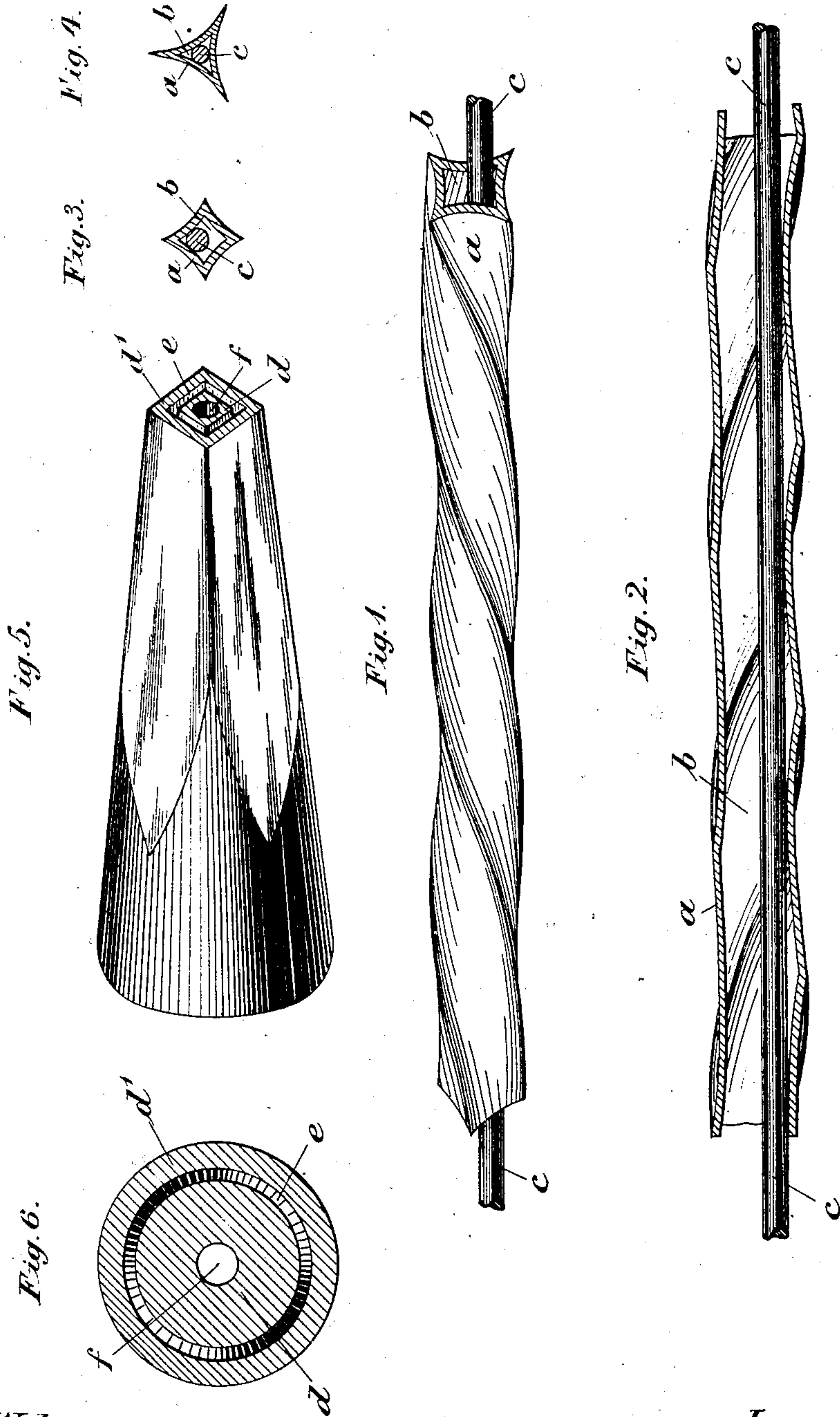


(No Model.)

T. GUILLEAUME.  
MEANS FOR INSULATING ELECTRIC CONDUCTORS.

No. 563,273.

Patented July 7, 1896.



Witnesses.  
Georg Müller  
Ernst Harnsey

Inventor.  
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# UNITED STATES PATENT OFFICE.

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

## MEANS FOR INSULATING ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 563,273, dated July 7, 1896.

Application filed March 19, 1895. Serial No. 542,376. (No model.) Patented in Belgium January 31, 1895, No. 113,902; in France February 1, 1895, No. 244,792; in England February 4, 1895, No. 2,430; in Hungary February 21, 1895, No. 2,202; in Austria May 25, 1895, No. 45/1,848; in India August 22, 1895, No. 271; in New South Wales September 7, 1895, No. 6,043; in New Zealand September 14, 1895, No. 7,893, and in Canada November 15, 1895, No. 50,602.

*To all whom it may concern:*

Be it known that I, THEODORE GUILLEAUME, a subject of the German Emperor, residing at Mülheim-on-the-Rhine, in the German Empire, have invented new and useful Improved Means for Insulating Electric Conductors, (in respect whereof I have by my agent obtained Letters Patent in Great Britain, dated February 4, 1895, No. 2,430; in France, dated February 1, 1895, No. 244,792; in Belgium, dated January 31, 1895, No. 113,902; in Austria, dated May 25, 1895, No. 45/1,848; in Hungary, dated February 21, 1895, No. 2,202; in British India, dated August 22, 1895, No. 271; in New South Wales, dated September 7, 1895, No. 6,043; in Canada, dated November 15, 1895, No. 50,602; in New Zealand, dated September 14, 1895, No. 7,893, and in respect whereof I have applied for but not yet obtained a patent in Germany to bear date January 21, 1895,) of which the following is a specification.

This invention relates to the insulation of electric conductors on the "air-space" system; and it consists in improved means for forming the air-space about the conductor and for preserving the same against crushing. According to the usual practice, the air-space inclosing the conductor is circular in cross-section and readily yields to external pressure. Moreover, the conductor is, throughout its whole length, in contact with the material forming the walls of the air-space, the insulation being thereby prejudicially affected.

In the accompanying drawings, Figure 1 is an elevation of an electric conductor insulated according to the improved method, Fig. 2 being a longitudinal section. Figs. 3 and 4 are transverse sections of conductors respectively inclosed in quadrangular and triangular air-space insulating-tubes. Fig. 5 is a perspective view of a die or folding instrument adapted for use in the production of the said tubes, Fig. 6 being a face view of the entering end thereof.

According to the improved method of construction, the subject of the present invention, the tube *a*, inclosing the air-space *b* and

conductor *c*, is triangular, quadrangular, or polygonal in cross-section, and is twisted longitudinally, Figs. 1 and 2. Owing to the angular form of the tube *a* it offers considerably greater resistance to external pressure than is presented by a cylindrical tube, and owing to the conductor *c* following a course parallel with the axis of the said tube, and only touching the sides of the spiral air-chamber at intervals, the insulation by air exclusively is more nearly accomplished. The conductor, moreover, in taking a straight course, is shorter, and therefore less costly, than in a case where the conductor follows the convolutions of the air-inclosing tube.

In the production of a twisted triangular, quadrangular, or polygonal tube for air-space insulation and in applying the same about an electric conductor a die or folding instrument of the character illustrated in Figs. 5 and 6 is employed. This instrument consists of two parts *d d'*, which resemble one another in form, the part *d* being arranged within the part *d'*. Between these two parts is a passage *e*, through which the insulating material for forming the twisted tube *a* passes. This passage *e* is or may be annular at the entering end, Fig. 6, and gradually changes as it approaches the exit end to a triangular, quadrangular, or polygonal form, according to the shape of the air-inclosing tube to be produced. Through the center of the inner part there is formed an avenue *f* for the passage of the conductor *c*. While the material for forming the air-inclosing tube *a* traverses the passage *e* between the two parts *d d'* of the folder or former, the instrument is rotated, the conductor *c* meanwhile traversing the central passage *f*. The conductor thus issues inclosed within a twisted tube of an angular character, which tube may then be taped and provided with an outer sheathing, or several conductors so insulated may be assembled in a cable.

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

1. An electric conductor insulated on the air-space system substantially as herein described, and consisting of a naked conduc-



tor inclosed in a twisted angular tube of non-conducting material, the latter having spiral prominences and intervening spiral air-spaces, the result of angularity of section and  
5 of twisting, the points of the spiral prominences being alone in contact with and supporting the conductor.

2. The combination, with a naked electric conductor *c*, of a tubular envelop *b* of non-  
10 conducting material, angular in cross-section and twisted, so as to present in its internal surface spiral prominences with which the conductor is alone in contact, substantially  
as set forth.

15 3. For use in the production of air-insulated

electric conductors of the kind herein referred to, a folding or forming instrument, constructed substantially as herein described, and comprising two parts arranged the one  
20 within the other and having between them a space or passage which gradually contracts in diameter and changes from an annular form at the entering end to an angular form  
at the exit end, the inner part being moreover  
25 provided with a central opening for the passage of the conductor.

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Witnesses:

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