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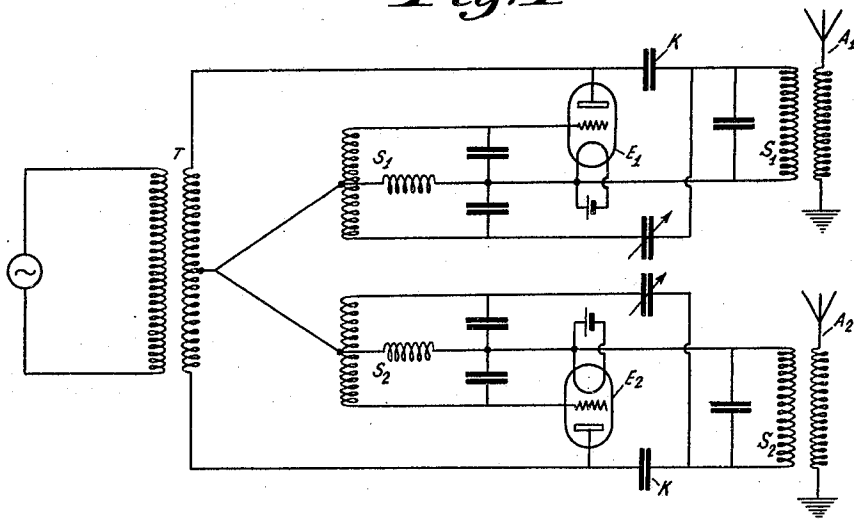
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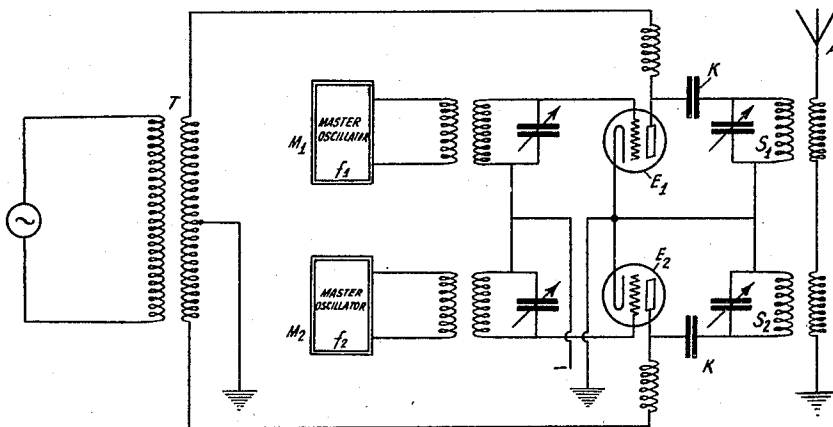
OSCILLATION GENERATION

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*Fig. 1*



*Fig. 2*



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## OSCILLATION GENERATION

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This invention relates to the generation of oscillations, and more particularly to the generation, alternately, of oscillations of different frequencies, for the reduction of fading.

5 The object of the present invention is to provide a transmitter arrangement for wireless communication especially on extra-short waves. It is a well-known fact that when  
10 working with short waves disturbances in traffic are often produced because the incoming signal strength becomes periodically or transiently very small or even drops to zero. Such variations in intensity, known as fading, are substantially due to interference  
15 phenomena. In order to eliminate them it is suggested to send the same signals simultaneously on carriers of two or more frequencies, inasmuch as fading depends upon the frequency that is used, so that, if two or  
20 more different wave-lengths are employed, simultaneous extinction of both or all of these frequencies is not to be anticipated.

Now, in order that it may be feasible to receive signals sent out on, say, two waves, with  
25 one receiver, and to economize in the use of available signalling frequencies, it is a preferable plan to utilize two frequencies which are but slightly different from each other. At the transmission end the generation of  
30 such closely adjacent frequencies gives rise to the difficulty that the two transmitters are subject to marked mutual interference, so that the oscillations of one of these transmitters, under certain circumstances, may be  
35 "entrained" by or fall inside the range of forced oscillations of the respective other transmitter tube, with the result that, instead of the intended two frequencies, only one frequency is sent out.

40 In order to overcome these practical difficulties, according to the disclosure of the present invention, the two thermionic tubes provided to generate or amplify the different frequencies are supplied from an alternating  
45 current source in push pull or phase opposition, so that the plates of the two transmitters are alternately fed with the positive half-cycles required for the production of oscillations. In this way, all chances of one of the  
50 tubes happening to fall inside the range of

forced oscillations of the other are precluded, not to speak of the fact that the use of such a working potential offers this further merit that the working potential changes inside a half-wave in its intensity whereby a modulation of the radio frequency sent is caused. Radio frequency waves modulated by alternating current, as has been found by tests, are subject to less fading, seeing that the modulation itself produces a decomposition or division of the frequency.

The specification is accompanied by drawings, in which

Figure 1 is a wiring diagram for one form of my invention; and

Figure 2 is a modification in which the frequency change is obtained in amplifier stages.

An arrangement according to this invention which may be regarded as an embodiment of the idea chosen by way of example is illustrated in the accompanying drawings. Two thermionic tubes E1 and E2 are connected transmitter fashion and are made to work upon two antennae A1 and A2. One of these thermionic tubes, E1, contains in its  
65 plate circuit an oscillation circuit S1, and in its grid circuit an oscillation circuit s1, which are tuned to one of the waves, while the other thermionic tube has two similar oscillatory  
70 circuits S2 and s2 which are tuned to the other wave to be generated. The working potentials for these two tubes are furnished by way of transformer T from an alternating current source, as shown. The ends of the  
80 secondary winding T of said transformer are united with the two plates, while the middle point of the transformer is associated with the two filaments. To shut off the alternating current operating current from the oscillation circuits carrying the radio frequency  
85 currents, blocking condensers K are provided.

It will be understood that, within the spirit of this invention, various other circuit arrangements are feasible. For instance, arrangements could be made also so that the  
90 two thermionic tubes whose plates are supplied with alternating current potentials in phase opposition, are separately controlled. In this case, the tubes themselves do not act as generators, but as amplifiers.

Such an arrangement is indicated in Figure 2, which is quite similar to the arrangement shown in Figure 1 except that in this case the tubes E1 and E2 are amplifier tubes, rather than oscillator tubes. The energies of different frequencies are first generated in master oscillators M1 and M2, and these are separately fed to the tuned input circuits of the amplifiers. It will be noticed that in this case the output circuits S1 and S2 are both amplifiers which have been shown coupled to a single antenna A instead of two separate antennas, but, of course, this feature is applicable to either arrangement.

I claim:

A transmission system for reducing the effect of fading comprising a first master oscillator for generating a first frequency, a first space discharge device amplifier circuit having input and output circuits tuned to said first frequency adapted to amplify the oscillations generated from said first oscillator, a second master oscillator for generating a second frequency, a second space discharge device amplifier circuit having input and output circuits tuned to said second frequency adapted to amplify the oscillations generated from said first oscillator, an alternating current source coupled in push-pull to the output circuits of said space discharge device amplifiers so that said amplifiers are made operative alternately, and means to radiate the resulting energy from both said amplifiers.

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