

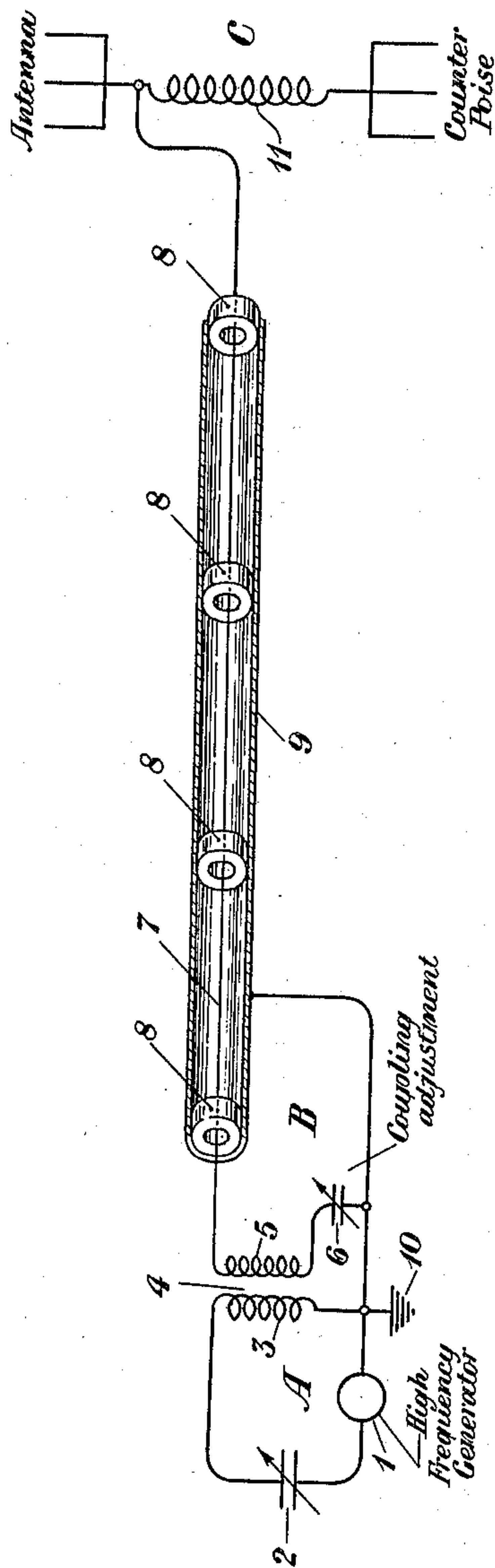
March 8, 1927.

R. S. OHL

1,619,882

MEANS FOR TRANSFERRING HIGH FREQUENCY ENERGY

Filed Dec. 4, 1924



INVENTOR
R. S. Ohl
BY *gr 40*
ATTORNEY

UNITED STATES PATENT OFFICE.

RUSSELL S. OHL, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

MEANS FOR TRANSFERRING HIGH-FREQUENCY ENERGY.

Application filed December 4, 1924. Serial No. 753,945.

This invention relates to radio signaling systems, and particularly to means for transferring high frequency energy from the point of generation to the point of radiation without incurring any substantial loss.

When the point of radiation of the energy of a high frequency signaling system is quite remote from the point of generation of the energy, substantial losses may be incurred in the transfer of the energy from the generating point to the radiating point owing to the presence of the structure supporting the transmitting conductor, as for example, the walls and framework of a building within the immediate field of radiation.

It is the object of this invention to transfer radio frequency energy from the point of generation to the point of radiation without any substantial loss of energy in the transfer circuit.

This invention will be apparent from the following description when read in connection with the attached drawing showing schematically a form of embodiment of the invention. In the drawing, A represents a high frequency generating circuit which is coupled to the circuit B which is connected with the antenna system C. The generating circuit contains a source 1 of high frequency currents, the condenser 2 and an inductance 3, the said inductance being the primary winding of the transformer 4 which couples circuit A to circuit B. Circuit B comprises an inductance 5 constituting the secondary winding of the transformer 4 and condenser 6. One terminal of the winding 5 is connected with the transfer conductor 7. This conductor is preferably of fine copper wire supported at suitable intervals by means of the insulators 8. These insulators should be of quartz or other insulating material having low loss at high frequencies. The conductor 7 as thus insulated is surrounded by a shield of copper 9 or other suitable metal. The shield 9 and the condenser 6 are grounded at the point 10 at which the generating circuit A also is grounded. The transfer conductor 7 is connected with an antenna system C which may be of any well known type. The ratio of the diameter of the cylinder 9 to the diameter of the transfer conductor 7 must be large to reduce the internal capacity between the conductor and the metallic cylinder 9 to a minimum.

In the operation of the system shown in the drawing, high frequency current generated within the circuit A will set up a high voltage within the circuit B of the same frequency provided the condenser 6 is adjusted to tune the circuit B to resonate with A. Owing to the high impedance of the circuit B, which includes as a part of fine copper conductor 7, the current transmitted over the circuit to the antenna system C is relatively small. The voltage at which such current is transmitted is, however, relatively high. Since the current is small and since the transfer conductor 7 is enclosed within the metal cylinder 9, the loss of energy due to the field set up by the current flowing over conductor 7 is relatively small. This is particularly true when the distance between the generating source and the point of radiation is less than one-fourth of the wave length transferred.

A field of use of my invention resides, for example, in radio-broadcast transmitting stations where it is necessary to locate the antenna upon the roof, and the generating station upon one of the lower floors of a building and at a relatively long distance from the antenna. With systems heretofore employed there would be considerable loss of energy due to absorption not only by the steel framework usually employed in high building construction but also by the walls themselves. With the system embodying my invention as described herein, such absorption is greatly reduced, partly by the small current flowing in the transfer conductor and partly by the shield surrounding the conductor. It is desirable to point out that by making the capacity between the conductor 7 and the shield 9 quite small the loss at high frequencies due to this capacity is likewise small. It is furthermore desirable to tune the antenna system C to resonance so that the small current transferred to it at high voltage would keep the antenna system resonating and would effect the radiation of large amounts of energy with slight loss.

Although no arrangement for modulating the high frequency currents has been shown in connection with the generating circuit A, it is desired to point out that details of this character have purposely been omitted from the drawing in order to render it simple. It is to be understood, however, that such

details may be employed in connection with this system without departing from the spirit of the invention.

While this invention has been disclosed
5 as embodied in a particular form and arrangement of parts, it is to be understood that it is not so limited but is capable of embodiment in other forms without departing from the spirit and scope of the ap-
10 pended claims.

What is claimed is:

1. The method for transferring high frequency energy from a source to a radiating circuit remote therefrom without incurring
15 substantial loss of energy during transfer, which consists in generating high frequency current, stepping up the generated voltage and reducing the current during the transfer of the energy from the said source to the
20 point of radiation, and preventing the dissipation of the energy during transfer by shielding the transferring medium from external bodies.

2. In a radio signaling system, the combination with a source of high frequency current, of a radiating system remote there-

from, a high impedance connecting circuit to transfer energy from the said source to the said radiating system, the said connecting circuit having a shield to prevent ab-
30 sorption of energy by surrounding bodies, and means to tune said connecting circuit together with said radiating system, the tuned circuit including the capacity to ground of the said radiating system. 35

3. In a radio signaling system, the combination with a source of high frequency current of a radiating system comprising an antenna and a counterpoise connected by an inductance, a shielded connecting circuit
40 coupled to the said source of high frequency current and connected with the said radiating system, and means to tune the said connecting circuit together with the said radiating system, the tuned circuit including the
45 capacity to ground of the said antenna and counterpoise.

In testimony whereof, I have signed my name to this specification this 3rd day of December, 1924.

RUSSELL S. OHL.