

Jan. 21, 1930.

H. J. WRAPE

1,744,091

LEAD FOR RADIO SYSTEMS

Filed Aug. 18, 1922

Fig. 1.

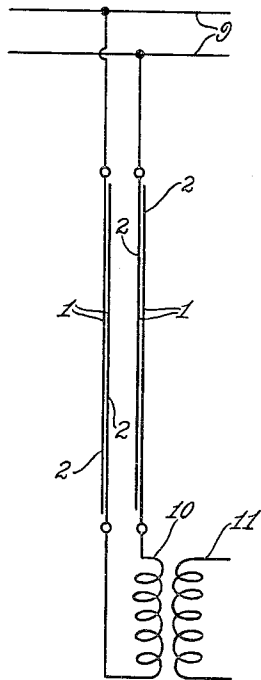


Fig. 2.

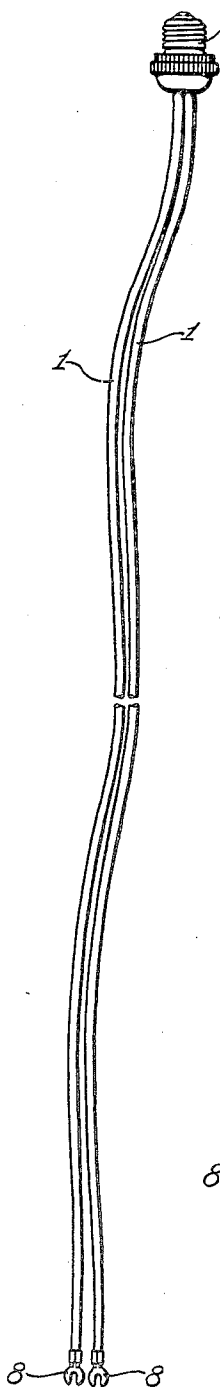


Fig. 3.

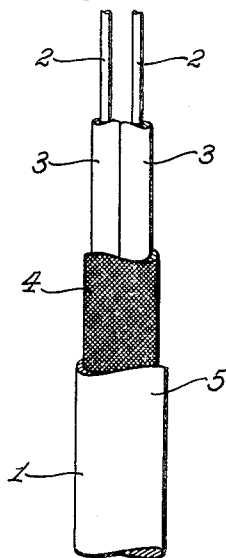


Fig. 4.

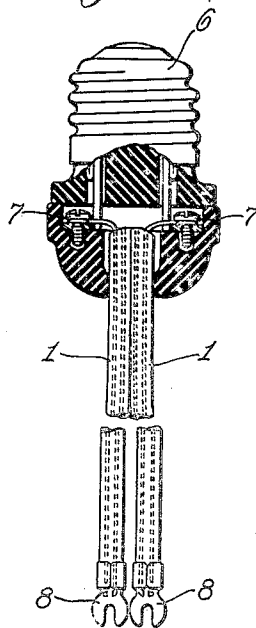
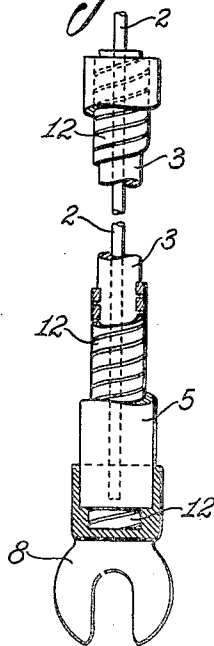


Fig. 5.



Inventor:
HAROLD J. WRAPE,
By John H. Brunning,
His Attorney.

UNITED STATES PATENT OFFICE

HAROLD J. WRAPE, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
BENWOOD-LINZE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI

LEAD FOR RADIO SYSTEMS

Application filed August 18, 1922. Serial No. 582,736.

This invention pertains to apparatus for use in wireless telegraphy and telephony.

In many installations of radio apparatus, condensers are required to furnish the required electrical capacity for proper tuning operations, adjustment of wave lengths, and similar purposes. In many cases the actual value of the capacity required is extremely small, and values as low as 1/100 to 1/1000 of a microfarad being used. In such cases the dimensions of a condenser constructed for such small capacity becomes very small. In fact, two parallel wires of several feet in length have been found to have between them sufficient capacity for some purposes.

One of the objects of this invention, therefore, is to provide a connecting lead for use with radio apparatus which shall have incorporated therein a condenser of small capacity.

It is often found inconvenient or expensive to erect the necessary antenna required for receiving or transmitting radio signals. In many cases it is found convenient to utilize in place of the antenna, an existing network of conductors such as, for instance, the electric light wiring of an ordinary house. Some difficulty is encountered in connecting to the light wiring of an ordinary house, on account of the fact that such wiring is always connected to the service mains and the current from such mains must be kept out of the radio apparatus.

Another object of this invention therefore is to provide a connecting lead or leads through which the radio set may be connected to the house wiring as an antenna without interfering with the use of such wiring for its normal purpose.

Another object is to provide a convenient form of connecting leads which may be attached to the house wiring by merely plugging into an ordinary lamp socket.

Further objects will appear from the following description taken in connection with the accompanying drawing in which,

Figure 1 is a diagram illustrating the general method of connecting to the house wiring through leads embodying this invention.

Figure 2 is a view illustrating a pair of

leads embodying this invention and attached to a standard plug.

Figure 3 illustrates the construction of a lead embodying this invention.

Figure 4 is a sectional view showing the connections to the plug.

Figure 5 is a view illustrating another embodiment of this invention.

Referring now to the drawing and more particularly to Figures 2, 3, and 4, 1 designates a lead which is made up of a pair of wires, 2, as illustrated in Figure 3. Each of the wires, 2, may be provided with its own insulation, 3. The pair of wires, 2, together with their insulation, 3, may then be covered by a protecting cover, 4, of braid or other suitable material. The pair may then be provided with an outer covering, 5, which may take the form of a rubber tube. This forms what is ordinarily called a two-conductor or twin-conductor cable.

In accordance with this invention, two leads each made up of a pair of wires as just described for Figure 3 are connected to a standard attachment plug, 6, as illustrated in Figure 4. In this figure each lead comprises a pair of wires as illustrated in Figure 3, one of which is connected to one of the terminals, 7, of the plug. The other wire of each pair is dead-ended and insulated at the upper end of the lead, 1, while at the other end of the lead this conductor is connected to a terminal, 8. There is thus no conductive connection between the terminals, 7 and 8, but the two wires to each lead lie parallel to one another at a short distance apart and form together a condenser of small capacity. The actual capacity of this condenser can be adjusted within the practical limits by varying the length of the lead.

In using this device the connection is made as illustrated in Figure 1, in which 9, designates the house wiring. 10 designates one coil of a radio transformer, of which 11 is the other coil. The coil 10 is connected to the main 9 through a pair of leads, 1, each lead comprising a pair of wires, 2. It will be noted that one of each pair of wires 2, is connected to the mains, 9, while the other conductor, 2, of each pair is connected to the

coil, 10. It will be noted that there is thus no conductive connection between the mains 9, and the coil, 10, so that practically none of the service current from the house circuit will flow through the coil, 10. Only such current as can pass through the condenser formed by the wires, 2, can flow and, since the voltage and frequency on the mains, 9, are comparatively very low, only a negligible current will flow from the mains through the coil, 10.

The conditions that obtain with this connection are, however, very favorable for use in radio work. It will be understood that in ordinary house wiring one of the mains, 9, is grounded while the other is not. It will be evident, therefore, that by this connection one terminal of the coil, 10, will be connected through a light condenser to a network of wires adapted to provide an effective antenna. It is true that the grounded and ungrounded mains are connected together through the secondary coil of the service transformer. The inductance of such a coil is, however, so high that currents of radio frequency will not flow therethrough, so that the presence of such a coil will not affect the operation of the system for radio work. It will be evident, therefore, that by simply inserting the plug, 6, into any lamp socket connected to the mains, 9, the radio set will be connected both to an effective ground and to an effective antenna.

While in the large majority of cases one side of the house wiring is grounded, there are some cases in which the house circuit is not grounded. In such case the radio set may be connected to one side of the house circuit by means of a single lead, and to the ground through a separate lead.

Figure 5 illustrates an embodiment of this invention in which a small amount of inductance as well as capacity is incorporated in the connecting lead. In this embodiment a single wire, 2, is provided with an insulated coating, 3. Surrounding the insulated coating, 3, is a coiled metallic strip, 12, forming a so-called armor or protective covering for the wire. This combination is furnished to the trade by the name of "Armored cable". The armor, 12, may be covered with an insulating covering, 5. At the upward end of the lead the wire, 2, may be connected to a plug or other suitable terminal, not shown. At the lower end of the lead the armor, 12, is electrically connected to a terminal, 8.

It will be noted that the wire, 2, and the metallic armor, 12, being parallel and close together, but insulated from one another, form two coatings of a condenser. At the same time the armor, 12, being coiled will have the effect of an inductance in the circuit in which the lead is connected. The relative values of inductance or capacity may be varied by varying the thickness of the insu-

lation, 3, or the pitch of the coil of the armor, 12, or both.

It will be evident from the foregoing that the invention accomplishes its objects. A device is provided whereby a radio set may be connected to the ordinary house mains in such a way that said mains will furnish both the ground connection and the antenna connection for the set. At the same time interference of the house circuit with the operation of the set is effectively prevented. The connecting leads also furnish the required small value of capacity for ordinary radio sets, particularly amateur sets of which a great many are in use. The connection is effected in the very simple and direct manner by simply plugging into a lamp socket. By the device illustrated in Figure 5, inductance as well as capacity can be inserted in the circuit.

It is obvious that various changes may be made in the details of construction without departing from the spirit of this invention; it is therefore to be understood that this invention is not to be limited to the specific details shown and described.

Having thus described the invention, what is claimed is:

1. In a radio system, a double pole plug, and leads, each of which comprises parallel filar conductors arranged to form a condenser, one conductor from each lead being connected at one end to a terminal of the plug, the other end of said conductor being insulated.

2. In a radio system, a double pole plug, and a pair of leads, each of which comprises a pair of parallel filar conductors arranged to form a condenser, one conductor of each lead being connected to a terminal of said plug, the other end of said conductor being insulated, and the first end of the other conductor of each lead being insulated and its last end provided with a terminal.

In testimony whereof I affix my signature this 18th day of July, 1922.

HAROLD J. WRAPE.