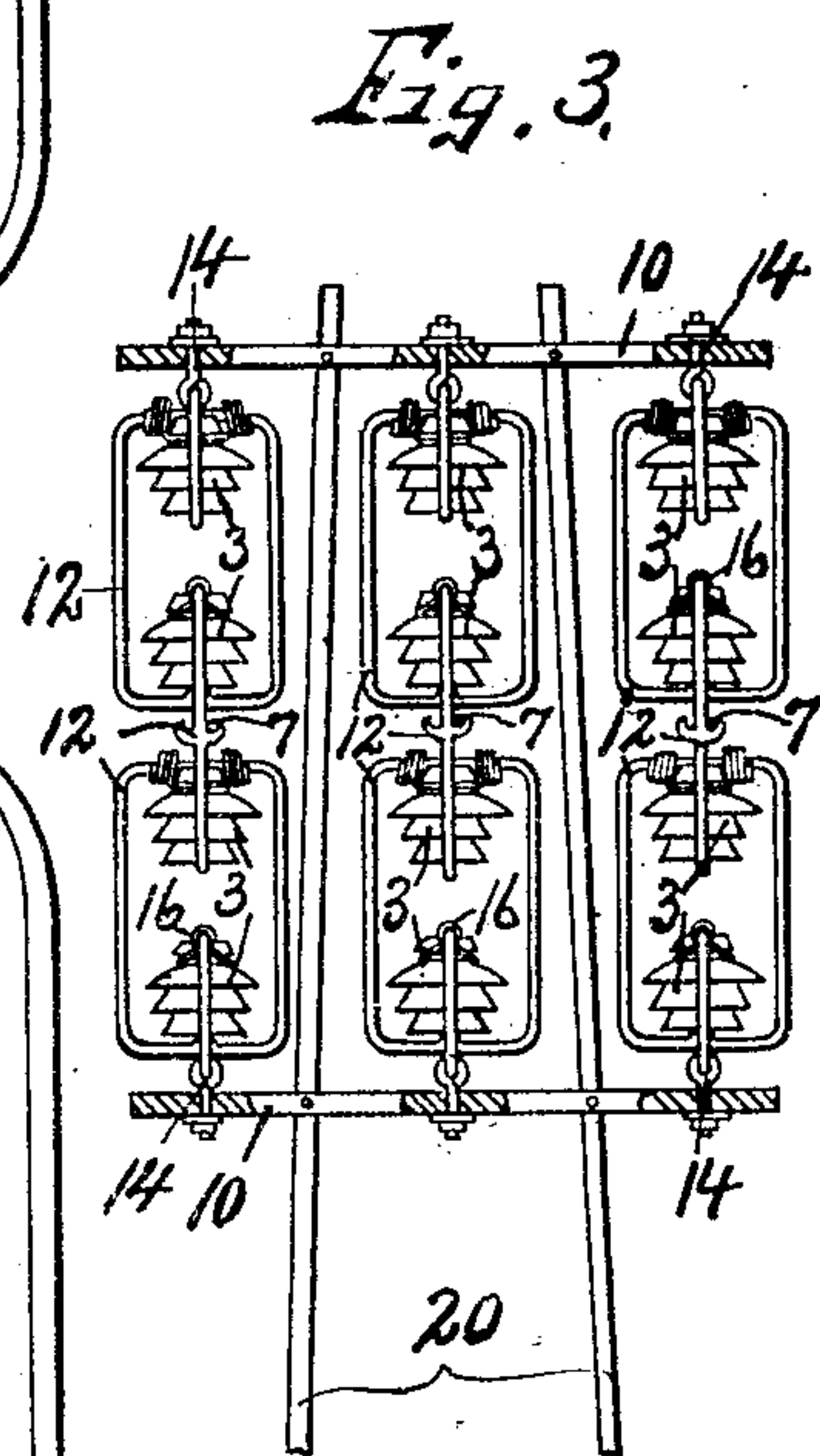
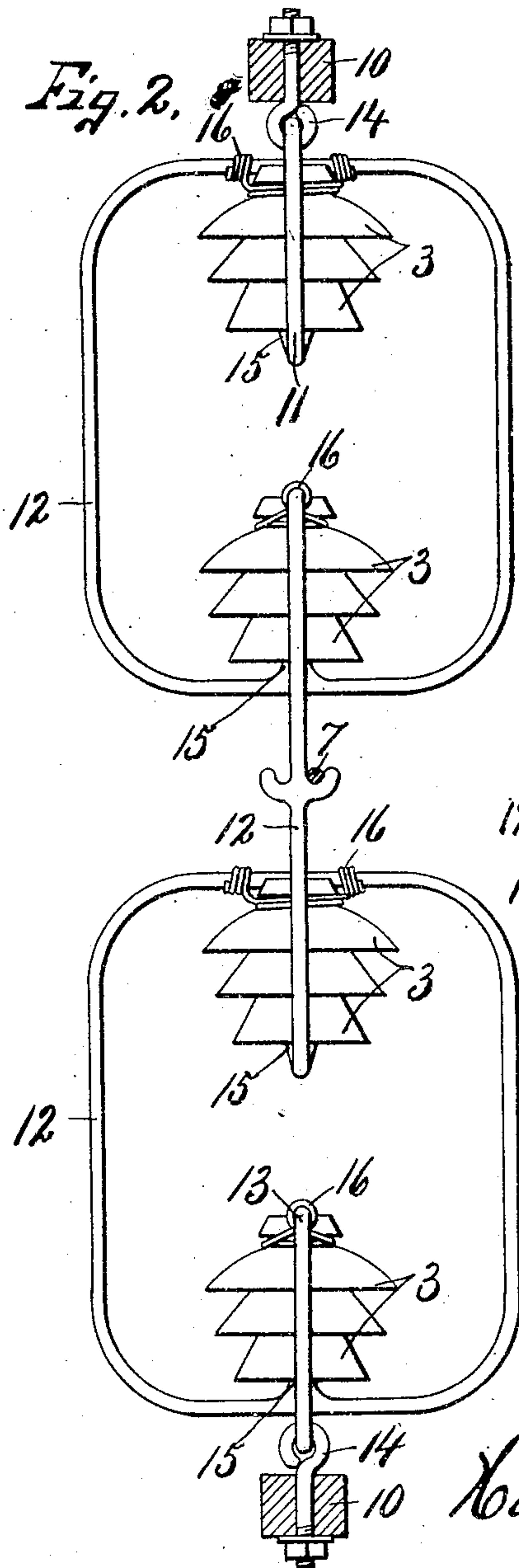
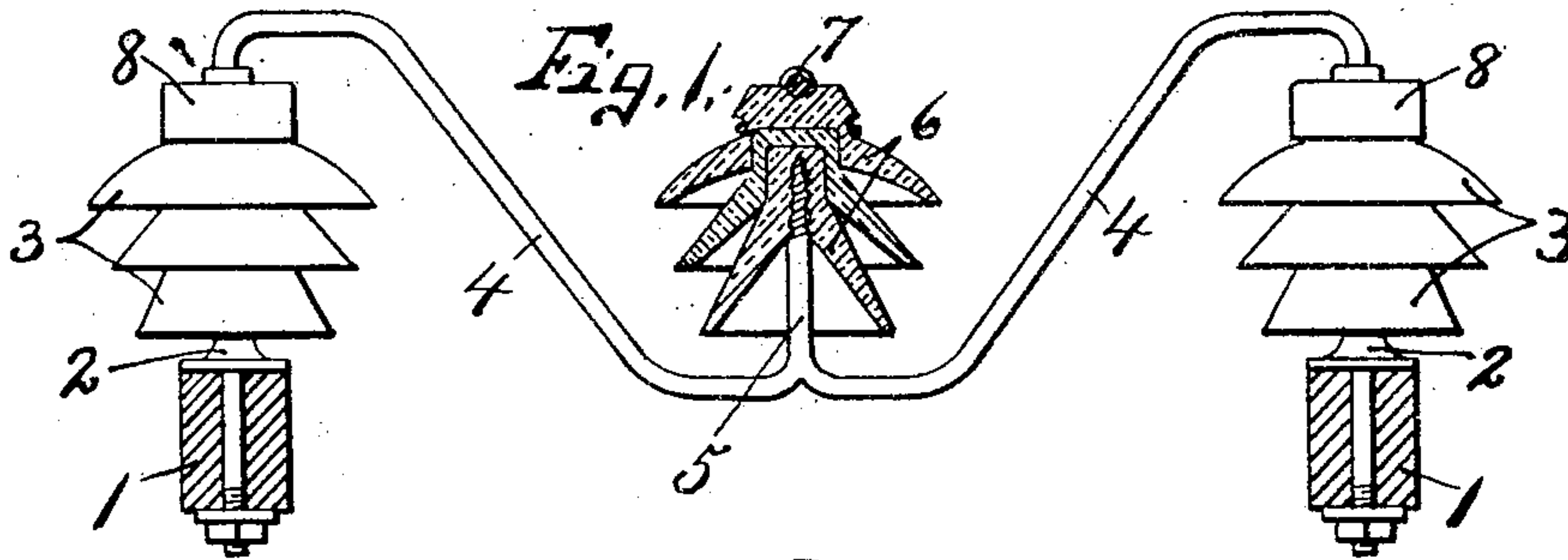


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 SYSTEM OF INSULATION FOR HIGH VOLTAGE ELECTRIC CONDUCTORS.
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SYSTEM OF INSULATION FOR HIGH-VOLTAGE ELECTRIC CONDUCTORS.

No. 918,339.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRED M. LOCKE, of Victor, in the county of Ontario, in the State of New York, have invented new and useful improvements in Systems of Insulation for High-Voltage Electric Conductors, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 This invention relates to certain improvements in system of insulation for high voltage electric conductors, the generic object of which, like that of my pending applications No. 359,442, filed Feb. 26, 1907 and 363,373
15 filed March 20, 1907, is to permit the installation of any number of comparatively small insulators between the conductor and the supporting medium in such manner that the sections of each insulator are pressed together and held against separation by the
20 weight of the conductor and insulators and their supporting mediums.

In my application No. 359,442 the insulators are suspended one from the other in
25 succession by suitable hangers, the first one of the series being suspended from a main support and the last one of the series carrying a hanger for the conductor. In my application 363,373, filed March 20, 1907, I
30 have shown a series of insulators, each composed of a series of petticoat sections nested one within the other, the bottom section of each insulator being supported by a hanger which is carried by the top section of the
35 next preceding insulator of the series nearest to the main support.

The generic object of this system is to arrange and connect a series of insulators in such manner that the resultant insulating
40 resistance is equal to or exceeds that of any one insulator of the series multiplied by the number of insulators of such series and at the same time to render the surface leakage, puncture test, arcing distance and mechanical strength practically unlimited.

45 The specific object of my present invention aside from its generic use, as previously stated, is to anchor the end insulators of the series to suitable supports either fixed or
50 movable and at the same time to tie the entire series together in such manner that the sections of each will be automatically drawn or pressed together and held in such relation without special securing means between
55 them so that the individual insulator

may be built up indefinitely or the number of insulators increased or diminished to correspond to the voltage of the current carried by the conductor.

Another specific use of this construction is that by tying the end hangers or tie pieces to the main supports and supporting the conductor intermediate the ends of the system, the end tie pieces may be adjusted to draw the insulator sections in close relation to each other thereby tensioning the parts of the entire system to better resist lateral strains and at the same time to cause such strains to more firmly bind the parts together.

70 It is evident that the foregoing objects may be carried out by various forms of devices and I have, therefore, shown and described different forms or systems which at the present time appear to be most practicable.

In the drawings—Figure 1 is an elevation partly in section of a system of insulation in which a series of insulators are supported side by side between two main supports, the center insulator carrying the conductor. Fig. 2 is an elevation of a modified system of insulation in which the insulators are supported one above the other between two main supports. Fig. 3 is an elevation, on reduced scale, of a still further modified system of insulation for supporting a plurality of, in this instance, three conductors.

In Fig. 1 I have shown a pair of main supports as cross arms—1— which may be fixed or movable and to which are secured suitable center pins—2— for supporting insulators—3—, said insulators being of the petticoat type made in sections brought together, the bottom section having a central socket into which the center pins—2— are inserted. The top section of each insulator—3— supports one end of a bracket or tie-piece—4—, the opposite ends of said tie pieces being, in this instance, joined together and carrying a center pin—5— which is inserted into the bottom of and supports a similar insulator—6— also composed of sections, the top section of the insulator—6— receiving and supporting a suitable electric conductor—7—. The outer ends of the arms—4— may be secured in any desired manner to the top sections of the insulators—3— and in this instance are provided with caps—8— fitting over and upon the reduced upper ends

of the insulators —3—. It is, therefore, apparent that the weight of the wire and intermediate insulator or insulators together with the supports therefor are borne by the top sections of the end insulators and that in all of these insulators the pressure and mechanical resistance is applied to opposite ends or sections of the insulator tending to retain them in operative position relatively to each other and to their supporting mediums.

The system shown in Fig. 2 comprises a pair of supports —10— located one above the other and a series of insulators —3— also supported one above the other between the main supports —10—, each insulator being composed of a series of sections nested together. The bottom section of the upper insulator is supported by a hanger —11— which is suspended from an eye bolt 14 on the cross arm or support —10—, said eye bolt being adjustable vertically. Each of the other insulators —3— is suspended by a hanger —12— from the top section of the next preceding insulator, the top section of the bottom insulator of the series carrying an additional hanger —13— which is anchored to an eye bolt —14— in the lower cross arm or support —10— this latter eye bolt being also adjustable, each of the hangers —11— and —12— is provided with a center pin —15— adapted to enter a socket in the under side of the bottom section of the adjacent insulator, the upper ends of said hangers being secured to the top section of the adjacent insulator by any suitable means as wire clamps —16—. In this particular system, the electric conductor as —7— is carried by the intermediate hanger —12— but it is evident that each insulator is held between two adjacent hangers operating to draw the sections of such insulator together and that by tightening up on one or the other of the eye bolts —13— the insulator sections are drawn into closer relation through the medium of the hangers, and furthermore by supporting the entire system of parts at opposite ends thereof, any lateral strains by winds or excessive tension upon the conductor operates to more firmly clamp the sections of the insulators together.

It is evident from the foregoing description that by combining the insulators and their sections in the manner described they are subjected to compression strains only and I am, therefore, enabled to use comparatively small insulators which possess great mechanical strength with a minimum surface area exposed to the elements, the resistance to compression being greater than the tensile strength so that the mechanical strength of the complete system is far in excess of that of any system in which the insulators are subjected to tensile strains and furthermore I am at liberty to space the insulators any

distance apart and to use any number of insulators between the conductor and main support.

In addition to the above advantages it will be observed that by using the smaller and consequently more perfect and more homogeneous insulators they are capable of standing a higher puncture test and avoid the usual creeping or static discharges so common in large insulators. In other words, the mechanical strength, arcing distance, puncture and static discharge tests are practically unlimited.

In Fig. 3 I have shown a system of insulation for a plurality of, in this instance, three wires or conductors, each conductor being associated with a separate insulating medium substantially identical with that shown in Fig. 2, the entire system including the cross arms —10— being shown as mounted upon a tower or pole —20— and although I have shown the wire —7— as attached to the intermediate tie piece or connection —12—, said wires may be supported directly upon any one of the insulators or upon any other one of the tie pieces.

In each of these systems it will be seen that the tie pieces connecting the successive insulators of the series are disposed in intersecting planes, that is they lead from the bottom of one insulator to the top of the next insulator of the series. In this latter system of insulation it will be observed that the supporting parts for the conductors are flexibly connected; that is, the entire system is flexible to allow a limited lateral movement in all directions so as to yield under wind and tension strains of conductors without liability of unduly straining or breaking the fastenings or hangers.

What I claim is:

1. A system of insulation for high voltage conductors comprising suitable supports, and a series of insulators arranged in sequence between the supports, and tie pieces connecting the insulators and supports and exerting compression strains upon the insulators.

2. In a system of insulation for high voltage conductors, the combination with suitable supports, and a series of insulators arranged in sequence and each composed of a plurality of sections nested together, and connections between the supports and insulators exerting compression strains upon the sections of each insulator.

3. In an insulating system, a support, an insulator on the support, a frame supported by the insulator, a second frame supporting the first frame, the connections between the two frames comprising an insulator attached to one frame and a corresponding offset portion in the other frame.

4. In an insulating system, a support, an insulator on the support, a frame supported

by the insulator, a second frame supported by the first frame, the connections between the two frames comprising an insulator attached to one frame and corresponding offset portion in the other frame to hold the frames in proper relative position.

5 Insulating means comprising a support, an insulator on the support, a frame supported on the insulator, and a second frame supported from the first frame, the latter frame having two insulators attached thereto one between said frames.

10 6. Insulating means comprising a support, an insulator on the support, a frame supported on the insulator, a second frame supported from the first frame, said frames being disposed one within the other and at an angle to each other the latter frame having two insulators attached thereto one between said frames, and an electric conductor attached to one of the latter insulators.

20 7. Insulating means comprising a support, an insulator on the support, a frame supported on the insulator, and a second frame supported from the first frame, said frames being disposed one within the other and at an angle to each other the latter frame having two insulators attached thereto one between said frames, and the two insulators being attached to the frame in practically the same plane.

30 8. An insulator comprising a series of petticoat insulators having their petticoats extending in the same direction, and frames attached to two of said insulators and uniting their opposite ends, said frames being arranged at an angle to and one within each other and each supported upon an insulator.

40 9. Insulating means comprising a support, an insulator on the support, a frame supported on the insulator, a second frame supported from the first frame, the latter having

two insulators attached thereto, the second frame being supported upon one of said insulators, both insulators having petticoats and one of the insulators being interposed between said frames.

10. In an insulator system, a frame having two insulators thereon, one adapted to hold an electric conductor, the other to insulate its support: a second frame arranged at an angle to the first frame and forming the said support, and a third insulator forming a support for the second frame, all of said insulators being in vertical alinement.

11. In an insulating system, three insulators arranged in vertical alinement with each other: one acting indirectly as a support for the other two, and two frames one of the latter being supported by the top of an insulator and the other by the bottom of the insulator.

12. Insulating means comprising a support, an insulator on the support, a frame supported on the insulator, and a second frame supported from the first frame: the latter frame having two insulators attached thereto one between said frames, the frames standing in intersecting right angle planes.

13. A system of insulation for high voltage electric conductors comprising suitable supports, a series of insulators arranged in sequence between the supports, tie pieces flexibly connected to the supports and to the end insulators of the system, additional tie pieces connecting adjacent insulators of the system, and means for connecting the conductor to the center of the system.

In witness whereof I have hereunto set my hand this 30th day of March 1907.

FRED M. LOCKE.

Witnesses:

MERCIE PEER LOCKE,
C. A. MOORE.