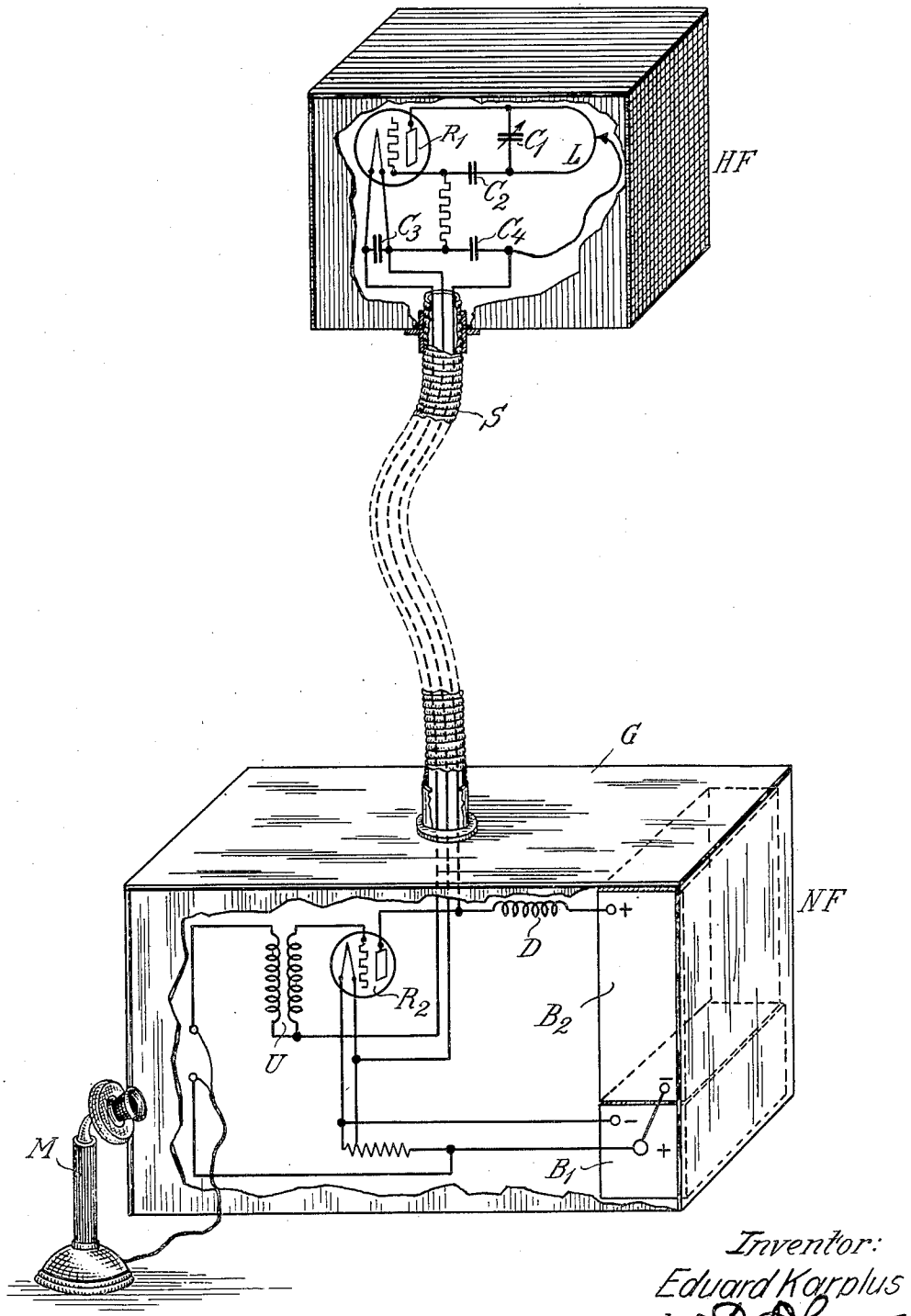
June 23, 1931. E. KARPLUS 1,811,357

WIRELESS SIGNALING APPARATUS

Filed March 11, 1929



Inventor:
Eduard Karplus
by Paul S. Phillips
Attorney.

Patented June 23, 1931

1,811,357

UNITED STATES PATENT OFFICE

EDUARD KARPLUS, OF BERLIN-TEMPELHOF, GERMANY, ASSIGNOR TO C. LORENZ AKTIENGESELLSCHAFT, OF BERLIN-TEMPELHOF, GERMANY

WIRELESS SIGNALING APPARATUS

Application filed March 11, 1929, Serial No. 345,914, and in Germany May 12, 1928.

In the construction of transmitters and receivers for short and ultra-short waves, special precautionary measures have to be taken, since all the oscillation circuits shrink to quite unusually small dimensions. For this reason, it is not possible simply to place an apparatus for the purpose of protection from external disturbing influences inside a metal casing and to earth the same. When operating with longer wave-lengths, this is possible without difficulty, since the lead to the antenna can be simply led out from the casing in an insulated manner in order to be connected to the antenna. The antenna circuit is, however, in devices for ultra-short waves, only several centimeters long and its entire energy would be taken from it if it were arranged in close proximity to the screening casing. Further difficulties arise, for instance, in aircraft stations, since the small antenna circuit must at all events be arranged outside the flying machine but longer leads to the same, cannot be attached. In this case therefore, the whole apparatus had to be installed outside the flying machine, on which account however, the manipulation of the same was impossible.

The disadvantages described are avoided, according to the invention, by arranging the circuits conveying low-frequency, medium frequency and direct current, in a screened earthed metal casing and making the connection with the circuits conveying high-frequency which are separated in space, galvanically by means of leads which are screened by a metallic protective covering and which do not convey any high-frequency.

The figure in the drawing shows one form of my invention, with parts of the housings broken away to diagrammatically disclose part of the transmitter circuit.

In the drawing of the subject of the invention given by way of example, the high-frequency part is indicated by HF and the modulation or low-frequency part by NF. The high-frequency transmitter given by way of example is connected in the manner usual with short-wave stations. The tunable oscillation circuit LC_1 is connected, under the intermediate connection of the usual condenser C_2, with the anode and the grid of the valve R_1. The anode voltage is introduced to the neutral point of the intermediate circuit L. The supply conductors of the heating and anode current are bridged over by capacities C_3 and C_4 in order to prevent high-frequency flowing in the same by making a short-circuit for high-frequency. The actual high-frequency transmitter is arranged inside a suitable casing, which may consist of weather-proof material or insulating material, in order that it should be possible also to arrange the transmitter somewhat outside the flying machine already mentioned at the beginning.

All the batteries in addition to the modulation arrangement or keying arrangement are situated in an earthed metal casing G. A Heising modulation circuit is diagrammatically shown in the figure. The microphone must, of course, be outside the casing and is connected at M, in order to influence the grid of the valve R_2 through a transformer U. The heating batteries B_1 and B_2 in addition to the anode choke D are likewise inside the casing. The connection with the high-frequency part is made by lines, which, in the example shown, are inside a flexible metal tube S, which is connected with the casing G. It is obvious that any desired modulation or keying arrangement can be arranged inside the casing and that the connecting line together with the flexible metal tube can be adapted to be plugged in. For special purposes, it is also desirable to replace the flexible metal tube by a stiff tube and to carry the high-frequency transmitter by means of the tube itself.

The separation, according to the invention, of the high-frequency part from the other parts can be carried out equally well in the case of a receiving apparatus. The wave-length of the transmitter can, of course, be firmly adjusted, but on the receiving side, a corresponding receiving apparatus must be used which need not be tuned in the high-frequency part. Either a receiver which is little selective is used or a superheterodyne receiver or super-regenerative receiver, the auxiliary frequency of which is conveyed to the high-frequency receiver likewise by leads,

which are led in the flexible metal tube. It is unnecessary to explain the circuit in more detail by aid of a figure, since in short-wave devices, the transmitting and receiving circuit are the same in principle and well-known of themselves. It is also possible without difficulty, with particular receiving arrangements, to arrange the medium frequency part also in the metal casing.

What I claim is:

1. An apparatus for wireless signaling by ultra-short waves comprising two parts arranged in spaced relation to one another, the first of said parts including the circuits for high frequency and the second of said parts comprising a screened metal casing connected with earth and including circuits for low-frequency and direct current; the said two parts being connected galvanically through leads which are screened by a metallic protective covering, and condensers shunting said leads at their connection points with the high frequency circuits.

2. An apparatus for wireless signaling by ultra-short waves comprising two parts arranged in spaced relation to one another, the first of said parts including the circuits for high frequency and the second of said parts comprising a screened metal casing connected with earth and including circuits for medium, low-frequency and direct currents; the two parts being connected galvanically through leads which are screened by a metallic protective covering, and condensers shunting said leads at their connecting points with the high frequency circuits.

3. An apparatus for wireless signaling by ultra-short waves comprising two parts arranged in spaced relation to one another, the first of said parts including the circuits for high frequency and the second of said parts comprising a screened metal casing connected with earth and including circuits for low-frequency and direct currents; the two parts being connected galvanically through leads enclosed in a flexible metallic tube, and condensers shunting said leads at their connecting points with the high frequency circuits.

4. An apparatus for wireless signaling by ultra-short waves comprising two parts arranged in spaced relation to one another, the first of said parts including the circuits for high frequency and the second of said parts comprising a screened metal casing connected with earth and including circuits for medium-frequency, low-frequency and direct currents; the two parts being connected galvanically through leads enclosed in a flexible metallic tube, and condensers shunting said leads at their connecting points with the high frequency circuits.

5. An apparatus for wireless signaling by ultra-short waves comprising two parts arranged in spaced relation to one another, the first of said parts comprising a water-tight casing enclosing the circuits for high frequency and the second of said parts comprising a screened metal casing connected with earth and enclosing circuits for low-frequency and direct currents; the said two parts being connected galvanically through leads screened by a metallic protective covering, and shunt condensers at the connection points of said leads with the high frequency circuits.

6. An apparatus for wireless signaling by ultra-short waves comprising two parts arranged in spaced relation to one another, the first of said parts comprising a water-tight casing enclosing the circuits for high-frequency and the second of said parts comprising a screened metal casing connected with earth and enclosing circuits for medium-frequency, low-frequency and direct currents; the said two parts being connected galvanically through leads screened by a metallic protective covering, and shunt condensers at the connection points of said leads with the high-frequency circuits.

In testimony whereof I have affixed my signature.

EDUARD KARPLUS.