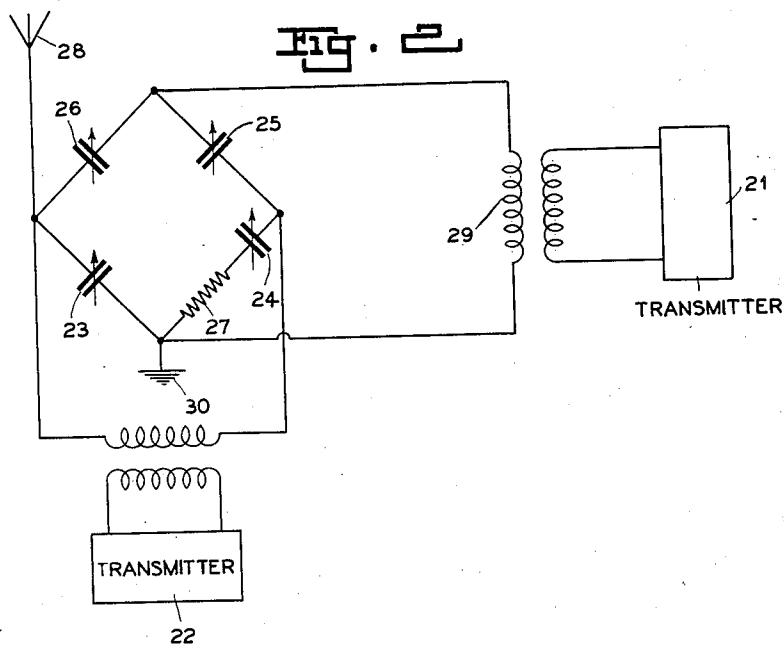
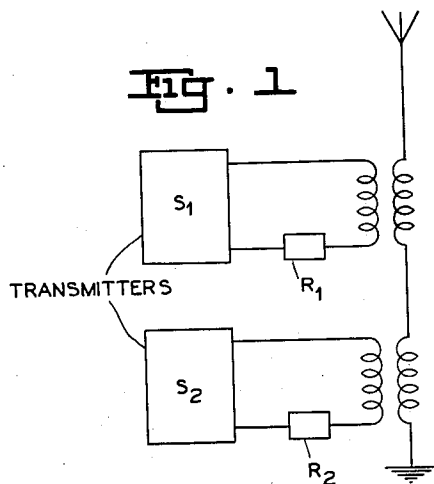


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RADIO TRANSMITTING CIRCUIT

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RADIO TRANSMITTING CIRCUIT

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6 Claims. (Cl. 250—17)

The usual type of modulated valve transmitters radiate off a frequency band the width of which is twice that of the maximum or highest overtone occurring in the modulation. Especially in cases where the modulation is rich in higher harmonics the width of the frequency band thus sent out assumes a considerable value. In practice, this condition, to be sure, is inevitable inasmuch as a high degree of modulation as required for a large range, of necessity, is associated with the arising of harmonics in modulation. Owing to this circumstance the number of stations simultaneously operable in a satisfactory manner within a given frequency band is reduced.

Now, according to this invention transmitters which are characterized by a certain wave length and a definite modulation note are obtained by a combination of two undamped (cw) transmitters the frequencies of which present such a wide difference that after rectification of the oscillations an audible sound is produced in the receiver. More specifically, the invention is concerned with jointly keyed transmitters handling non-modulated continuous waves of high frequency which differ in their frequency by an audible wave length. As a general rule, in order to stabilize this note, means will have to be provided in order that the frequency of the two partial transmitters may be kept constant. For this purpose could be employed means and ways known in the prior art such as quartz crystal control, constant oscillation circuits, thermostats or compensation of thermal expansion.

One fundamental circuit scheme incorporating this idea is shown in Figure 1. Figure 2 shows a special form of construction embodying this invention.

Referring to Figure 1, S1 and S2 are the two transmitters which work upon the aerial A. The transmitters are modulated by way of telegraphic key relays R1 and R2. One particular advantage of this circuit scheme is the chance to operate the two relays independently of each other. As a result it is feasible either to send one telegram modulated or simultaneously two messages undamped (on cw).

Most important and valuable in technical respect is the use of the basic principle of this invention in connection with simple self-excited senders, such as radio beacons. In this case the circuit scheme shown in Figure 1 would be attended with difficulties inasmuch as it is known that the oscillations of two self-excited valve generators whose frequencies are closely adjacent or similar, exhibit a tendency to "cohere" (entrain). For this reason, it is necessary to provide means in a general embodiment of the invention whereby reaction of the wave radiated off by one of the two transmitters upon the control stage of the respective other transmitter will be precluded. With that end in view recourse may be had in both transmitters, say, to neutralization or screen-grid tubes.

In a special form of construction as shown in Figure 2 the two transmitters are neutralized (balanced out) by the aid of a Wheatstone bridge. The two senders 21 and 22 are united with the four corners of a bridge which comprises the capacities 23, 24, 25, 26, with a possible or optional addition of the resistance 27. The capacity of the antenna 28 conjointly with the capacity of the condenser 23 constitutes the capacity of one of the arms of the bridge. The preferable plan is to build the capacities 24, 25 and 26 in the form of three condensers seated upon one and the same spindle, whereas the capacity 23 is variable separately. In this case the bridge is in a state of balance if the condenser 23 together with the antenna capacity is of the same value as the other condensers included in the bridge. The said condensers are in practice so set that the bridge with the coil 29 is in resonance relation with the wave transmitted by the sender 21. The coils 29 and 30 have approximately the same inductance so that in this instance the bridge spontaneously or automatically will be in resonance with the neighboring wave transmitted from transmitter 22.

As has been stated it is advisable to include a resistance 27. The size of the resistance in the present scheme is equal to the radiation resistance (characteristic impedance) of the aerial. In the presence of dissimilar values of the capacities 24, 25 and 26 the resistance must be correspondingly altered in value. At any rate, it is thus feasible to insure perfect mutual neutralization of the transmitters 21 and 22.

I claim:

1. A transmitting system comprising an antenna, two transmitters, and a balanced Wheatstone bridge circuit having variable capacitive elements in each arm of said bridge, one arm of said Wheatstone bridge circuit including the antenna capacity, said two transmitters being connected to different conjugate points on said bridge circuit.

2. A transmitting system comprising a radiating element, two transmitters, a Wheatstone

bridge circuit having variable capacitive elements in each arm of said bridge for simultaneously coupling said transmitters to said radiating element and for preventing reaction between said transmitters, said transmitters being connected to the opposite junction points of the arms of said bridge.

3. A transmitting system comprising a radiating element, two transmitters, a Wheatstone bridge circuit having four arms with variable capacitive means for simultaneously coupling said transmitters to said radiating element and for preventing reaction between said transmitters, and inductance coils connected to the opposite junction points of the arms of said bridge, said transmitters being coupled to said inductance coils.

4. A transmitting system comprising a radiating element, two telegraphic continuous wave transmitters, a Wheatstone bridge circuit comprising four arms each of which includes a variable capacity, said radiating element being included in one of said arms, said bridge circuit being arranged to simultaneously couple said transmitters to said radiating element and to prevent reaction between said transmitters, inductance coils connected to the opposite junction points of the arms of said bridge, said

transmitters being coupled to said inductance coils.

5. A transmitting system comprising a radiating element, two transmitters, a Wheatstone bridge circuit for simultaneously coupling said transmitters to said radiating element and for preventing reaction between said transmitters, said bridge circuit comprising four arms each of which includes a variable capacity, said radiating element being included in one of said arms, and a balancing resistance element in another one of said arms, inductance coils coupled to the opposite junction points of the arms of said bridge, said transmitters being coupled to said inductance coils.

6. A radio transmitting system comprising an antenna, two transmitters, a Wheatstone bridge comprising four arms having variable capacities in each arm, three of said variable capacities simultaneously variable, the other variable capacity in the fourth arm being separately variable, said antenna connected to one arm of said bridge, and inductive coupling coils connected to each junction point of the arms of said bridge, said transmitters coupled to said inductance coils.

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