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SYSTEM FOR HIGH FREQUENCY TRANSMISSIONS

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Fig. 3.

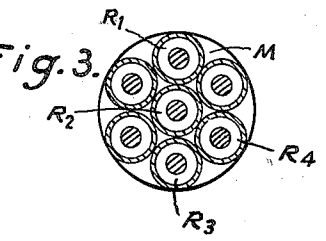


Fig. 1.

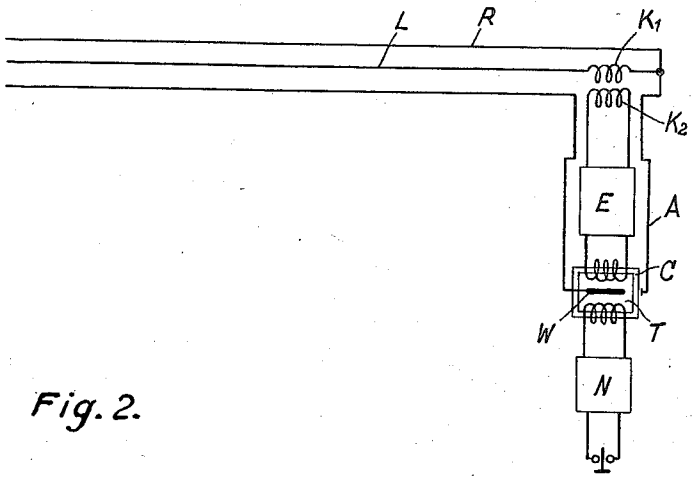
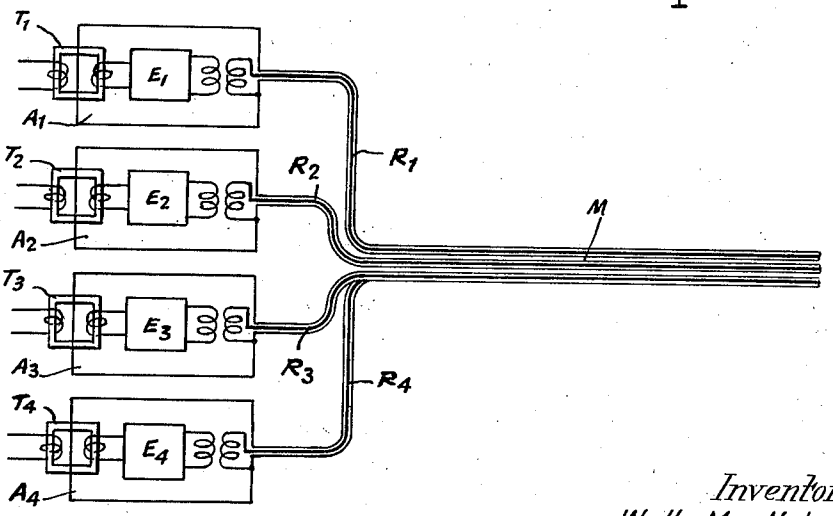


Fig. 2.



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SYSTEM FOR HIGH FREQUENCY TRANSMISSIONS

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3 Claims. (Cl. 178—44)

It is well-known to transmit intelligence by means of high frequency along cables instead of employing space radiation. In prior arrangements the customary telephone cables have served this purpose. It has however been suggested also to employ cables of a special construction, having a greater or less part of their insulation constituted by air. It has further been proposed to effect the transmissions along so-called concentric cables, i. e. cables containing concentric conductors. In this case, however, at larger distances disturbances occur which are avoided by the invention.

The use of concentric cables above all entails difficulties inasmuch as the outer conductor of the cable is adapted to receive considerable electric charges from interfering fields, high frequency transmitters or the like. It must be considered here that in the case of large distances the cable lengths are in the order of magnitude of the wave-length or of a multiple thereof. If now the receiver is simply connected between the central conductor and the outer one, which may be made inductively or capacitively, then there is a symmetry as regards the traffic currents, i. e. the high frequency that on the transmitting side is impressed upon the cable, while there is no symmetry as regards the currents coming from without, such as those of interfering fields.

In order now to obviate disturbances due to such outer fields, in the novel arrangement the high frequency device connected to the concentric cable, and preferably the receiver, is partly or entirely contained in a screening connected to the outer conductor of the cable, the high frequency device thus being in a sense included in the cable.

The invention is adapted for use with the receiving stations as well as transmitting stations, although provisions of this kind are in the first place required on the receiving side.

The invention is described hereafter by way of example, in connection with the accompanying drawing, in which Fig. 1 is a diagrammatic showing of a receiver and part of the high frequency cable connected thereto.

Fig. 2 illustrates several such systems arranged in connection with a single cable, and—

Fig. 3 illustrates a cross-sectional view of the cable M of Fig. 2.

This cable has a central conductor L and a tubular outer conductor R. The constructive details of the cable are not of interest here. The receiver, whose high frequency portion is designated E, is coupled to the cable by two coils K1 and K2. Coil K1 is disposed between the conductors L, R. The device E, that need not be earthed, is inclusive of the rectifier contained in a screening or shielding A connected to conductor R. The device E is thus in a sense included in the cable.

The low frequency portion of the receiver is denoted by N. A low frequency transformer T, by which a low frequency amplifier N is coupled to the high frequency receiver and detector E, has its two windings each disposed on a limb of a frame-shaped iron core C. Between these limbs or the two windings there is a wall W that serves to complete the screening A in such a manner that only low frequency currents shall flow at N. The low frequency amplifier may be earthed in a well-known manner more or less efficiently or more or less symmetrically.

If the receiver is fed from a network, the network connecting device, so far as it is concerned with the feeding of electronic tubes carrying high frequency, should be included in the screening A. In such case the network-lead for instance must likewise be provided with a protecting wall such as the wall W, or an equivalent means must be arranged. Further, if the low frequency amplifier is fed by the same network connecting device then care should be taken that also here no asymmetries are introduced into the arrangement.

If the invention is not employed the following difficulties arise.

The receivers are from a high frequency point of view always more or less asymmetrical. For example, in automatic telephone systems, which may of course have to be dealt with in effecting the invention, the low frequency exchange equipments are made up asymmetrically with respect to earth, and in addition the line wires themselves are by no means run symmetrically with respect to earth.

The invention further enables cables to be made which comprise a plurality of individual high frequency cables provided each with concentric conductors. To such end it is necessary to include in the manner before described each high frequency receiver or transmitter in the outer conductor of the cable appertaining to it.

Such an arrangement is shown in Figs. 2 and 3. Fig. 3 represents, for example, four screening means A1, A2, A3 and A4, which are connected to their corresponding outer conductors of the

coaxial cables R1, R2, R3 and R4. These coaxial cables are combined into a single cable M made up of the four individual cables R1 to R4.

The high frequency members E1 to E4 of the receiving arrangement are contained within the screening members A1 to A4, respectively. These high frequency members may comprise, for example, one or more amplifier stages which may be of a well known form of electron tube amplifier. The transformers T1, T2, T3 and T4 correspond to transformer T of Fig. 1 and serve to couple the high frequency members E1 to E4 to a low frequency apparatus such as shown at N in Fig. 1.

Fig. 4 represents a cross-sectional view of a cable such as shown in Fig. 2, in which the four conductors R1, R2, R3 and R4 are included.

What is claimed is:

1. In a system for high frequency transmission, a cable containing concentric conductors, a high frequency device connected to said cable, a screen for said high frequency device, said screen being connected to the outer of said concentric conductors, a low frequency equipment, a transformer connecting said equipment to the said high frequency device and screening means fitted to said transformer and completing the screening of the said high frequency device.

2. In a system for high frequency transmission, a cable containing concentric conductors, a high frequency device connected to said cable, a screen for said high frequency device, said screen being connected to the outer of said concentric conductors, a low frequency equipment, a transformer connecting said equipment to the said high frequency device and a screening wall disposed between the coils of said transformer to complete the screening of the said high frequency device.

3. In a system for high frequency transmission, a cable comprising a number of component cables having each concentric conductors, a high frequency device for each of these component cables and connected thereto, and a screening for each of the said high frequency devices, this screening being connected to the outer of the said concentric conductors of the component cable appertaining to the respective high frequency device.

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