

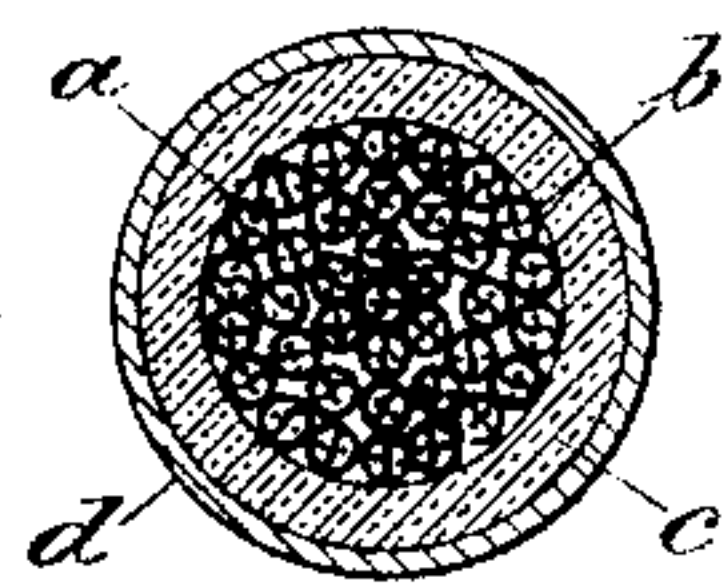
(No Model.)

M. GUILLEAUME.  
ELECTRIC CABLE.

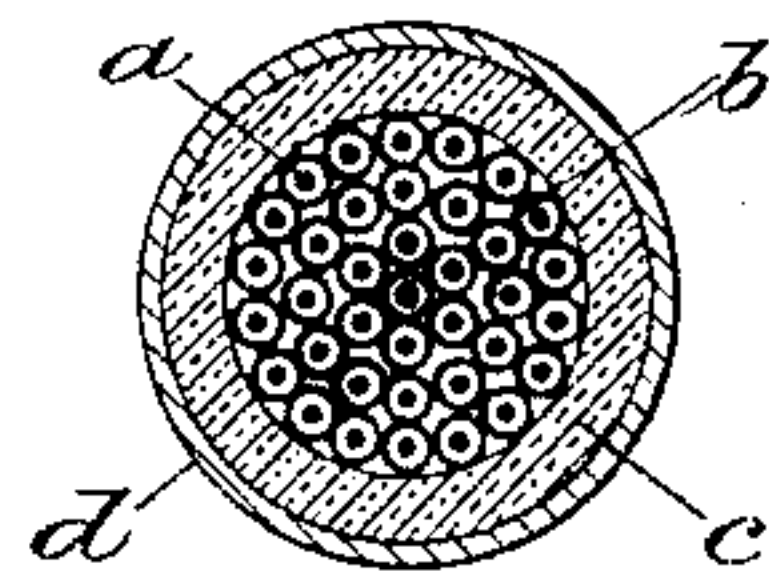
No. 581,715.

Patented May 4, 1897.

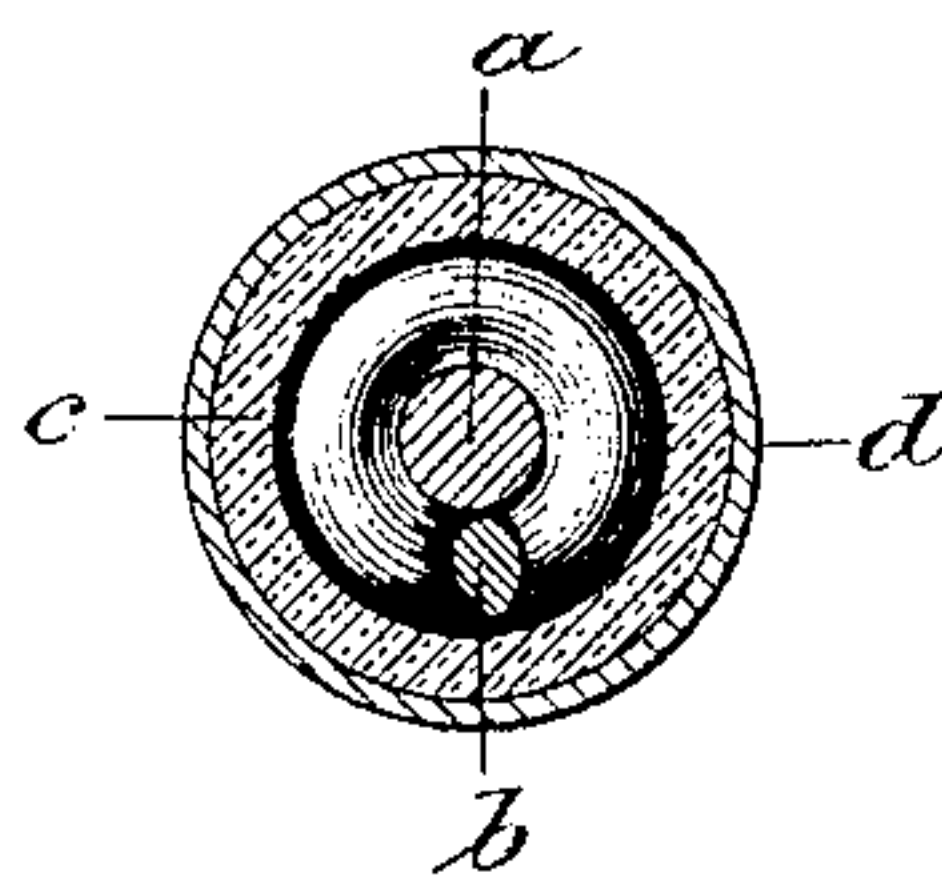
*Fig. 1.*



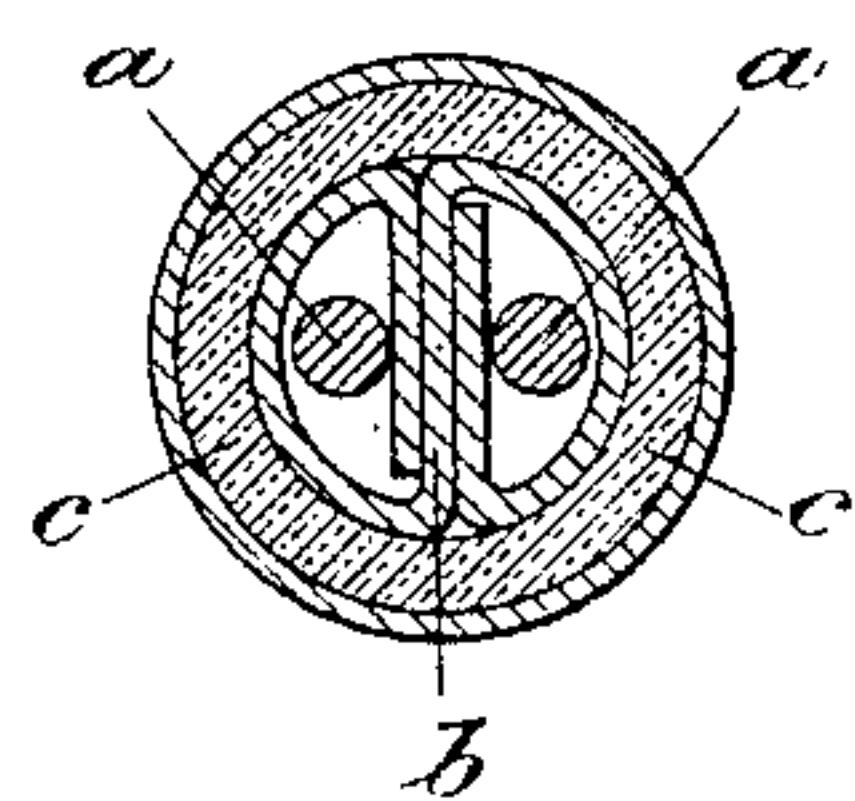
*Fig. 2.*



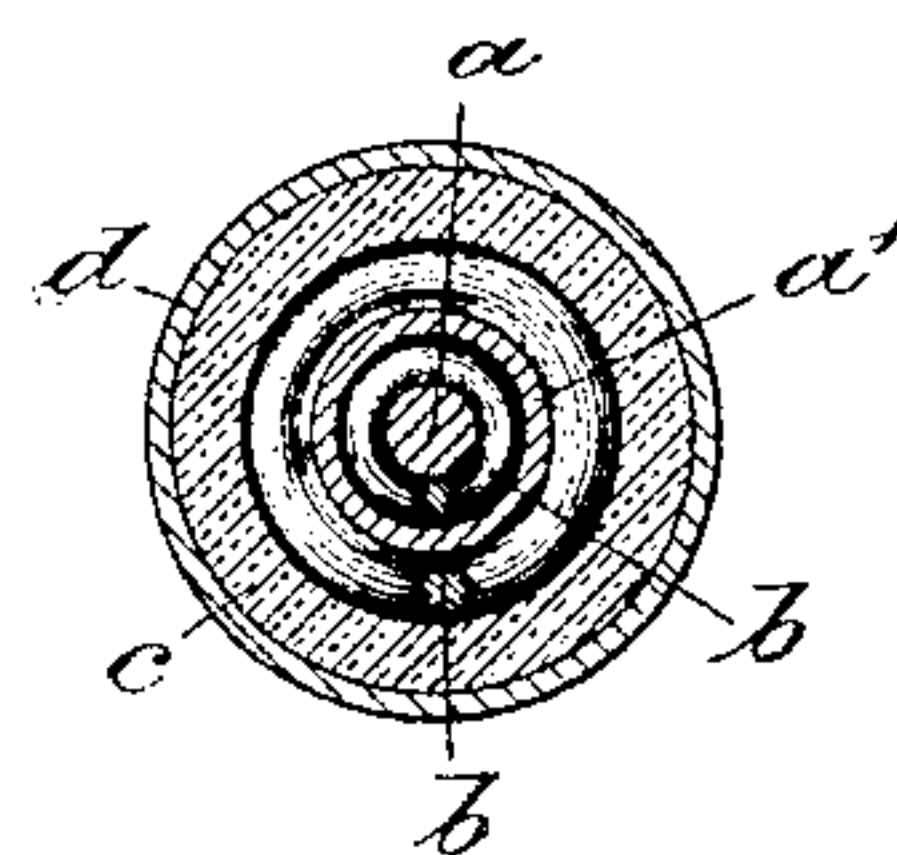
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



*Witnesses.*

*Thos. P. Clann.*  
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*Max Guillaume*  
*per H. M. Hardingham.*  
*Attorney.*

# UNITED STATES PATENT OFFICE.

MAX GUILLEAUME, OF MÜLHEIM-ON-THE-RHINE, GERMANY.

## ELECTRIC CABLE.

SPECIFICATION forming part of Letters Patent No. 581,715, dated May 4, 1897.

Application filed October 18, 1895. Serial No. 566,101. (No model.) Patented in Switzerland June 27, 1895, No. 10,761; in France July 8, 1895, No. 248,750; in Belgium August 19, 1895, No. 117,043; in England August 20, 1895, No. 15,703; in Norway September 4, 1895, No. 4,754; in Hungary September 5, 1895, No. 3,581; in Italy October 8, 1895, LXXVII, 492; in Spain October 30, 1895, No. 17,870, and in Austria December 2, 1895, No. 45/4,617.

*To all whom it may concern:*

Be it known that I, MAX GUILLEAUME, a subject of the German Emperor, residing at Mülheim-on-the-Rhine, in the German Empire, have invented new and useful Improvements in Electric Cables, (in respect whereof I have caused a patent to be obtained in Great Britain, dated August 20, 1895, No. 15,703; in Belgium, dated August 19, 1895, No. 117,043; in Switzerland, dated June 27, 1895, No. 10,761; in Austria, dated December 2, 1895, No. 45/4,617; in Hungary, dated September 5, 1895, No. 3,581; in France, dated July 8, 1895, No. 248,750; in Spain, dated October 30, 1895, No. 17,870; in Italy, dated October 8, 1895, No. 77/492, and in Norway, dated September 4, 1895, No. 4,754,) of which the following is a specification.

This invention relates to electric cables principally intended for aerial use, same comprising one or more insulated conductors embedded in a mass or inclosed within a covering of india-rubber, india-rubber compound, gutta-percha, or the like, such covering serving to protect the insulated conductor or conductors from the effects of moisture and to take the place of the heavy lead sheathing which is usually employed for this purpose.

In the accompanying drawings, which illustrate in transverse section several examples of electric cables constructed in accordance with this invention, Figure 1 represents an "air-space" cable for use in telephonic and telegraphic transmission in which the conductors are disposed in pairs, each pair being inclosed within a bipart tube of non-conducting material, (such, for instance, as paper.) The cable represented in Fig. 2 is of a similar kind, except that the several conductors are separately inclosed within tubular coverings of insulating material. Figs. 3, 4, and 5 represent cables adapted for conveying heavy currents, Fig. 3 showing a cable with a single insulated conductor maintained in position by means of a spiral winding of cord with intervening air-spaces; Fig. 4, a cable with two insulated conductors arranged side by side and maintained in position by means of an S-shaped strip of non-conducting material;

and Fig. 5, a cable with two insulated conductors arranged concentrically, each having a spiral winding of cord about it.

Referring to Figs. 1 and 2, in constructing according to this invention a cable for telephonic or telegraphic purposes a number of electric conductors *a a*, inclosed within bipart or other tubes of insulating material *b*, are served with a pressing *c*, of india-rubber or the like, which, owing to its soft state, is capable of being applied to insulated conductors of the kind referred to without crushing the air-spaces. A braiding, weaving, or other protective outer covering *d*, of hemp, jute, thin wire, or the like, may, when necessary, be added. In Fig. 1 each bipart tube *b*, inclosing a pair of conductors *a a*, is twisted, while in Fig. 2 two or more of the conductors *a*, with their tubular envelops *b*, of insulating material, are twisted together, or the whole group may be twisted before being served with the pressing of india-rubber or the like.

In constructing cables for conveying heavy currents the conductor may consist of a single wire *a*, Fig. 3, or there may be two or more conducting-wires *a a*, Fig. 4, or two conductors *a a'* may be arranged concentrically and insulated the one from the other by non-conducting material *b*, Fig. 5, the insulated conductor or conductors being in each instance surrounded by a pressing *c*, of india-rubber or like material, capable of being applied in a soft state about a delicate body, such as an air-space formed by a paper tube.

The non-conducting material shown, for example, in Figs. 3 and 5 consists of a spiral winding of cord *b* with intervening air-spaces, the winding being inclosed in a paper tube or envelop, whereon is applied the soft pressing, the conductors in Fig. 4 being each confined in an air-space formed by inclosing them in an S-shaped tube *b* of non-conducting material, (such as paper.)

A protective outer covering or braiding *d* may be added.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An electric cable comprising conductors



each inclosed within an insulating-envelop, the material of which is, so far as possible, out of contact with, and is unsupported by, the conductor, the said envelops being inclosed  
5 within a soft "pressing" of rubber or similar protective material, applied in a plastic state and without crushing the envelops upon the conductors, substantially as set forth.

2. In an electric cable, the combination  
10 with the conductors *a*, each inclosed within an insulating-envelop *b*, which is, so far as possible, out of contact with, and unsupported by, the conductor, whereby an air-space is

maintained between the conductor and the surrounding insulating material, of a soft 15 pressing *c* of india-rubber or similar protective material, applied in a plastic state without crushing the envelops upon the conductors, and an outer protective covering *d*, of hemp, jute, thin wire or the like, substan- 20 tially as specified.

MAX GUILLEAUME.

Witnesses:

WILLIAM H. MADDEN,  
MARIA NAGEL.