

(No Model.)

S. Z. DE FERRANTI.
JOINT FOR ELECTRIC MAINS.

No. 409,183.

Patented Aug. 20, 1889.

Fig. 1.

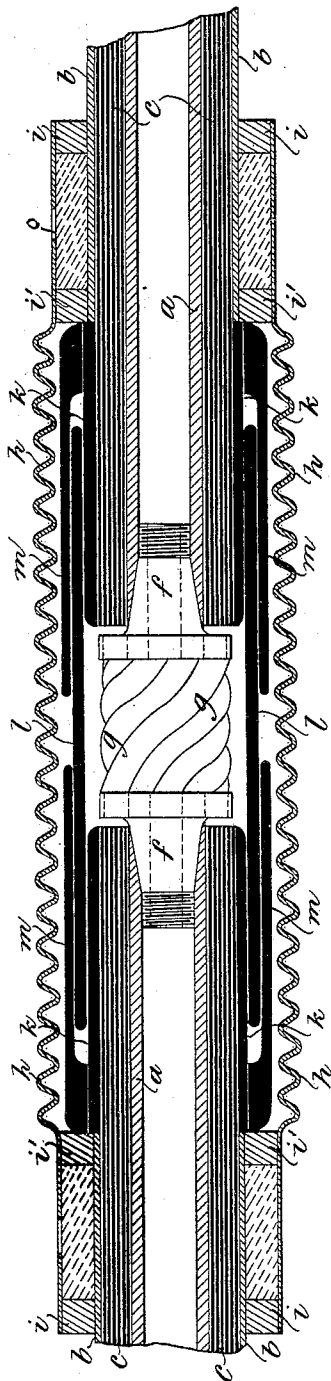


Fig. 3.

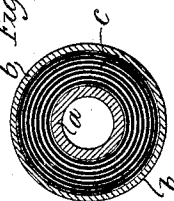
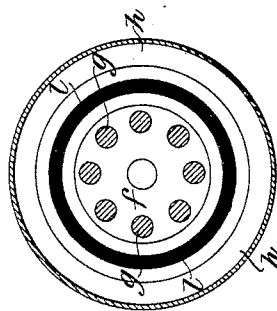


Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

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JOINT FOR ELECTRIC MAINS.

SPECIFICATION forming part of Letters Patent No. 409,183, dated August 20, 1889.

Application filed March 30, 1889. Serial No. 305,441. (No model.)

To all whom it may concern:

Be it known that I, SEBASTIAN ZIANI DE FERRANTI, electrician, a subject of the Queen of Great Britain, residing at 120 Fellows Road, Hampstead, in the county of Middlesex, England, have invented certain new and useful Improvements in Joints for Electric Mains, of which the following is a specification.

The object of this invention is to provide a flexible expansion-joint for coupling together lengths of electrical conductors composed of two concentric tubes separated from one another by insulating material.

I make the joint in the following manner: I insert into the ends of the inner conductors copper cones, which are connected by flexible conducting-strands, and I connect the outer conductors by a metallic tube corrugated transversely. To prevent an arc being formed between the coupling which unites the inner conductors and the corrugated tube which unites the outer conductors, a tubular telescopic or expansible screen is interposed between them.

The drawings annexed show a joint formed according to my invention.

Figure 1 is a longitudinal section, and Fig. 2 a transverse section, of the joint. Fig. 3 is a section through one of the lengths of the concentric tubular conductors which the joint connects.

a is the inner tubular conductor, of copper. *b* is the outer tubular conductor, preferably of the same metal. *c* is the insulating material between the two.

f f are hollow cones or plugs of copper screwed into the conductors *a a*, and *g g* are flexible wire strands soldered to them.

h is a copper tube the central portion of which is corrugated transversely, as shown. *i i'* are rings fitting into its plain ends and fitting over the outer tubular conductor *b*. These rings inclose between them a cavity for white-metal to be poured into. When white-metal is poured in, the tubes *b* and *h* and the rings *i* and *i'* become soldered together.

The outer tube *b* of the portion of the concentric tubular conductor which projects beyond the ring *i'* is cut away and a tube *k*, of vulcanite or like insulating material, put in

its place. This tube is made to closely embrace the insulating material *c*.

l is a tube of vulcanite fitting loosely over the tubes *k*, and *m m* are outer tubes of vulcanite, thickened at one end, and made to fit upon the tubes *k*, where these also are slightly thickened. India-rubber varnish may be filled into the space between the tubes *k* and *m*.

To make one of the joints, the outer tubular conductor *b* is first cut away for a distance from the end of each of the lengths which are to be joined. The metal rings *i i'* are slipped onto the outer conductors, and the vulcanite tubes *k* are fixed in place. The vulcanite tubes *m* are slipped onto the outer metallic tubes *b* of the two lengths, and also the vulcanite tube *l* onto one of the lengths. The corrugated tube *h* is also slipped over the end of one of the lengths. The cones of copper are now screwed into the ends of the inner conductors, which have previously been prepared to receive them. These cones have flanges extending around their outer ends, and in these are holes for the ends of the copper strands *g* to be passed into. When the ends of the strands have been inserted into the holes, they are fixed therein by solder. The vulcanite tubes *m* and *l* are now slipped into their proper places, the joints between the vulcanite tubes *m* and *k* being made tight by india-rubber cement. The rings *i i'* and the corrugated tube *h* are now slipped into their proper places. When this has been done, white-metal or solder is poured into the spaces between the rings *i i'* through holes *o*, formed for the purpose through the tube *h*. The parts with which the molten metal comes into contact having been all previously tinned, these parts become securely soldered together, and the joint is complete.

What I claim is—

1. The combination of the inner conductors *a*, coupled by cones or plugs *f*, and flexible conducting-strands *g*, the outer concentric conductors *b*, coupled by an extensible tube *h*, and the insulating-screens *k l m*, interposed between the extensible tube and the cones *f* and strands *g*.

2. The combination, with two electric conductors end to end and connected by a flexi-

ble connection, as *g*, of the surrounding telescoping insulators.

3. The combination, with two electric conductors connected end to end, of the surrounding telescoping insulators and the corrugated metal tube surrounding the insulators, substantially as set forth.

4. A flexible or expansion joint for electric conductors formed of a metal tube corrugated transversely and secured at one end to the end of one length of conductor and at the other end to the next length.

5. A joint connecting the end of two lengths of an electrical conductor composed of two rings *i i'*, surrounding each length near its end at a distance apart from one another, a

metallic tube, as *h*, surrounding the rings on both lengths, and fusible metal filling the spaces on each length between the two rings and between the conductor and metallic tube. 20

6. The combination of two rigid interior tubular conductors or rods, flexible copper strands connecting them end to end, other tubular conductors surrounding the interior conductors, and insulating material separating the interior conductors and their coupling-connection from the exterior conductors. 25

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