

A. P. HANSON.
ELECTRIC CABLE.

APPLICATION FILED MAR. 19, 1904.

Fig. 1.

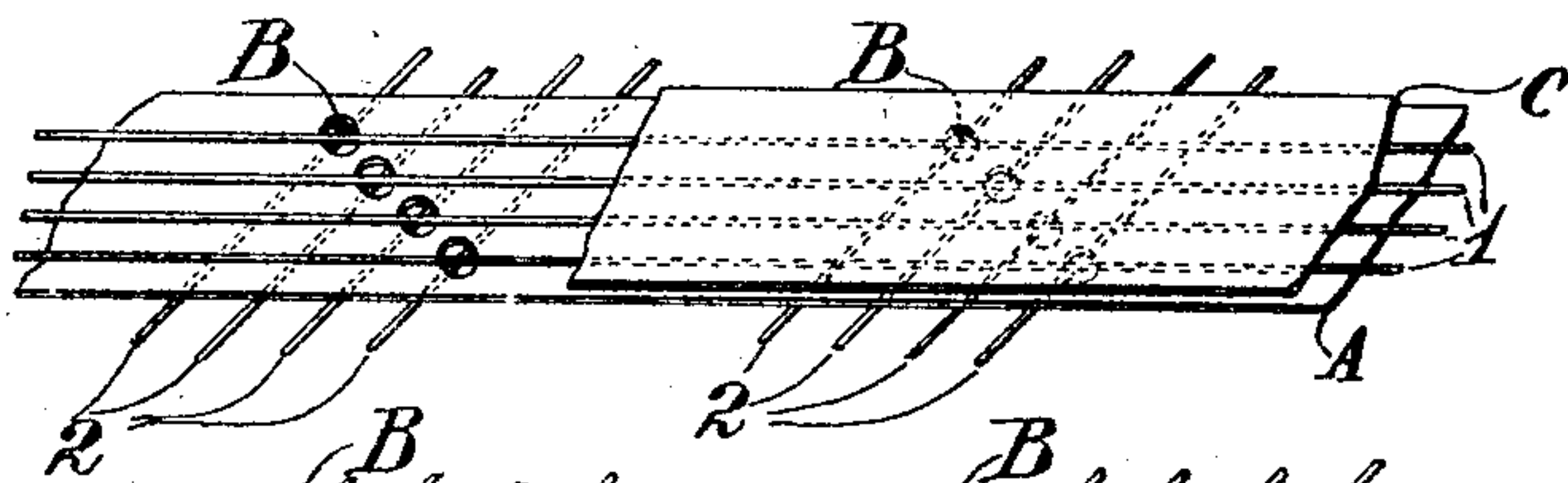


Fig. 2.



Fig. 3.

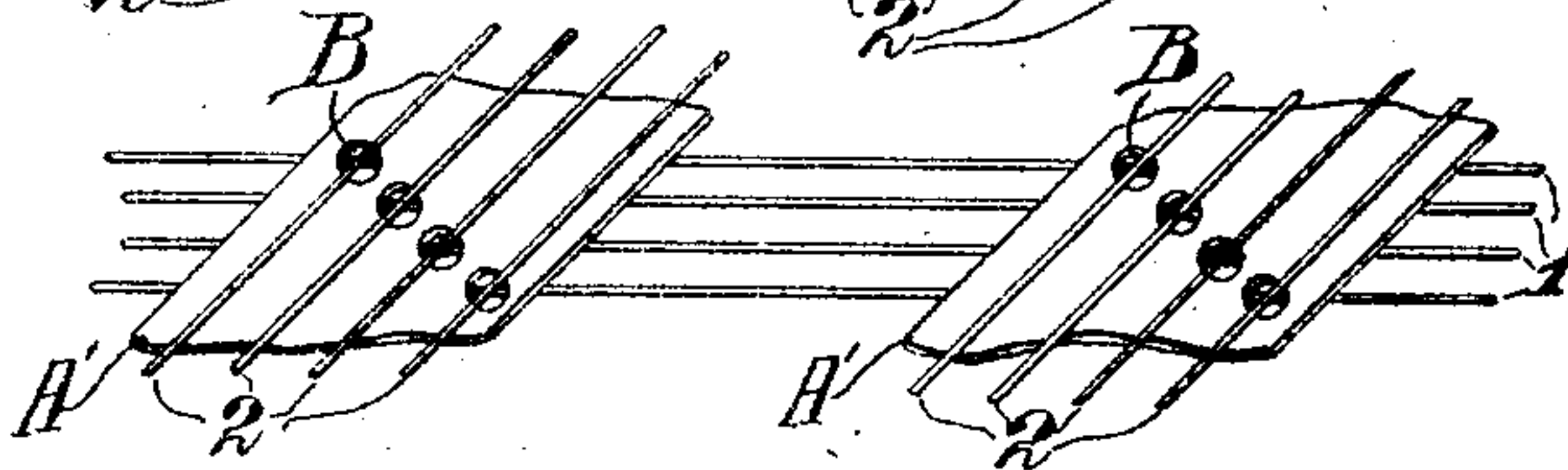


Fig. 4.

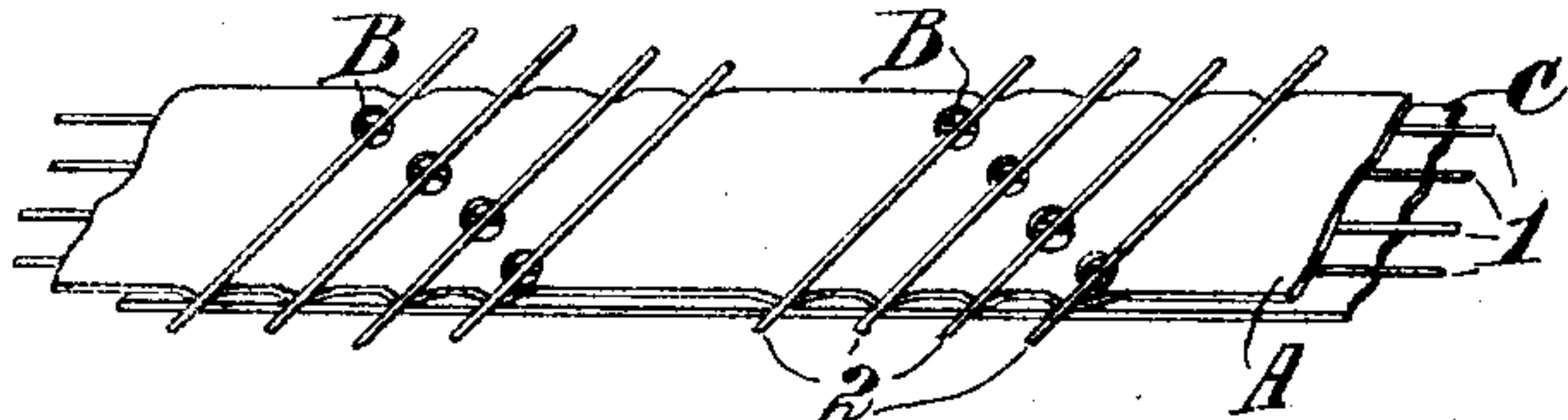


Fig. 5.

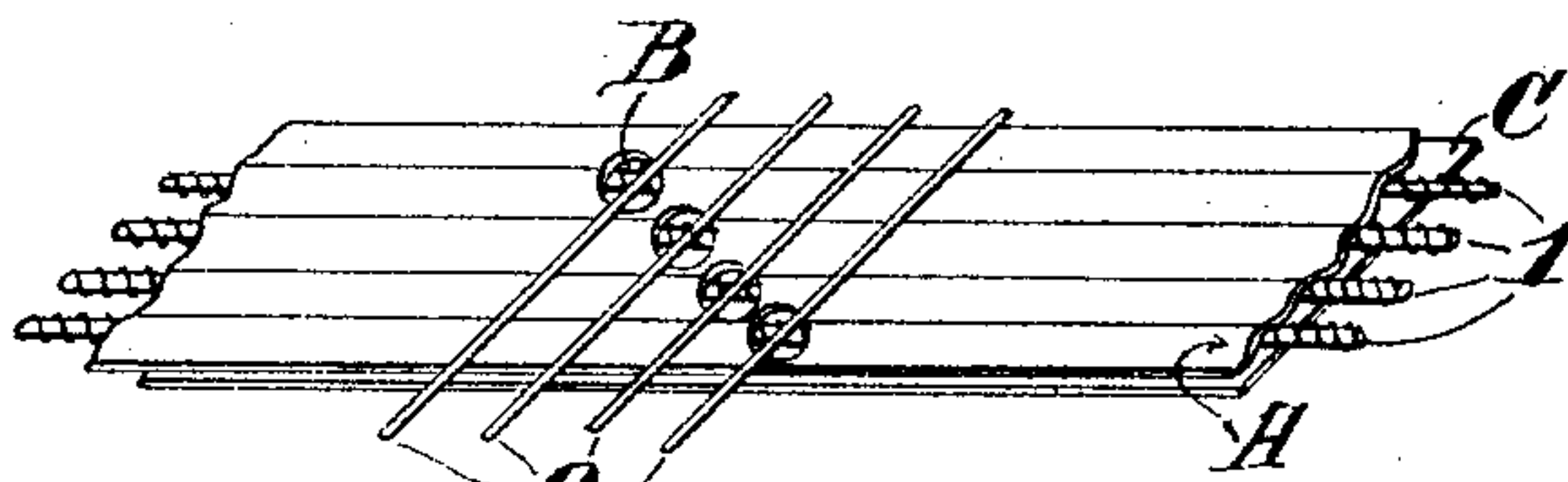


Fig. 6.

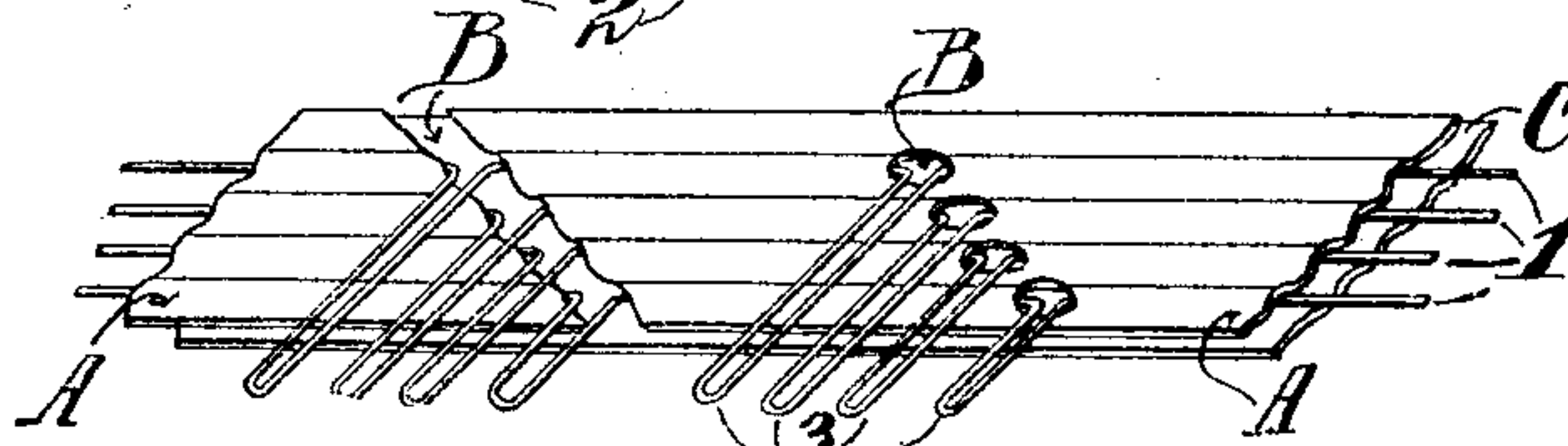


Fig. 7.

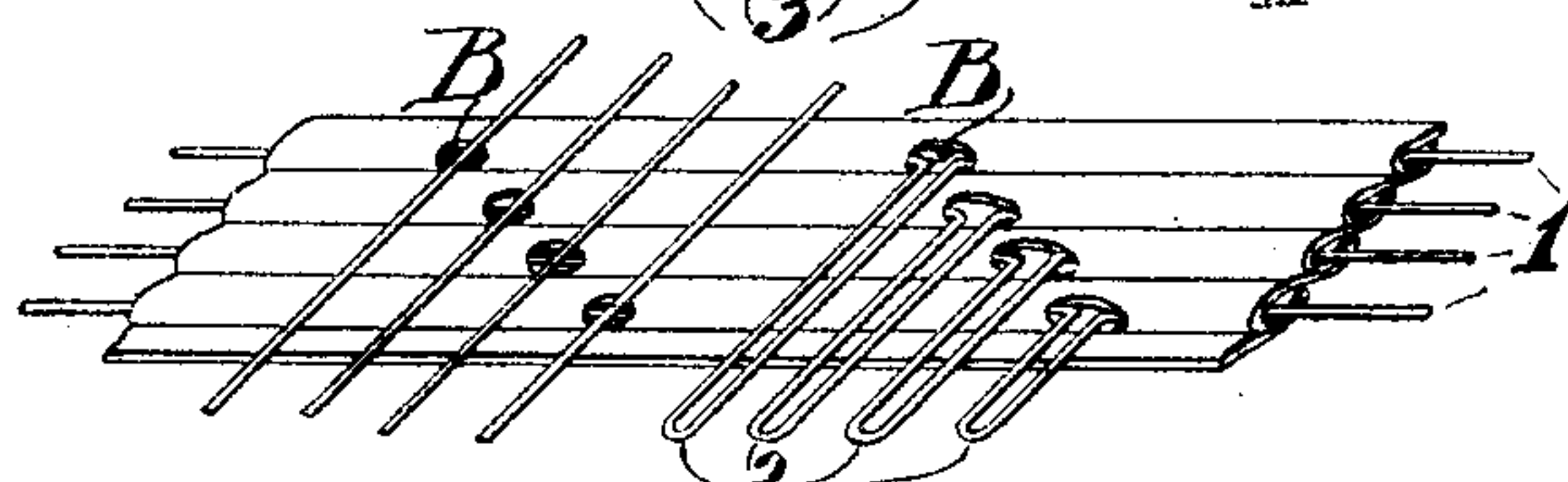


Fig. 8.



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UNITED STATES PATENT OFFICE.

ALBERT PARKER HANSON, OF CHARLOTTENBURG, GERMANY.

ELECTRIC CABLE.

SPECIFICATION forming part of Letters Patent No. 782,391, dated February 14, 1905.

Application filed March 19, 1904. Serial No. 199,024.

To all whom it may concern:

Be it known that I, ALBERT PARKER HANSON, a citizen of the United States, residing at Charlottenburg, Germany, (whose post-office address is Dorotheenstrasse, 38 and 39, Berlin, Germany,) have invented certain new and useful Improvements in Electric Cables, of which the following is a full, clear, and concise specification.

My invention relates to electric cables, and more particularly to simple and practical forms of construction of the same in the respect of the disposition of the leads or taps by which the respective conductors thereof are connected to line-jacks and other points, the more prominent objects of the invention being economy of space, comparative cheapness of manufacture, and a material saving of time required for installation.

The invention also involves other features of importance and advantage, as will hereinafter appear, and be more particularly pointed out in the claims appended hereto.

In another application, filed by me July 7, 1902, Serial No. 115,248, I have shown and described a modification of the principle of my invention specially adapted for the multiple contact-points of individual-switch automatic telephone-exchanges. The present application pertains to the broad form of my invention for general use and as a substitute for the complicated cable construction heretofore employed.

The invention consists of an arrangement of main cable-conductors folded into or otherwise disposed upon or between a layer or layers of insulating ribbon or sheet material, the layer or layers being perforated or cut away at certain points, so as to leave openings or gaps which permit of the connection of a series of tap-conductors with particular ones of the main conductors or through which, if desired, the main conductors themselves may be looped to form the tap-conductors, as will be hereinafter described.

In the accompanying sheet of drawings, which forms a part of this specification, Figures 1 to 5 are elementary forms of the invention, illustrating different methods of embodying the same; Fig. 6, a view illustrating

the manner of looping the main conductors to constitute tap-conductors; Fig. 7, a view illustrating a modification with main conductors disposed in longitudinal tucks, and Fig. 8 a bank form of the cable.

Referring to Figs. 1 to 6, A represents a sheet or ribbon of insulating material, provided with openings or gaps B, extending diagonally across the same, the latter being in the form of slots or apertures or a complete severing of the ribbon, as shown in Fig. 2. Upon one side of the ribbon is disposed a series of main cable-conductors 1, running longitudinally of the ribbon and preferably suitably secured to it by means of shellac, glue, &c., or by embedding or inclosing them in it. Upon the opposite side is disposed, either in groups or continuously, a series of transverse tap-conductors 2, 2, &c., which are preferably also suitably secured to the ribbon A, the conductors of the two series being thus arranged in substantially parallel planes. At the crossing-points of the different conductors of the two series of main and tap conductors the latter are electrically connected to the former through the openings or gaps, the connection being effected either by the contact of one with the other or by the more permanent means of a drop of solder. The main conductors may manifestly be of any suitable shape and size, being shown in the drawings as round bare wires, and they may be wound around an insulating string core, as indicated in Fig. 5, or provided with any of the usual appurtenances to electrical conductors designed to lessen the inductive disturbance of one upon the other. The tap-conductors extend on one or both sides beyond the edges of the ribbon A, and covering-ribbons C, of insulating material, may be employed where the wires are required to be further protected. In Fig. 3 is illustrated a form in which the main and tap conductors are separated by separate cross-running strips of insulation A' A' instead of a continuous ribbon, the sheets A' being perforated to allow of proper connection through them the same as above.

In Figs. 4 to 8 one or both of the separating and protecting layers A or C are corrugated and the conductors are disposed in the

corrugations, the apertures B being provided as before, but located, respectively, in the valleys of said corrugations. The advantage of these forms is not only a more reliable insulation and independence of the several conductors, but also that the tap-conductors are separated by a greater distance from the main conductors, except at the crossing-points, and are thus less liable to inductive influence from them, and a further special advantage is that the corrugations give to the cables a certain thickness and rigidity without adding much to their weight or their material, which is of importance where the cables are laid one upon the other in the form of a bank and it is desired to space the tap-terminals properly to correspond with the thickness of the jacks or other apparatus with which they are to be employed. In Fig. 4 the layer A is corrugated transversely to receive the tap-conductors, and the main conductors 1 are disposed in the longitudinal corrugations in the cover layer C, the layer A being properly apertured for the connection of the conductors there-through. It is not necessary, however, that both separating and covering layers be corrugated to give the advantages mentioned, as manifestly the corrugation of only the separating layer or the covering layer may be fully adequate for the purpose in hand. (See Figs. 5 and 8.) In the corrugated cables it will be understood that the conductors are not required to be glued or fastened to the ribbons, although such additional securement may be used, if desired. In these forms, as well as in those of the figures above described, the main conductors themselves may be looped or drawn through the openings in the separating layer to constitute the tap-conductors, as is indicated in Figs. 6 and 7, and the loops 3 thus formed may be connected to the line-jacks or other apparatus the same as the separate taps above described.

In Fig. 7 is shown a further development of the corrugated form in which the main conductors are completely inclosed and protected by but a single ribbon of insulation. The corrugations are closed and folded over against each other, forming a series of longitudinal tucks in which the main conductors are confined, and the tucks are apertured at certain points, as before, for the connection of the different pairs of main and tap conductors or for permitting the main conductors to be looped out through them, as shown.

Any of the forms described may be superposed and united, as in Fig. 8, and the proportion and contour of the bank may obviously be varied according to the requirements of special work or the fancy of the manufacturer without departing from the scope or spirit of the invention.

Having described my invention, what I claim, and desire to secure by United States Letters Patent, is—

1. An electric cable comprising a series of main conductors and a series of tap-conductors, the conductors of said two series being disposed in substantially parallel planes, in combination with a ribbon of insulating material between the two series, cut away at the crossing-points of the different conductors, respectively, of said series, and permanent electrical connections at each of said crossing-points between the different conductors respectively of said two series.

2. An electric cable comprising a ribbon of insulating material, provided with openings diagonally across the same, in combination with longitudinal conductors disposed on one side of the ribbon and transverse tap-conductors on the other having electrical connection respectively with the longitudinal conductors through the openings in said ribbon.

3. An electric cable comprising a ribbon of insulating material provided with diagonally-disposed openings, in combination with longitudinal conductors disposed on one side thereof and loops of said conductors extending through said openings and disposed on the other side thereof constituting tap-conductors from said longitudinal conductors, and a suitable covering.

4. An electric cable comprising a longitudinally-corrugated ribbon of insulating material, provided with openings in said corrugations and main conductors disposed in said corrugations, in combination with a series of tap-conductors disposed transverse upon said corrugations in a plane substantially parallel to the plane of said main conductors and co-operating with said openings at the crossing-points of the different main and tap conductors, whereby the latter are in permanent electrical connection respectively with the former.

5. An electric cable comprising a ribbon of insulating material provided with longitudinal tucks, main conductors disposed within said tucks and a series of tap-conductors disposed on the outside thereof and in a plane substantially parallel to the plane of said conductors, in combination with openings in said tucks at the crossing-points respectively of different main and tap conductors, whereby the latter are in electrical connection with the former.

In witness whereof I have hereunto signed my name, this 7th day of March, 1904, in the presence of two subscribing witnesses.

ALBERT PARKER HANSON.

Witnesses:

LUDWIG ZIELKE,
PETER BROCK.