

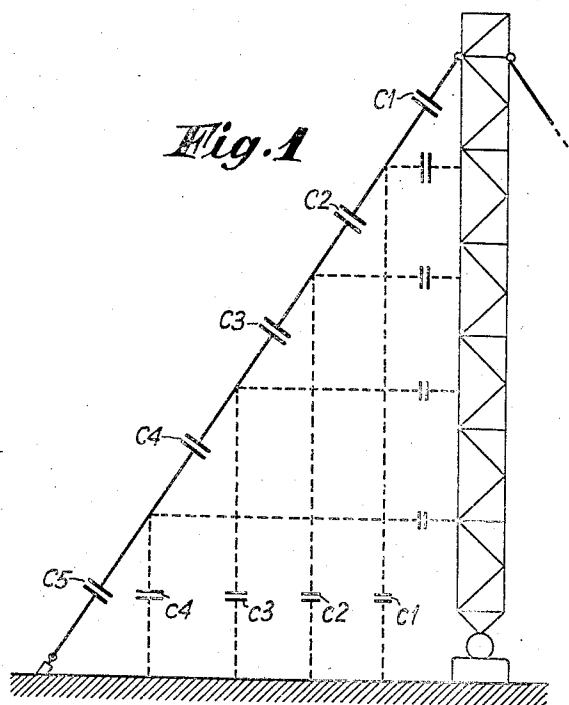
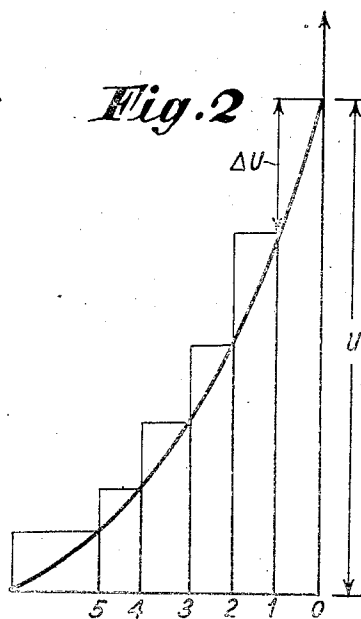
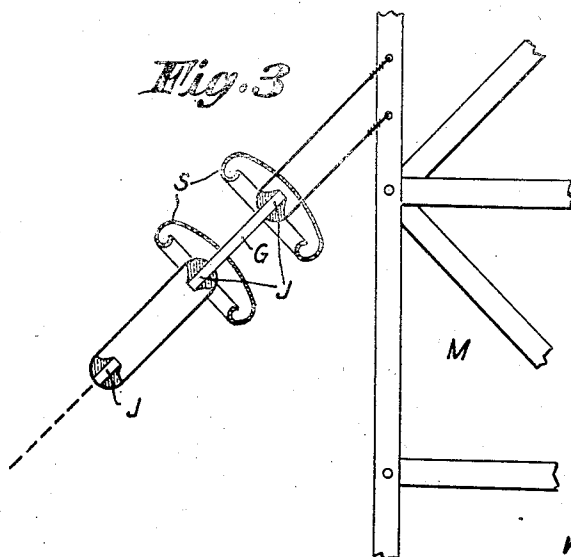
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W. PETERS

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GUY WIRE INSULATOR

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INVENTOR
WILHELM PETERS
BY *H. S. Sover*
ATTORNEY

UNITED STATES PATENT OFFICE

2,298,900

GUY WIRE INSULATOR

Wilhelm Peters, Berlin, Germany; vested in the
Alien Property Custodian

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4 Claims. (Cl. 174—140)

This invention relates to a new and useful arrangement for guy wire insulators.

An object of this invention is to insure a better and more uniform voltage distribution of a guy wire insulator arrangement for swinging type antenna masts.

A feature of this invention is the novel arrangement of mounting metallic members over the insulators in such a way that the capacitance between the various guy wire ends is increased. This novel arrangement also shelters the insulators from rain, likewise, the insulators are varied in number and arranged in series on different portions of the antenna guy wire sections to equalize the voltage stress on the individual insulators.

The antennae of large power radio stations are frequently built in the form of freely swinging masts. These are guyed to the ground by means of guy wires or cables and insulators.

To prevent electrical swinging or sway of the cables, thus it would be expedient to subdivide the guys uniformly by insulators so that sections of like length result. These sections, if possible, should be less than, say, one-fifth or one-sixth of the wave-length.

The guy wire insulation must take up and withstand the potential prevailing between the point where the guy wire is attached to the antenna mast and the earth. Inasmuch as the displacement current entering the cable at the mast does not flow continuously through the cable, but will, on the contrary, more and more flow to ground by way of the ground capacitances of the various portions or sections of the cable, it follows that in the case of a chain uniformly subdivided by the insulators, the drop of potential will become non-uniformly distributed over and between the various seriated guy insulators, to be more precise, it is distributed in such a way that the strain by potential of the insulators diminishes with their distance from the mast. This invention will best be understood by referring to the accompanying drawing, in which:

Fig. 1 is a schematic view of the electrical equivalent to calculate the distribution of the voltage, Fig. 2 shows this voltage distribution in the presence of uniform subdivision comprising five guy wire insulators, and Fig. 3 shows the insulator arrangement of this invention. Referring now in detail to the drawing, Figs. 1 and 2 show by the graph that the voltage distribution is only a function of the ratio of the capacitance between the various guys C_1 , C_2 , C_3 , which essentially is the insulator capacitance, to the capacitance c_1 , c_2 , c_3 of the guy sections to ground. The voltage gradient in the neighborhood of the mast becomes so much steeper and marked, and hence the voltage strain of the insulators in the vicinity of the mast so much greater, the smaller the ratio of C is to c . In a great many practical cases, equality of these capacitances must be figured with. However, in reality, the gradient is slightly less severe for the reason that, as a result of influence actions potentials are induced from the live mast through capacitances existing between the mast and the guy cable sections in the lower sections of the guys. However, this action will be so much lower, the more steeply the voltage on the mast declines to the base or footing. In other words, it is the lowest for the $\lambda/4$ type radiator for which therefore the voltage drop on the guy chain is very marked.

However, for reasons of standardization, that is, replaceableness of the insulators, it is desirable to use like insulators throughout. Moreover, for reasons of safety, it is necessary to use interlinking suspension fittings for in this case the insulators consisting of ceramic are predominantly subjected to compressive stresses. Suspension insulator fittings and insulators of this nature have been disclosed, for instance, in my copending United States patent applications Ser. No. 297,295, filed Sept. 30th, 1939, and Serial No. 323,531, filed March 12th, 1940, now Patent No. 2,270,964, issued January 27, 1942. High-grade ceramic material having a dielectric loss factor of low value which could here be used makes it moreover impossible to attach rain sheds of ceramic directly to the insulator in order that also under rain conditions a high flashover strength may be obtained. The impairment of flashover strength under dew conditions, on the contrary, is not so dangerous for the reason that moisture in the form of dew is anyway caused to disappear inside a short while by dielectric heating, while immediate precipitation of dew on the insulator is prevented by its heating.

According to the invention, with a view to insuring better and more uniform voltage distribution, the insulator capacitance C between the guys is artificially increased by the use of metallic members placed adjacent the insulators to serve as sheds over them. These metallic members at the same time raise the sparkover or flashover strength under rainy conditions by mounting metal drains or sheds S over the insulators.

An exemplified embodiment of such an arrangement is illustrated in Fig. 3. This figure shows the portion of the mast M where the guys are

attached. The insulators J are interconnected by metallic links G which are in the form of interlinking suspension insulator fittings similar to my copending applications mentioned above. The insulators are furnished according to the invention with sheds S which are secured to the links J and at the same time preclude the rain and increase the capacity of the insulator. Further equalization of the voltage stress on the individual insulators J according to the invention is insured by interposing a more or less great number of insulator units in series between the various guy ends depending on the location of the guy wire portion with respect to its distance from the mast.

What is claimed is:

1. An arrangement for uniform potential distribution of an antenna mast comprising a plurality of guy wires each one of which is divided into sections, a plurality of insulators for dividing said guy wires, a plurality of metallic members adjacent each one of said insulators, said metallic members being arranged in pairs on said guy wires to artificially increase the capacitance therebetween to give a uniform potential distribution to the guy wires of said antenna.

2. An arrangement for uniform potential distribution of an antenna mast comprising a plurality of guy wires each one of which is divided into sections, a plurality of insulators for dividing said guy wires, and a plurality of metallic shed members located adjacent to and surrounding

each one of said insulators, said metallic members being arranged in pairs on said guy wires to artificially increase the capacitance therebetween to give a uniform potential distribution to the guy wires of said antenna.

3. An arrangement for uniform potential distribution of an antenna mast comprising a plurality of guy wires each one of which is divided into sections, a plurality of insulators for dividing said guy wires, a plurality of interlinking suspension members secured to said insulators, and a plurality of metallic members secured to said interlinking members and located adjacent said insulators, said metallic members being arranged in pairs on said guy wires to artificially increase the capacitance therebetween to give a uniform potential distribution to the guy wires of said antenna.

4. An arrangement for uniform potential distribution of an antenna mast comprising a plurality of guy wires, each one of which is divided into sections which are less than $\frac{1}{4}$ of the normal operating wave length, a plurality of insulators for dividing said guy wires and a plurality of metallic shed members located adjacent to and surrounding each one of said insulators, said metallic members being arranged in pairs on said guy wires to artificially increase the capacitance therebetween to give a uniform potential distribution to the guy wires of said antenna.

WILHELM PETERS.