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W. DIESELHORST & A. W. MARTIN.

TELEGRAPH AND TELEPHONE CABLE CORE.

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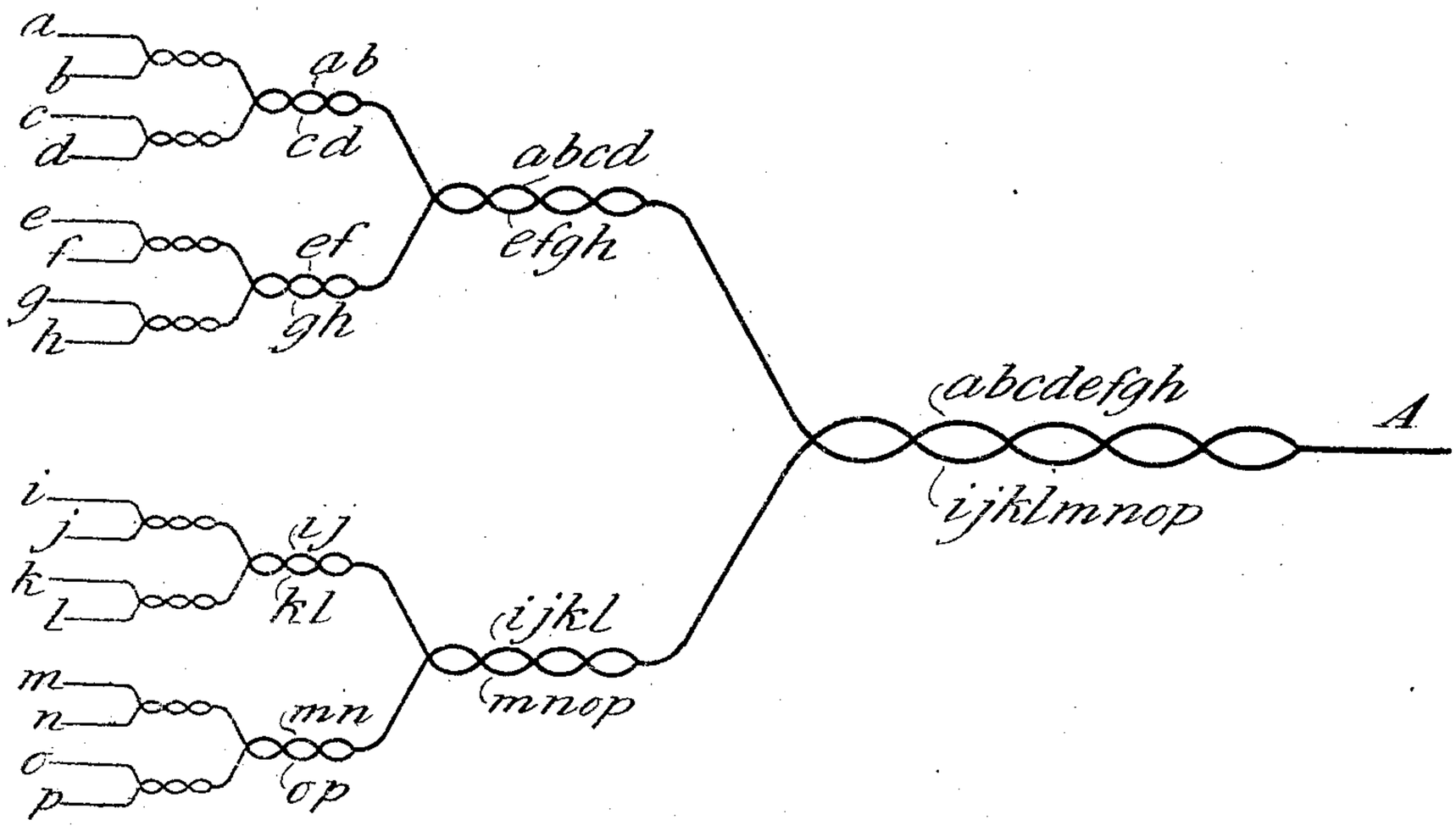

WITNESSES

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TELEGRAPH AND TELEPHONE CABLE CORE.

No. 863,969. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed March 29, 1904. Serial No. 200,636.

To all whom it may concern:

Be it known that we, WILLIAM DIESELHORST and ARTHUR WILLIAM MARTIN, both subjects of the King of Great Britain and Ireland, residing at 182 Victoria road, Old Charlton, in the county of Kent, and 37 Mayfield road, Stroud Green, in the county of London, England, respectively, have jointly invented certain new and useful Telegraph and Telephone Cable Cores, of which the following is a specification, (for which we have applied for a patent in Great Britain, dated 2d June, 1903, No. 12,526, and in Germany, dated 17th June, 1903, Serial No. 12,732.)

Cables for telephone and like circuits are usually made up of conductors insulated by paper wrappings. Two such insulated conductors are twisted together to make a pair and several such pairs are then stranded together to form a cable which is lead-sheathed.

A cable made up in this manner possesses one great disadvantage, namely, that if for any reason telephone loops the product of the capacity and resistance of which is less than that of one pair be required, they cannot readily be obtained free from mutual interference due to electromagnetic and electrostatic induction. It follows that the limit of usefulness of such a cable is attained when every pair of wires forms an independent circuit; that is to say, superimposing cannot be introduced without the occurrence in the case of telephone cables of serious overhearing between the additional circuits so obtained.

It was suggested by Jacob in his British specification No. 3281 of 1882 that, in order to prevent interference by induction in a cable, the latter might be made by a method which may be called successive twinning and consisting in twisting together two wires to make a pair, and then twisting two such pairs to make a rope of four wires and so on. This method does not suffice for the production of a cable free enough from inductive interference for practical purposes.

By our present invention we make a cable or core of a cable by the method above referred to as successive twinning but at each twinning operation we vary the length of lay, the length of lay being the pitch of the helical spiral formed by the twisting. In this manner we avoid the parallelism of the wires which must occur when the length of lay is not varied.

To make the process of manufacture clear, the operations for making a core of 16 wires would be as follows:—

A. One insulated conductor twisted with another insulated conductor to form a pair.

B. Two pairs, made as in A, twisted together to form a core of four wires.

C. Two four-wire cores, made as in B, twisted together to make a core of eight wires.

D. Two eight-wire cores, made as in C, twisted together to form a core of sixteen wires.

Of course, the number of wires is not limited to 16, but whatever number is used the manner of combining them to form a core is similar, and in all cases the length of lay is varied at each twisting operation.

Owing to the flexible nature of the dielectric, which is of any well-known kind, a core made according to this invention is sufficiently round and even for practical purposes. Obviously, the core may itself be used as a cable, or several cores may be stranded into a cable in any known manner, the cores being either all alike or of different numbers of wires, while pairs or larger cores may be wormed between the main cores of the cable.

The accompanying drawing is a diagram representing the method of manufacture in accordance with this invention.

The core A is made up of 16 wires, namely *a b c d e f g h i j k l m n o p*, and it will be clear from the diagram that these 16 wires are put together by the process of successive twinning, the length of the lay being varied at every twinning.

If each conductor weighs 100 lbs. per mile we may obtain from any one core of sixteen wires the undermentioned loops.

8 loops	with	conductors	of	100	lbs.	per	mile.
4 "	"	"	"	200	"	"	"
2 "	"	"	"	400	"	"	"
1 loop	"	"	"	800	"	"	"

It is important to notice that the loops of any one group will not interfere with the loops of the same or any other group since they are twisted independently with different lengths of lay. If four such 16-wire cores were made up into a single cable, they might also be used as two loops of 1600 lbs. per mile each and as one loop of 3200 lbs. per mile.

It is found that however such cores are made up into a cable the increase in the electrostatic capacity is small compared with the decrease in the electrical resistance; the increase in capacity measured between wire and wire being only about 30 per cent.

By the successive twinning system of constructing cable cores, therefore, circuits of lower product of capacity and resistance than one pair may readily be obtained and because of the differential twinning of the components, the circuits so obtained will be free from overhearing.

In addition to the advantage of being able to obtain loops of low product of capacity and resistance the cores made by successive twining may be used for superimposed telephone circuits working without overhearing between the various parts.

In the foregoing specification "variation of the length of lay" means either an increase or a decrease of the length of lay, and the term "twisting" includes winding one individual round the other in whatever manner.

Having thus described this invention and the best means we know of carrying the same into practical effect, we claim

1. A method of making telephone and telegraph cable cores, which consists in twisting together pairs of individual conductors with a constant length of lay from end to end of each twisted pair, and again twisting the twin conductors in pairs but with a different length of lay.

2. The herein described method of making telephone and telegraph cable cores, which consists in successively twisting together pairs of individual conductors, varying the length of lay at each twisting operation, and subsequently twisting together the previously twisted conductors; substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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