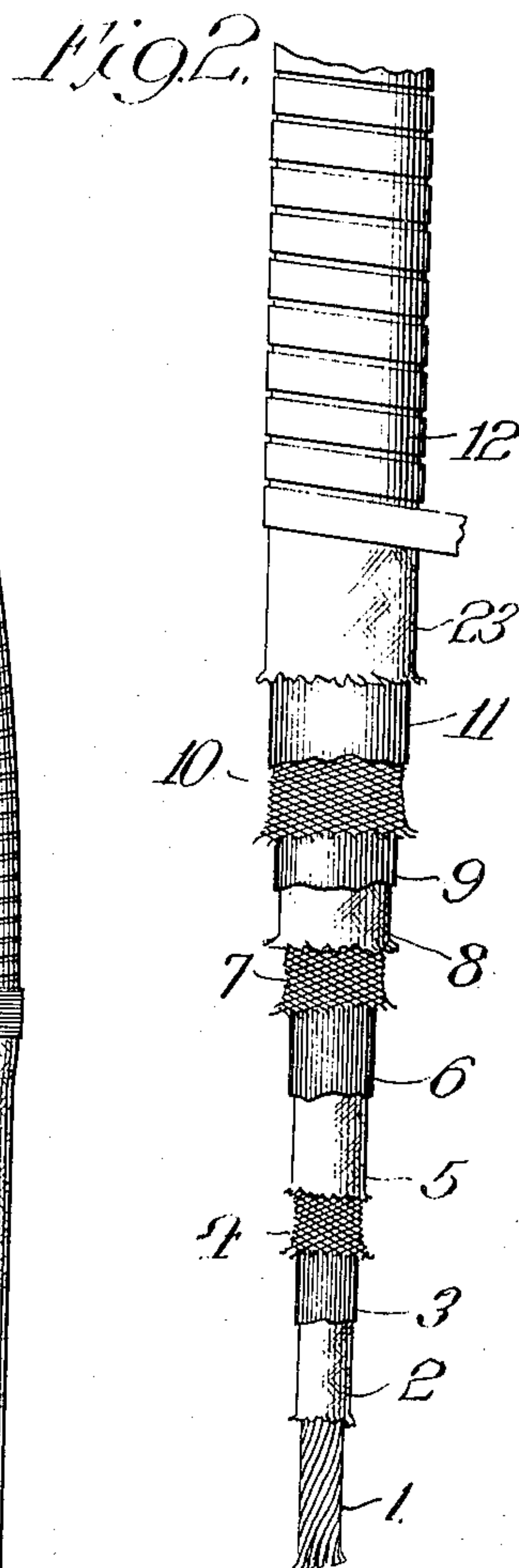
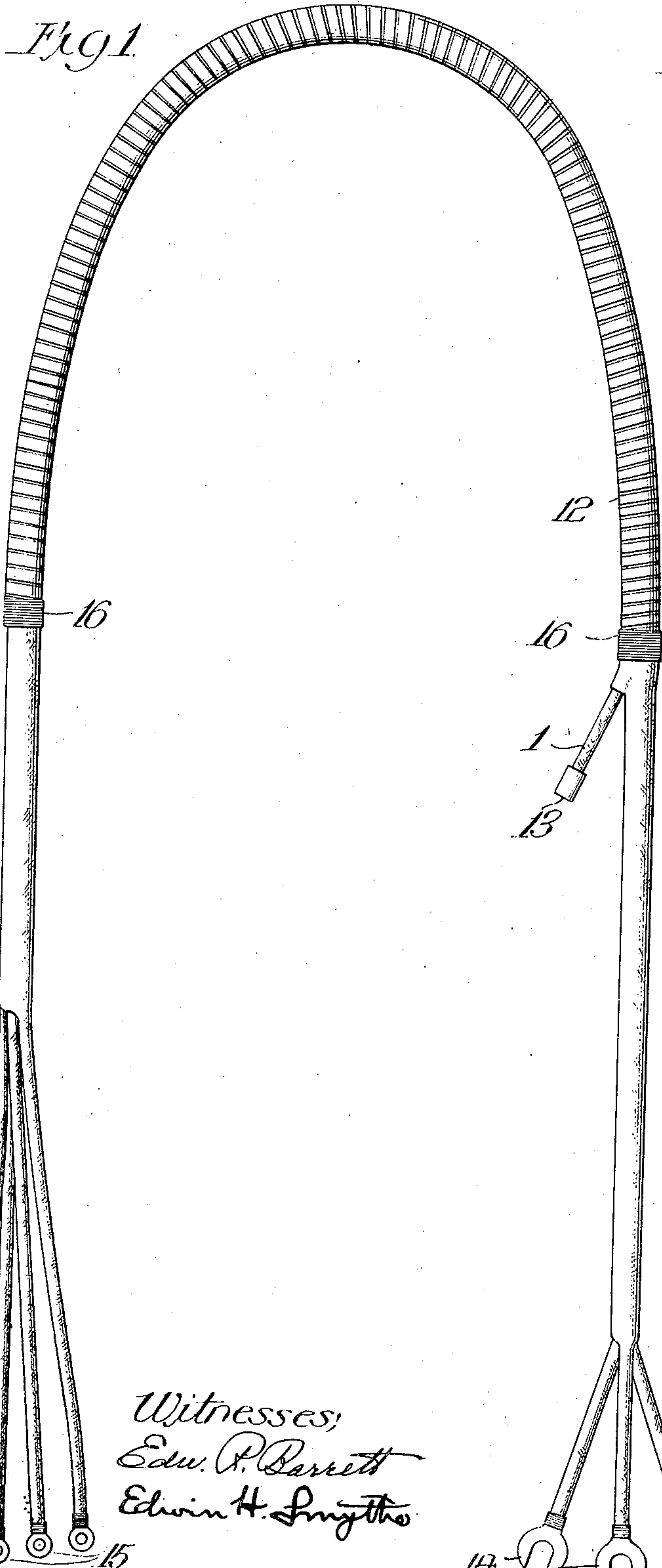
No. 896,700.

PATENTED AUG. 25, 1908.

G. F. ATWOOD.
ELECTRICAL CONDUCTING CORD.

APPLICATION FILED JAN. 22, 1906.

2 SHEETS—SHEET 1.



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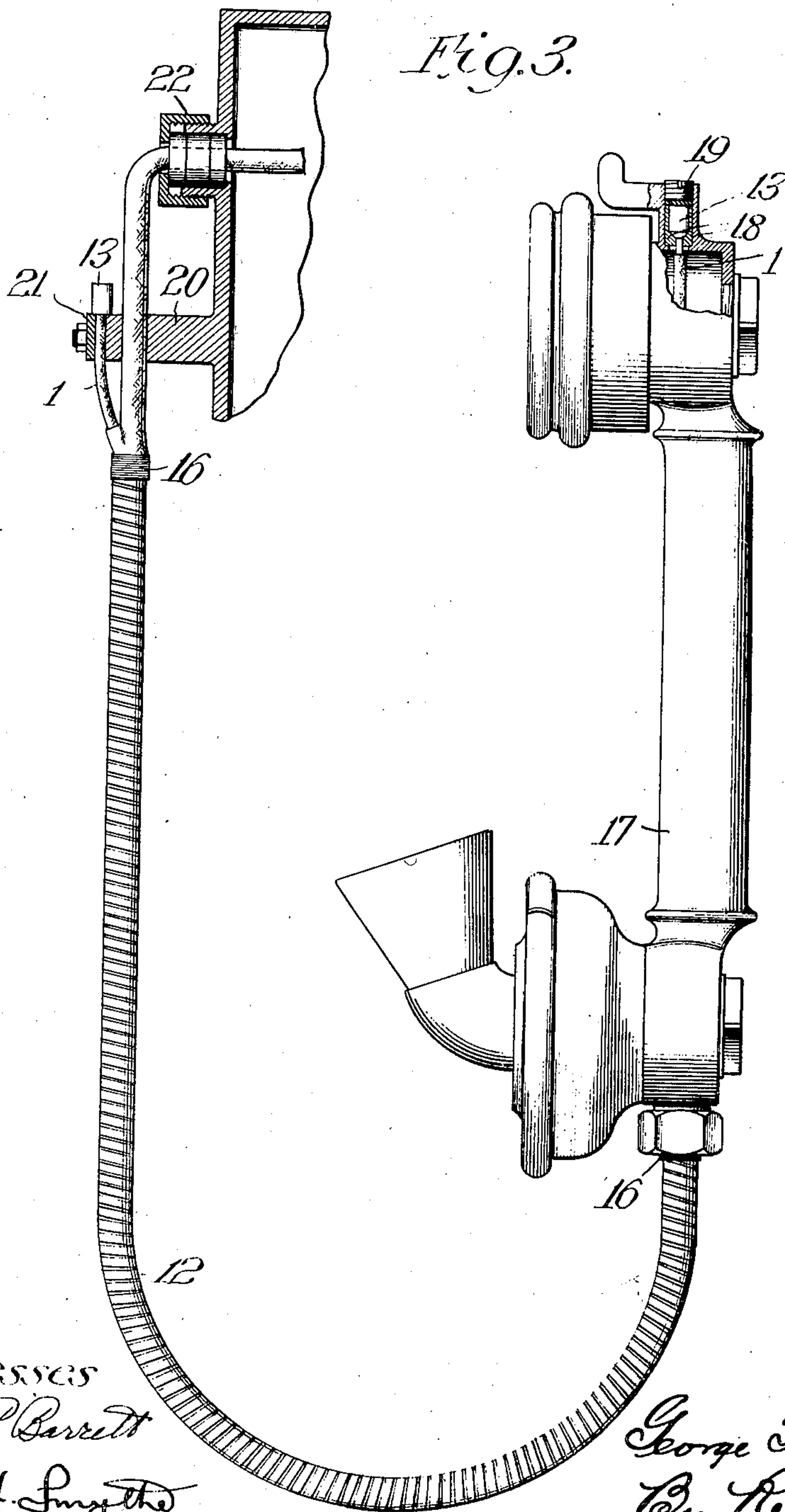
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Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE F. ATWOOD, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTRICAL CONDUCTING-CORD.

No. 896,700.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed January 22, 1906. Serial No. 297,214.

To all whom it may concern:

Be it known that I, GEORGE F. ATWOOD, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electrical Conducting-Cords, of which the following is a specification.

My invention relates to a conducting cord, and more particularly to a cord adapted to furnish connection between the hand telephone, or combined telephone and transmitter, of a telephone set and its associated apparatus.

My principal object is to provide a conducting cord adapted not only to furnish electrical connection between the hand set and its associated apparatus, but also such ample mechanical connection with a suitable point of support, as will enable it to support the user in case he should be thrown from his feet while using the telephone, and should retain his hold upon the hand set. This result I accomplish, generally speaking, by associating with the insulated conducting strands of the cord, a flexible supporting strand of high tensile strength, which, by taking any longitudinal strain to which the cord may be subjected, serves not only to relieve the conducting strands and prevent their rupture, but also serves to secure the hand set firmly to its point of support, and thus to support and safe-guard the user. I also employ other novel features in my improved cord, by means of which it is strengthened and rendered particularly capable of performing the service for which it is designed. Such a cord is particularly useful in connection with telephone installations on battle-ships, wherein it is necessary to use the telephone during storms and in battle, at which times it is of the greatest importance not only that the telephone cord shall be prevented from breaking and thus interrupting telephonic communication, but also that the user shall be afforded every possible protection while in the discharge of his duty.

In the accompanying drawings, Figure 1 illustrates a cord embodying my invention; Fig. 2 shows this cord partially in section to illustrate its construction; and Fig. 3 illustrates the completed cord extending between a hand set and its associated appa-

ratus, to show the manner in which the cord is preferably used.

In the embodiment of my invention illustrated in the drawings, the supporting strand of the cord is in the form of a flexible core 1, preferably of wire, the material which I have found it convenient to employ being, in the present instance, steel wire rope of approximately $\frac{3}{32}$ of an inch in diameter. The material and dimensions of the core may, of course, be varied as desired to meet the various requirements of use. This core is provided with an insulating covering 2, preferably of closely braided silk, upon which is laid an insulating and water-proof covering 3 consisting, in the present instance, of a thin layer of vulcanized soft rubber, and upon this a conducting strand 4, consisting of a loosely braided tube of soft copper wires, which may be tinned to prevent oxidation. This conducting tube or strand 4 is covered by a serving 5 of silk closely braided upon it, over this another layer of soft rubber 6 is laid, and, upon the rubber, another loosely braided conducting tube or strand of thin soft copper wires 7. In the present instance, another series of successive layers of braided silk 8, soft rubber 9, and braided copper wires 10, is added to constitute a three-conductor cord, and the cord is finished by a final layer of soft rubber 11, and a strong braid 23 preferably of heavy linen over the whole. In order to afford still further protection to the cord, it is surrounded by a metallic armor in the form of a slightly open helix 12, formed of a ribbon of steel or other tough and elastic metal.

It will be understood that as few or as many series of successive layers of insulating material and conducting material as desired may be laid upon the supporting core 1, to constitute a cord having the required number of conducting strands. Likewise, the cord may be made of any desired length. The cord may be terminated and adapted for connection with the apparatus with which it is to be associated in any desired manner. In the present instance the four strands of the cord are brought out independently at both ends, the supporting strand 1 being provided with tubular connecting tips 13 within which the ends of the strand are firmly secured by soldering, and the conducting strands being fitted with terminal punchings 14 at one end

and 15 at the other, by means of which they may be put in electrical connection with the telephone apparatus. The insulating serving which lies between each strand and its neighbor in the body of the cord is preferably continued about the strand where it is brought out independently, to serve as an individual insulating covering therefor. The layers of soft rubber 3, 6 and 9 are preferably terminated at the point where the various strands of the cord diverge. The metallic armor 12 is preferably terminated at a point slightly back of the point where the cord strands separate, and its end held in place by a wrapping 16 of stout thread. To distinguish the strands of the cord from each other and identify them at the two ends, the braided insulating coverings are given distinctive colors in accordance with the usual practice.

In Fig. 3 I have illustrated the cord of my invention associated with certain telephone apparatus with which it is particularly adapted to be used. This apparatus, however, forms no part of my present invention, and is covered in another application, Serial No. 305,551, filed March 12, 1906. As shown, one end of the cord passes into an opening at one end of the hollow stem or handle of the combined receiver and transmitter 17, within which the conducting strands 4, 7 and 10 are connected to appropriate terminals of the instrument by means of the connecting tips 15, while the supporting strand 1 passes through the hollow handle and into a tubular opening at the other end, within which its terminal tip or lug 13 is held by means of two semi-cylindrical jaws embracing the tip and resting upon a flange at the bottom of the tubular opening. The tubular opening may be closed by a screw 19, having a rubber washer interposed between it and the head of the tip. The other end of the cord is joined, in the present instance, to the stationary portion of the telephone set, which is firmly secured to a suitable support, and a portion only of which is shown. The telephone set has a portion 20 of its metallic case provided with a clamping plate 21, beneath which the end of the supporting strand 1 is firmly held. The conducting strands may pass loosely through an opening in the projecting portion 20, and into the case through a stuffing box 22, where they are connected to the terminals of the apparatus mounted therein.

If in the use of the telephone, the user should accidentally be thrown from his feet, by retaining his grasp on the telephone instrument he may support himself, the central strand or core being made strong enough to withstand any such stresses to which the cord may be subjected. Moreover, the fact that the central strand is of high tensile strength, and incapable of any material extension resulting from stresses to which it is likely to be subjected, while the conducting

strands are loosely arranged, and therefore susceptible of considerable extension without rupturing them or impairing their efficiency as conductors, leads to the result that a cord constructed in accordance with my invention is less liable to injury and is capable of operating efficiently under more adverse conditions than conducting cords as heretofore constructed. The metallic sheath or armor with which the cord is provided also protects it against injury such as would result from a crushing strain, and the formation of this sheath or armor as a loose helix enables it to furnish such protection without interfering with the flexibility of the cord.

It will be understood that my invention may be embodied in cords varying from the particular form which I have chosen for the purposes of illustration and description; for instance, while desirable, it is not essential that the conducting strands be placed about the supporting core in the form of braided tubes of wire, as it would be practicable to dispose them in the form of concentric helices of suitable metallic ribbon, or in the form of separately insulated strands independently disposed about the central core, or in any other suitable manner.

I claim:

1. A telephone cord, comprising a flexible core of metal of high tensile strength provided with terminal lugs at both ends, and a plurality of insulated conductors disposed concentrically about said core, each of said insulated conductors being provided with terminal connectors at both ends.

2. A telephone cord, comprising a flexible strand of high tensile strength secured at one end to a support, and at the other end to a telephone instrument, and a conducting strand connected at one end with said telephone instrument, and associated with said first mentioned strand to constitute the cord.

3. A telephone cord, comprising a flexible strand of metal of high tensile strength secured at one end to a support, and at the other end to a telephone instrument, and a plurality of conducting strands associated with said first mentioned strand to form the telephone cord, said conducting strands being connected at one end to the telephone instrument.

4. In a telephone cord, the combination with a flexible metallic core of high tensile strength secured at one end to a support, and at the other end to a telephone instrument, of a plurality of conductors consisting of braided wire tubes surrounding said core, and insulated from it and from each other, said conductors being electrically connected at one end to the telephone instrument, and a flexible metallic armor surrounding said conductors and their associated central strand.

5. A telephone cord comprising a flexible steel wire core of high tensile strength adapt-

ed to be secured at one end to a support and at the other end secured to a telephone instrument, a plurality of conductors consisting of loosely braided wire tubes surrounding said core at different distances therefrom and insulated from it and from each other, said conductors being electrically connected at one end to the telephone instrument, and an armor consisting of a slightly open helix of metal ribbon surrounding the whole.

6. A telephone cord, comprising a core of wire rope of high tensile strength secured at one end to a support and at the other end mechanically secured to a telephone instrument, and an insulated conducting strand in the form of a flexible tube arranged concentrically about the core and electrically connected with the telephone instrument.

7. A telephone cord, comprising a core of wire rope of high tensile strength secured at one end to a support and at the other end

mechanically secured to a telephone instrument, and an insulated conducting strand consisting of a flexible braided wire tube arranged concentrically about the core and electrically connected with the telephone instrument.

8. A telephone cord, comprising a core of wire rope of high tensile strength secured at one end to a support and at the other end mechanically secured to a telephone instrument, and a plurality of conductors in the form of concentric flexible braided layers of wire, surrounding said core, said conductors being insulated from the tube and from each other and being electrically connected at one end to the telephone instrument.

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