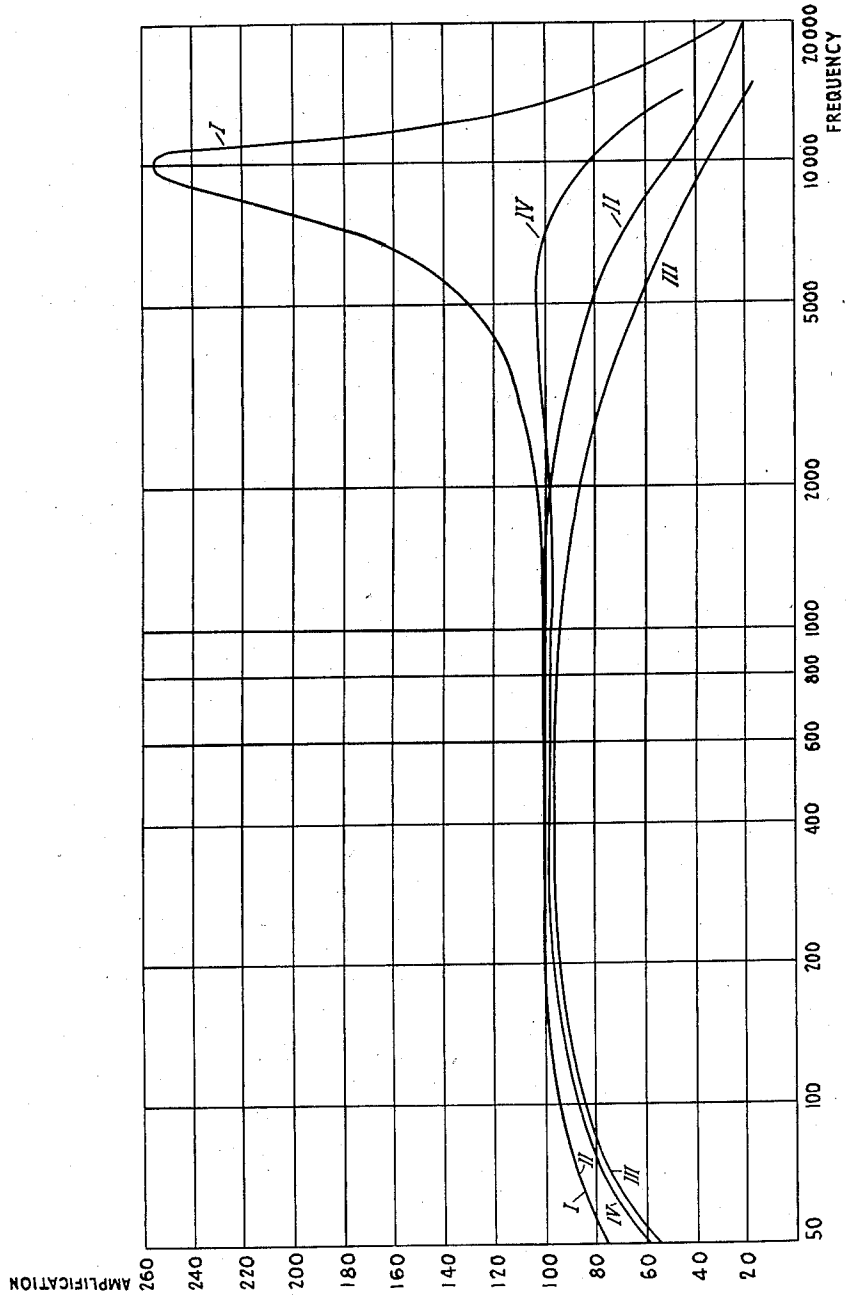
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TRANSFORMER

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TRANSFORMER

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The invention relates to transformers for amplifying electrical oscillations, such as used, for example, in wireless telephony or telegraphy. When transformers of this kind are tested, it is found that due to magnetic leakage, resonance peaks occur which, especially when lying in the audible region, are objectionable in the use of wireless telephony. For wireless telephony it is especially desirable that all the audio-frequency oscillations should be amplified evenly and that there should not be a definite band of frequencies which obtain a larger amplification than the other frequencies. The invention has for its object to provide a transformer which amplifies substantially evenly all the frequencies for which it has been designed.

According to the invention, the wire of at least one of the windings of the transformer consists principally of such a material that the production of resonance peaks is prevented by the resistance caused by the said wire. The wire may be used both for the primary and for the secondary winding. If, however, transformers are constructed for interconnection between amplification stages of a receiving set, it is advisable to choose a primary winding of low specific resistance and to use in that case the wire according to the invention for the secondary winding.

The wire may be made of a material which in itself has a high specific resistance, such for example as nickel, chromium, constantan, German silver, etc. In that case, resonance peaks are smoothed out by the high resistance, and due to a suitable choice of the material of the wire, the amplification curve of the transformer will gradually fall off with the higher frequencies. With such a wire care should be taken to choose the resistance not too high because the result thereof would be that the amplification curve would fall off too rapidly, and consequently the smoothing out of the resonance peak would be attended with the suppression of those oscillations for which the transformer has been constructed, so that the object to be attained would be defeated.

According to the invention, the production of peaks may also be prevented by constructing the wire of a magnetic material, since such a material has the property that the resistance increases with the freqeuncy, so that resonance peaks which would be otherwise produced at high frequencies, are prevented by this magnetic wire material. The transformer may even be so constructed that its resonance peak comes to lie at the highest limit of the band of frequencies for which the transformer has been constructed. When use is made of magnetic wire material, the arrangements may be such that at this highest limit the resistance has increased to such an extent that not only is the peak smoothed out, but at the end of the flattened part the amplification curve has a sharp bend downwards so that frequencies lying above the said highest limit are no longer amplified. Therefore, with such a transformer only the oscillations which lie within the range of the transformer are uniformly amplified.

The invention will be more clearly understood by referring to the accompanying drawing which represents a graph in which the abscissæ indicate the frequencies on a logarithmic scale, while the ordinates indicate the amplification. Four curves are shown which are indicated by I, II, III and IV respectively.

Curve I represents the amplification curve of a transformer with a resonance peak at about 10,000 oscillations per second. From the graph it will be seen that a frequency of 10,000 is amplified about 2½ times as much as a frequency of 1,000 oscillations per second. If such a transformer is used in a receiving set, the annoying "howling" is liable to occur.

Curve II indicates the amplification curve of the same transformer with a secondary winding of wire of nickel chromium. As appears from this curve, the peak has entirely disappeared, but the curve has such a course that at 1,000 oscillations there is already a gradual falling off to the higher frequencies. When the resistance is raised still more, the course of curve III is obtained

which is still more unfavorable and which amplifies for example frequencies of 5,000 about half as much as a frequency of 600 oscillations per second. As appears from the curves II and III the amplification over the whole region is much more uniform than with curve I, but the curve falls gradually off with the higher frequencies.

Curve IV finally shows the course of the same transformer with a secondary winding of magnetic material. The peak has been entirely smoothed out, but much more favorably than with the curves II and III, while after the point of smoothing, at a frequency of about 10,000, the curve falls off rapidly. Since the resistance of the wire increases rapidly with the frequency, the falling off of the curve is concentrated in a very small band of frequencies so that, generally speaking, oscillations of 10,000 are still amplified satisfactorily whereas oscillations of 11,000 are amplified poorly. According to this method it is possible to make excellent transformers by causing the resonance peak of the transformer to lie at about the highest limit of the band of frequencies for which the transformer has been built. By using magnetic wire material, a smoothing of this curve is obtained which corresponds to the uniform course of the amplification curve, and after the smoothing point there is such a high resistance that all the high frequencies are no longer amplified.

We claim—

A transformer for high frequency current having its secondary coil composed of nickel, whereby the oscillations which lie within the range of the transformer are substantially uniformly amplified.

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