J. E. MATEER.

INSULATOR.

APPLICATION FILED AUG. 8, 1908.

1,078,633.

Patented Nov. 18, 1913.

Fig. 1

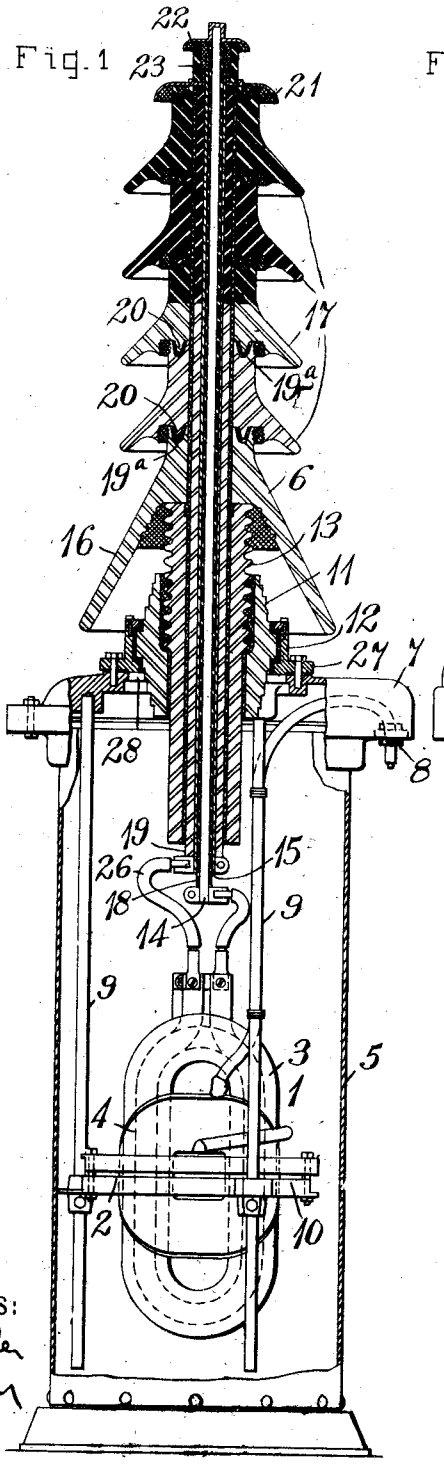
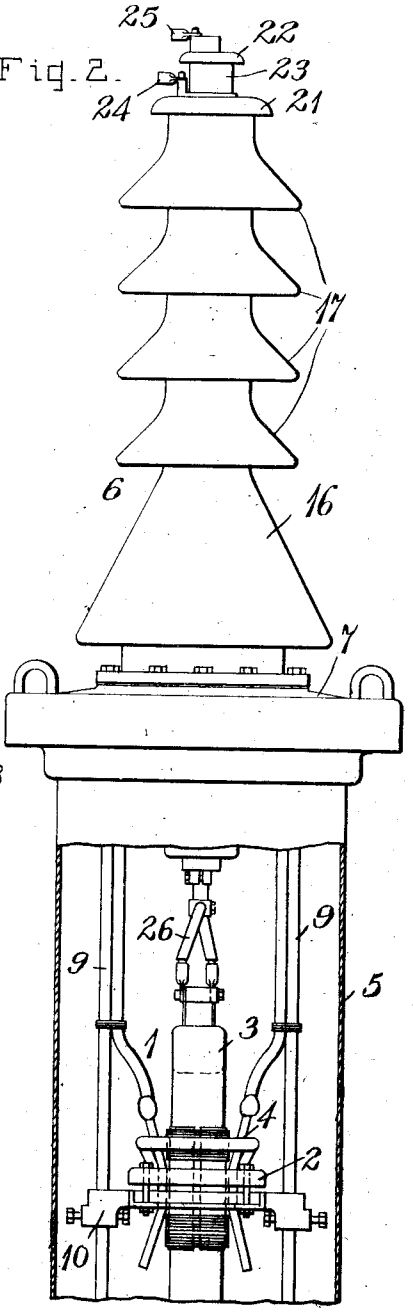


Fig. 2.



WITNESSES:

INVENTORS

BY

ATTORNEY

UNITED STATES PATENT OFFICE.

JESSE E. MATEER, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, OF EAST PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

INSULATOR.

1,078,633. Specification of Letters Patent. Patented Nov. 18, 1913.

Application filed August 8, 1908. Serial No. 447,497.

To all whom it may concern:

Be it known that I, JESSE E. MATEER, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Insulators, of which the following is a specification.

My invention relates to insulators and insulating bushings for supporting electric line conductors and for separating the conducting leads of electrical apparatus from the casing which incloses such apparatus.

The object of my invention is to provide an improved arrangement of conducting leads and simple and efficient insulating bushings suitable for outdoor service by which very high-voltage leads may be supported and electrically separated from the casing of a transformer or other electrical device.

Although not restricted in its application, my invention is specially adapted for use with a series transformer in which the high-voltage winding comprises comparatively few turns or convolutions so that the difference in potential between the two leads is relatively small while the voltage of both may be very high.

Figures 1 and 2 of the accompanying drawings are views, at right angles to each other, of a transformer and its inclosing casing with my invention applied thereto, said structure being shown in section in Fig. 1 in order to disclose more completely the arrangement of parts.

Referring to the drawings, the device here illustrated comprises a transformer 1 having a magnetizable core member 2 and primary and secondary windings 3 and 4, an inclosing casing 5 in which the transformer is disposed and an insulating bushing 6 for the high-voltage leads of the transformer winding which extend through the cover of the casing. The cover 7 of the tank or casing overhangs the casing walls and is provided with insulating bushings 8 for the low-voltage leads of the transformer. The transformer is supported entirely from the cover member 7 by means of rods 9 which project downwardly therefrom and to which the end plates 10 of the transformer core are adjustably clamped.

The insulating structure comprises an outer sleeve or bushing 11 having a stepped outer surface, the middle portion of which is gripped by a clamping ring or collar 12 of metal by which the structure is supported, a relatively long inner sleeve or bushing 13 which is cemented to the outer sleeve and extends from each end thereof, its outer surface being corrugated at the upper end; a pair of conducting members 14 and 15 which are disposed within the inner sleeve, as hereinafter pointed out, and a plurality of insulating skirts 16 and 17 which together form a continuation of the inner insulating sleeve 13. The conductor 14 is in the form of a cylindrical rod and is surrounded by a tube 18 of hard insulating material which is preferably constructed as set forth in Patent No. 858,385, granted July 2, 1907, to the Westinghouse Electric & Manufacturing Company as assignee of Emil Haefely. The conductor 15 is in the form of a tube and is fitted over the insulating tube 18 but is somewhat shorter in order that a greater insulating surface distance may be obtained between the corresponding ends of the conductors. The tubular conductor 15 is also surrounded by a second insulating tube 19 which is securely cemented into the inner sleeve 13 and projects for a material distance from its upper end. The insulating skirts 16 and 17 are provided with axial holes through which the upper extremity of the insulating tube may extend and they are similar to each other except that the flange of the lower skirt 16 is materially longer and more widely extended in order to protect the joints formed between the inner and outer insulating sleeves and the collar by which they are supported. The adjacent surfaces of the insulating skirts are provided with coöperating annular grooves 19^a and projections 20 and these parts are cemented together so that, in the assembled structure, a continuous bushing of hard inorganic weather-proof insulating material, such as porcelain, is formed by the sleeves and the skirts.

The bushing terminates at its upper end in a cap or flange 21 of metal which overhangs the top of the uppermost skirt 17 and is electrically connected to the conductor 15. The metal rod 14 and the insulating tube 18 which surrounds it, extend materially above

the cap 21 and the rod is provided with a cap 22 which is separated from the cap 21 by a short insulating bushing 23 the joints of which are overhung by the cap 22. The cap 22 and such portions of the structure as extend above the cap 21 will, of course, be omitted entirely when the bushing is put to ordinary use with a single conducting lead instead of being adapted for two leads as in the drawings which form parts of this application. The voltage-sustaining or resisting power of the bushing is materially improved by the use of the metal cap or caps since, by this means, the electro-static leakage which impoverishes the insulating properties of the surrounding air and produces the so-called corona effects with very high voltage is materially reduced and is carried away from the adjacent porcelain parts, which have shown a tendency to become overheated and cracked if they are kept close to the static discharge points of the conducting terminal member.

Terminal members 24 and 25 are severally secured to the metal caps 21 and 22 so that these parts may be readily connected to external circuit conductors. The lower extremities of the conductors are similarly provided with terminal members 29 to which the ends of the high-voltage transformer winding are connected by means of flexible conductors 26. The collar 12 is provided with a flange 27 which is secured to the cover member of the transformer casing around the edge of an opening 28 through which the lower end of the insulating structure extends.

It will be observed that the structure is particularly well fitted for very high-voltage outdoor service since none of the exposed parts are liable to deteriorate in contact with air or moisture.

It will be understood that various structural variations may be effected in the device illustrated in the drawings without departing from the spirit of my invention and I desire that such variations shall be included within its scope.

I claim as my invention:

1. An insulating structure comprising a tube, a series of overhanging skirts fitted upon said tube and cemented thereto and an external metal cap or crown, combined with a conductor that extends through said tube and is connected to said cap or crown having an overhanging skirt.

2. An insulated lead structure for electrical apparatus comprising concentric conductors, an interposed insulating tube, and a segmental sleeve or bushing of inorganic weather-proof insulating material composed of a series of overhanging skirts, and metal caps or crowns electrically separated from each other and severally connected to the concentric conductors.

3. In electrical apparatus, the combination with an inclosing casing having a cover and flexible conducting leads within the casing, of concentric conductors, an interposed insulating tube, an insulating bushing composed of an insulating sleeve secured to the cover member and a series of overhanging insulating skirts mounted on said sleeve above the cover, and caps or crowns of conducting material that overhang the insulating skirts and are severally connected to the concentric conductors.

4. In electrical apparatus, the combination with an inclosing casing having a cover and conducting leads supported thereby, of an insulating bushing structure comprising concentric insulating sleeves extending through the cover and secured thereto, insulating tubes within the sleeves, a plurality of insulating skirts mounted upon the tubes and forming a continuation of the sleeves and a metal cap overhanging the skirts and connected to one of the leads.

5. In electrical apparatus, the combination with an inclosing casing having a cover, of a pair of concentric conductors extending outwardly through the cover, an insulating tube interposed between said conductors, an insulating tube surrounding the outer conductor, relatively short insulating sleeves encircling and supporting the tubes and conductors and secured to the cover, and a plurality of insulating skirts mounted upon the tubes to form a continuation of the sleeves and overhang the joints between the adjacent parts.

6. A structure for electrical apparatus comprising concentric conductors of different lengths, a separating insulating tube, an outer tube surrounding and supporting the outer conductor, a relatively short insulating sleeve surrounding the tube, a plurality of skirts forming a continuation of the sleeve and overhanging the joints formed between adjacent parts, and metal caps or crowns severally secured to the conductors and overhanging the upper skirt.

7. An insulating structure comprising a weather-proof bushing or sleeve having a series of overhanging skirts of insulating material and an overhanging metal cap at the top of said series, combined with a conductor that extends through said bushing or sleeve and is connected to said metal cap.

In testimony whereof, I have hereunto subscribed my name this 31st day of July, 1908.

JESSE E. MATEER.

Witnesses:
C. S. Lawson,
Birney Hines.