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CIRCUIT ARRANGEMENT FOR THE TRANSMISSION OF ULTRA HIGH FREQUENCY ELECTRICAL OSCILLATIONS

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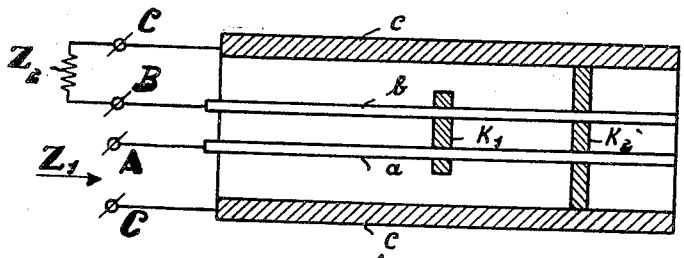

Fig. 1.

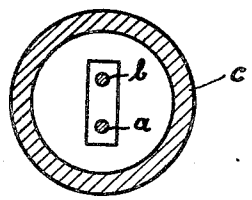

Fig. 2.

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CIRCUIT ARRANGEMENT FOR THE TRANSMISSION OF ULTRA HIGH FREQUENCY ELECTRICAL OSCILLATIONS

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5 Claims. (Cl. 178—44)

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This invention relates to a circuit arrangement for the transmission of ultrahigh frequency electrical oscillations.

In transmitting ultrahigh-frequency electrical oscillations use is often made of circuits by means of which a definite impedance is transformed into an arbitrary or other impedance (impedance transformers) for instance where the impedance of an apparatus consuming ultrahigh-frequency electrical oscillations is to be matched to the source of energy. Furthermore it is often desirable, for instance for measuring purposes, to have very small, variable capacities and inductances whose values are exactly known. In these cases use may likewise be made with advantage of an impedance transformer, an impedance which is several times too large or too small then being connected to one side of the transformer, whereas the desired smaller or larger impedance is found at the other side of the impedance transformer.

Impedance transformers are known, consisting of a certain number of parallel conductors which form lecher systems in pairs that are each adjusted by means of a short-circuit bridge and are decoupled with respect to one another. These impedance transformers are suffering from the drawback that their construction and control is complicated.

The present invention provides a simple circuit by means of which any impedance can be transformed into any other impedance and the adjustment of which is easy.

The circuit according to the invention is characterised by three parallel or substantially parallel conductors *a*, *b*, *c*, all of which are intercoupled and of which two of the ends at the same side serve to constitute input terminals *a*, *c* whereas the third of these ends, together with one of the said ends, serve as output terminals *b*, *c* of the circuit, the circuit comprising two, preferably movable, short-circuit bridges one of which interconnects the conductors *a* and *b* and the other interconnecting all of the three conductors.

In an extremely suitable form of construction of the circuit the conductor *c*, to which is connected the terminal common to the input and the output of the circuit, surrounds the two other conductors *a* and *b*.

In order that the invention may be more clearly understood and readily carried into effect it will now be described more fully with reference to the accompanying drawing, given by way of example, which represents the said very suitable form of construction of the circuit (impedance transformer) according to the invention. Figure 1 is

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a longitudinal section and Figure 2 a cross-section of the impedance transformer. The impedance transformer consists of three parallel conductors *a*, *b* and *c*. The conductor *c* is tubular and surrounds the conductors *a* and *b*. The left-hand end of the conductors act as input terminals A and C and output terminals B and C of the circuit respectively. Between the conductors *a* and *b* is provided a movable short-circuit bridge K_1 and furthermore a movable short-circuit bridge K_2 interconnects the conductors *a*, *b* and *c*. If—as shown in Figure 1—an impedance Z_2 is provided between the terminals C and B, an impedance Z_1 is measured between the terminals A and B.

The said impedance transformer has the property that any impedance Z_2 can be transformed into any other impedance Z_1 by a suitable adjustment of the short-circuit bridges K_1 and K_2, consequently by controlling or adjusting only two variable values. With the known impedance transformers the various conductors form pairs of lecher systems which are separated from each other and each of which must be adjusted by means of a short-circuit bridge. However, these impedance transformers, at least insofar as they are capable, similarly to the present transformer, of transforming some impedance into any other impedance, are much more complicated in regard to construction and operation, since there are at least three lecher systems so that three short circuit bridges must be adjusted.

The impedance transformer according to the invention is based on the recognition that by intercoupling the various lecher systems and by providing the short-circuit bridges in the manner referred to, the adjustment of the impedance transformer can be greatly simplified without the aforesaid property (the possibility of transforming some impedance into any other impedance) being lost.

What we claim is:

1. A circuit arrangement for transmitting ultra-high-frequency electrical oscillations, which comprises three substantially parallel conductors *a*, *b*, *c*, all of which are intercoupled and of which two of the ends at the same side serve to constitute input terminals *a*, *c* whereas the third of these ends, together with one of the said ends, serve as output terminals *b*, *c* of the circuit, the circuit comprising two, movable, short-circuit bridges one of which interconnects the conductors *a* and *b* and the other interconnecting all of the three conductors.

2. A circuit arrangement as claimed in claim 1, in which the conductor *c*, to which is connected

the terminal common to the input and the output of the circuit, surrounds the two other conductors *a* and *b*.

3. An ultra-high-frequency impedance transformation device comprising first, second and third conductors arranged in substantially parallel relation, a pair of input terminals connected to corresponding ends of said first and second conductors, a pair of output terminals connected to said end of said first conductor and the corresponding end of said third conductor, a first shorting member interconnecting corresponding points on said first, second and third conductors, and a second shorting member interconnecting corresponding points on said second and third conductors.

4. An ultra-high-frequency impedance transformation device comprising first, second and third conductors arranged in parallel relation, a pair of input terminals connected to corresponding ends of said first and second conductors, a pair of output terminals connected to said end of said first conductor and the corresponding end of said third conductor, a first movable bridge interconnecting said first, second and third conductors, and a second movable bridge interconnecting said second and third conductors.

5. An ultra-high-frequency impedance transformation device comprising first, second and third conductors arranged in parallel relation, a pair of input terminals connected to corresponding ends of said first and second conductors, a pair of output terminals connected to said end of said first conductor and the corresponding end of said third conductor, said first conductor being tubular and surrounding said second and third conductors, a first movable bridge disposed within said first conductor and interconnecting all of said conductors, and a second movable shorting bridge disposed within said first conductor and interconnecting said second and third conductors.

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