No. 657,104. Patented Sept. 4, 1900.

L. HACKETHAL.

METHOD OF STRINGING OR SUPPORTING ELECTRICAL CONDUCTORS.

(Application filed Apr. 20, 1900.)

(No Model.)

Fig. 1.

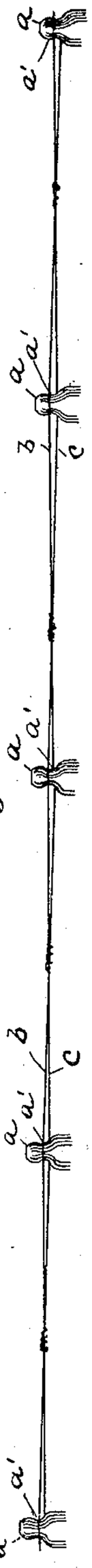
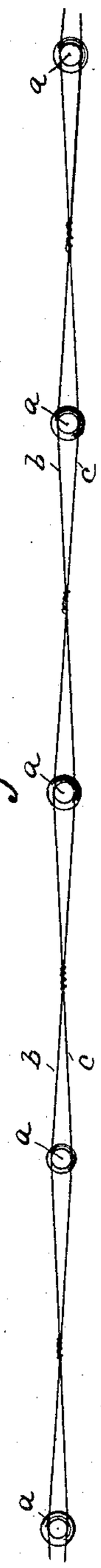


Fig. 2.



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UNITED STATES PATENT OFFICE.

LOUIS HACKETHAL, OF HANOVER, GERMANY.

METHOD OF STRINGING OR SUPPORTING ELECTRICAL CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 657,104, dated September 4, 1900.

Original application filed December 20, 1898, Serial No. 699,820. Divided and this application filed April 20, 1900. Serial No. 13,614. (No model.)

To all whom it may concern:

Be it known that I, LOUIS HACKETHAL, a subject of the King of Prussia, German Emperor, residing at Hanover, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in Methods of Stringing or Supporting Electrical Conductors, (for which I have applied for patents in Germany, No. 20,427 II/21c, dated May 25, 1898; in England, No. 24,404, dated November 18, 1898; in Denmark, No. 1,214, dated November 16, 1898; in Russia, No. 6,176, dated November 12, 1898; in France, No. 271,072, dated November 19, 1898; in Belgium, No. 108,963, dated November 19, 1898; in Italy, dated November 22, 1898; in Austria, No. 67,975, dated November 16, 1898, and in Hungary, No. 16,601, dated November 23, 1898,) of which the following is a specification, being a divisional part of the application bearing the serial number 699,820, filed on the 20th of December, 1898.

This invention relates to the construction and mounting of overhead electrical conductors, the object being to provide a plan for mounting or stringing conductors by which inductional influences are suppressed and a large number of wires may be strung side by side on a pole within a given space at cheaper cost than has been heretofore possible.

My invention comprehends the use of insulated wires and the support of the same upon the poles or cross-arms by means of insulators of ordinary character, there being two wires attached to each insulator and upon opposite sides thereof, the said wires crossing each other midway between the poles, so that the wire which on one pole is attached to the front of the insulator is on the next succeeding pole attached to the back of the insulator. In this way the number of insulators necessary is decreased by one-half. The number of wires that may be strung in a given space is increased substantially twice and the inductional influences between the wires are suppressed by reason of the fact that the wires cross each other at regular intervals and that each pair of wires is maintained at a uniform space relation to each other.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of a pair of wires strung upon a series of insulators, and Fig. 2 is a plan of the same.

The insulators are indicated by *a*, and the two wires are indicated by *b* and *c*, respectively. The insulators *a* are provided with grooves *a'*. By tracing one wire it will be seen that from one side of one insulator it leads to the opposite side of the next, and so on throughout the series of insulators, in a zigzag course. The other wire leads in a similar zigzag course; but it always occupies that side of the insulator opposite to that against which the first wire rests. The two wires therefore cross regularly at the middle points between every two insulators, and they diverge regularly from the crossing-point to the insulators, at which location they are only separated by the diameter of the insulator. Since the wires are insulated, there will not be a short circuit at the points of crossing, and no particular care need be exercised to prevent mechanical contact between the wires at these points. Indeed it is the intention to bind the two wires together at the points where they cross by means of a tape or other device. This procedure will very much strengthen the wires and will prevent them from swaying or sagging, besides quite overcoming any tendency to become entangled with neighboring wires. The two wires are held on the opposite sides of the groove *a'* of the insulator *a*, the tension of the wires and their crossed directions acting in a measure to hold the pair of wires firmly against the insulator and to prevent their displacement.

I am aware that it has been proposed heretofore to cross the wires of adjacent circuits at regular intervals, and this idea I do not claim; but in such instances the crossed wires have been supported by two insulators at each pole, which not only occupy more space and increase the cost, but introduce difficulty in placing them at uniform distances apart. Furthermore, in all such cases known to me the crossing has been accomplished in the neighborhood of the two insulators, where the

wires can be rigidly secured out of contact with each other, whereas if they crossed each other at points between the poles sagging or swaying of the wires would cause them to get into contact with each other.

In prior methods of stringing electrical wires on insulators and connecting their sections crosswise for anti-inductive purposes each wire of a pair of wires has been, in effect, a separate mechanical structure. In my method, however, it will be seen that the two wires of a pair constitute, in effect, a single mechanical structure with a single cross between each pair of insulators, for under my invention the wires of a pair are connected together at the insulators and at their crossing-points.

Heretofore in stringing crossed wires on insulators, each wire being strung by itself was liable to have its several sections strung under a difierent tension and with a different amount of sag. Again, unless the pairs of insulators apportioned to a pair of wires on each pole were spaced with absolute accuracy the sections of wire between successive poles would be at different distances apart, even though the sag were the same. In consequence it frequently happens that the two sections of a circuit between one pair of poles are nearer together than the two sections of the same wires between another pair of poles, so that the induction of an exterior circuit upon the various sections would not be equal to zero when summed up. In my construction such a result is substantially impossible, since the wires lie in immediate proximity and are held in contact at their crossing-points, and assuming that the insulators are all of equal size the induction of a pair of wires for one section will be the same as for all the other sections and will sum up to zero.

It is pointed out that the herein-described system of supporting electrical conductors is best adapted for metallic telephone-circuits, the two wires attached to a given series of insulators being used as the outgoing and return conductors. It is thus seen that a given pair of wires strung in accordance with my invention uses a series of single insulators as distinguished from a series of double insulators—that is, in my invention there is but one insulator on a pole for a given pair of wires, which means that there are as many insulators on a given pole as there are pairs of wires. In prior methods of stringing these conductors there has been at least a pair of insulators on each pole for each pair of wires.

Having described my invention, I claim—

1. A series of single insulators and a pair of conducting-wires each supported by one side or the other of each single insulator, and each pair of wires crossed between adjacent insulators in the series, substantially as described.

2. A series of single insulators and a pair of insulating conducting-wires each passing around and supported by the opposite sides respectively of each single insulator of the series, and each pair of wires crossed between adjacent insulators of the series, substantially as described.

3. A series of single insulators and a pair of insulating conducting-wires, each supported by the opposite sides respectively of each single insulator of the series and each pair of wires crossed between the adjacent insulators in the series, and a mechanical connection for securing the wires together at the crossing-points, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

LOUIS HACKETHAL.

Witnesses:
LEONORE RASCH,
JAY WHITE.