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HIGH FREQUENCY FEEDER ARRANGEMENT SUITABLE FOR USE WITH RADIO AERIAL SYSTEMS

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Fig. 1

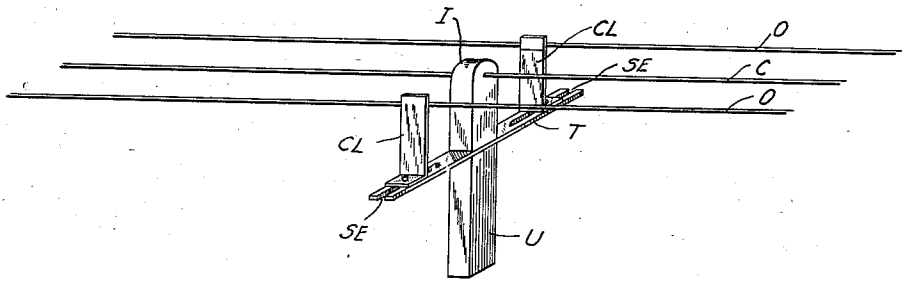
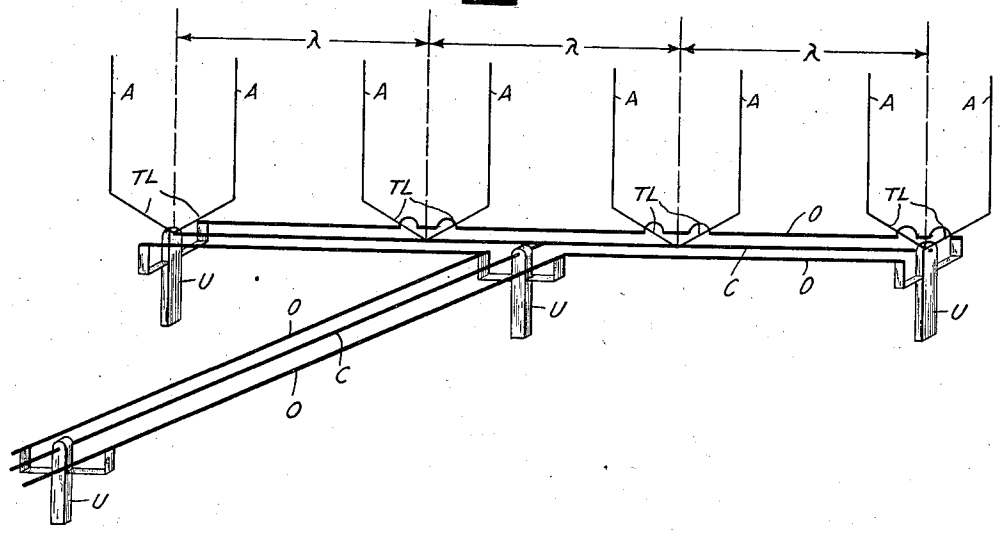


Fig. 2



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HIGH FREQUENCY FEEDER ARRANGEMENT SUITABLE FOR USE WITH RADIO AERIAL SYSTEMS

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5 Claims. (Cl. 178—44)

This invention relates to high frequency feeder arrangements and more particularly to feeder arrangements for use in connection with radio aerial systems.

It is a common practice to feed radio frequency energy from a generator to an aerial system by means of an open wire feeder arrangement consisting of conductors situated at some convenient height above the ground and running parallel thereto.

As a rule the feeder arrangement consists of two wires terminated by a load which is as nearly non-reactive as possible and is approximately equivalent in value to the surge impedance of the feeder. Theoretically, if the surge impedance of the feeder be exactly matched, no reflection will occur and hence there will be no radiation from the feeder. In practice, however, perfect matching is found to be almost impossible and, in consequence, in actual installations it is invariably found that radiation occurs from the feeder wires.

The principal object of the present invention is to provide a high frequency feeder system from which the radiation will be very small or substantially zero.

According to this invention, a feeder system for radio and other high frequency currents consists of three conductors all arranged substantially at a common height above earth, the two outer conductors being symmetrically disposed about a central conductor which is insulated and forms the "live" wire of the system.

A feeder system in accordance with this invention possesses the advantage, as compared with two conductors and four or more conductor systems, of obtaining a very high degree of symmetry as regards the relationship of the conductors to earth in conjunction with the relationship of the inner to the outer conductors. Of course, the "live" wire of the conductor system is connected to its load at such points as will give the required loading conditions with respect to earth.

Feeder systems in accordance with this invention may have their conductors supported at convenient intervals by conducting brackets which are earthed or have appreciable capacity to earth, said conducting brackets being in conductive contact with the outer conductors, but insulated from the center conductor.

The invention is illustrated schematically in the accompanying drawing.

Figure 1 is a perspective view of a portion of the feeder system in accordance with applicant's invention; and

Figure 2 shows a perspective view of applicant's feeder system applied to an aerial system.

Referring to Figure 1 which shows one practical embodiment of feeder in accordance with the invention, a feeder system consists of three wires or other conductors running parallel to the earth and to one another, and arranged at a convenient and common height above the earth. The outer conductors O are equally spaced from the central conductor C and all three are supported at convenient intervals by supporting means each comprising a conducting upright designated U buried at its lower end into the earth, said upright carrying a conducting transverse member designated T extending on either side thereof and formed with slotted ends at SE.

The central conductor C is carried by an insulator I fixed to the top of the conducting upright and the outer conductors are carried each by a cleat or bracket CL mounted upon the slotted ends of the transverse member. The arrangement is such that the members CL may be moved along the slotted ends SE and clamped in any desired position, whereby the distance separating the conductors, and therefore the impedance of the feeder system as a whole, may be adjusted.

A convenient application of the invention is to the energization of a broadside radiating aerial array. In this application, which is illustrated in the accompanying Figure 2, a feeder system of low damping, evenly loaded at even intervals of one wave length, is employed, and, as can be shown, with such an arrangement the power input at one end of the feeder will be evenly distributed at the loads irrespective of the reaction of the said loads at the points of connection.

In detail, in the application now described, the loads consist of vertical aerial elements A, A, separated horizontally by one half wave length from one another, said aerials being connected in pairs at their bases by tails TL, the common central point of each pair of tails being joined to the "live" wire C of the three wire feeder system, said feeder system running beneath the aerials. Thus the connections of the aerials to the "live" wire of the feeder will be spaced one wave length apart.

In order to obtain the best directive effect it is preferred to employ an arrangement in which (as shown in Figure 2) the feeder from the source of high frequency oscillations is connected to

that portion of the feeder beneath the aerial at the middle of said portion. so that the aerial system is energized outwards from the center, i. e., the whole feeder system in plan view will resemble a T. The junction of that portion of the feeder system which lies beneath the aerial array, and that portion leading from the source of high frequency oscillations, is preferably so arranged (by suitable choice of surge impedance in the respective portions of the feeder system) that the impedances at the junction are matched.

In a modification (not shown) the feeder beneath the aerials consists of a single insulated wire of appropriate diameter and height above earth connected at its mid-point to the "live" wire of a three wire system connecting the aerial system with the energizing or reeciving apparatus (not shown).

The aerial and feeder system above described may be employed either for transmission or for reception.

I claim:

1. In a radio frequency system, a radiationless feeder system consisting of three conductors all arranged substantially horizontally at a common height from the earth, the two outer conductors being symmetrically disposed about the central conductor which is insulated from the other conductors and forms the live wire of the system, brackets of substantially T shape comprising a vertical support and an arm on each side of said support disposed at intervals for supporting said conductors, and adjustable means on the arms of each of said brackets for varying the separation of the outer conductors with respect to the central conductor.

2. In a radio frequency system, a radiationless feeder system consisting of three conductors all arranged substantially at a common height above earth, the two outer conductors being symmetrically disposed about the central conductor which is insulated from the other conductors and forms the "live" wire of the system, a vertical support provided with at least one arm for supporting said conductors, metallic elements mounted on said arm and having by virtue of their construction appreciable capacity to earth, said elements being in electrical conductive contact with the outer conductors but insulated from the center conductor.

3. In a radio frequency system, a radiationless feeder system consisting of three conductors all arranged substantially horizontally at a common height above the earth, the two outer conductors being symmetrically disposed about the central conductor which is insulated from the other conductors and forms the "live" wire of the system, brackets of substantially T shape comprising a vertical upright and a traverse member disposed at intervals for supporting said conductors, vertical portions mounted on the transverse member for supporting the outer conductors, said vertical portions forming with the transverse member of each of the T-shaped brackets a U, said U being mounted at its center on the vertical upright of the bracket, said upright supporting the central conductor.

4. A system as defined in claim 3 characterized in this, that said U's which support the outer conductors, and the vertical uprights of the brackets are made of electrical conducting material, each of said uprights including an insulator for supporting the central or "live" conductor.

5. In a radio frequency communication system, a substantially radiationless feeder system consisting of three conductors all arranged at the same height above earth, the two outer conductors being symmetrically disposed about a central conductor which is insulated from the other conductors and forms the "live" wire of the system, brackets disposed at intervals for supporting said conductors, each bracket including three vertical arms, one for each conductor, and a common supporting upright for said arms.

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