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METHOD OF PRODUCING SENSITIVE ELECTRICAL RESISTANCES

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Fig.1.

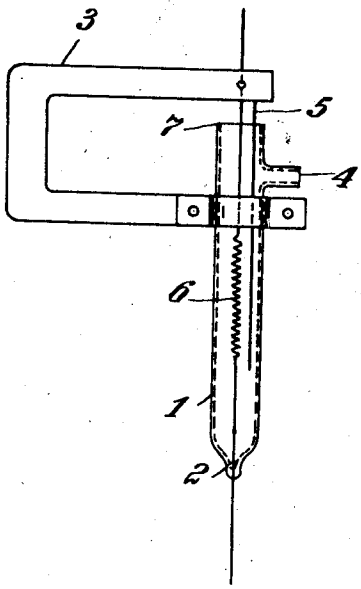
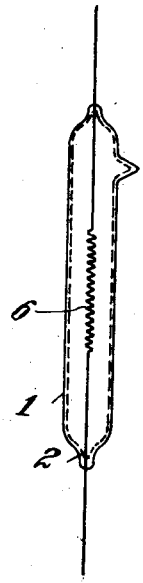


Fig.2.



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METHOD OF PRODUCING SENSITIVE ELECTRICAL RESISTANCES

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5 Claims. (Cl. 201—63)

For the purpose of wireless telephony, wireless telegraphy and wireless transmission of pictures or the like there are used electrical resistances. It has been found, however, that the sensitivity of such resistances is not sufficient at all events.

It is an object of the invention to provide an electrical resistance producing a physical effect, viz., a heat effect, even at a current of $\frac{1}{2000}$ ampere whereby the electrical resistance is increased. Such increase is based upon the effect that under the influence of the current the electrical resistance of a wire is increased by the rise in temperature due to the energy lost in the wire. The invention provides a process of producing a wire the ohmic resistance of which is increased by very weak electric currents so that the wire has a positive temperature coefficient of resistance. Suppose, the resistance of the wire is of the order of 30,000 ohms at a certain weak current. According to the invention the electrical resistance must increase to 32,000 ohms at a growth of the current of 1 milliampere and corresponding increase takes place at a further increase of current of 1 milliampere.

It is an object of the electrical resistance according to the invention to maintain weak anode-currents as uniform as possible.

The resistance according to the invention will be formed from a thin iron or steel wire preferably arranged in a glass tube. The glass tube may be filled with an inert gas as hydrogen or the like. The initial diameter of the wire may be of about 0.06 mm. The wire is covered by a metal layer, e. g., a silver layer. The initial diameter of the covered wire is of about 1 mm. The silver layer may be applied to the iron wire galvanically in order to prevent breakage of the wire in drawing. By the aid of the metal layer the iron wire will be brought to a diameter of about 0.005–0.002 mm. and less.

In the accompanying drawing a constructional example of the invention is illustrated. Figure 1 shows a resistance unit in the process of manufacture, and Figure 2 shows a completed resistance.

At the lower end 2 of the glass tube 1 there is sealed the thin platinum end of the silver covered iron wire 6 having an iron core the diameter of which is of about 0.005 mm. The upper end of the wire is held in position by means of a clamping device 3 which holds the glass tube 1 in fixed relation to the wire. The glass tube 1 is provided with a hollow extension 4 the object of which will be described later on.

The glass tube 1 will be filled with a liquid to a desired extent for removing the silver layer galvanically. The liquid may be an alkaline one so that the thin iron wire may not be affected. A copper wire 5 then will be immersed into the liquid and may be used as cathode whereas the wire 6 may be used as anode. After having applied a voltage between the anode and cathode the silver passes from the anode to the cathode, i. e., to the copper wire 5. After removing the silver on the wire 6 the liquid will be drained off and the wire will be chemically neutralized. During this treatment the wire is held in its position by the clamping device 3. The clamping device will be taken off after the upper end 7 of the tube 1 has been sealed.

The tube 1 will be evacuated through the extension 4. The evacuated tube will then be filled through said extension with an inert gas, e. g., hydrogen, by means of a three-way valve (not shown). After the filling has been completed the extension will be sealed. The diameter of the wire now is of about 0.005–0.002 mm.

Fig. 2 shows the finished resistance sealed in the glass tube which is filled with hydrogen.

The constructional form illustrated and described is only a constructional example. Many modifications are possible within the scope of the invention.

What I claim is:—

1. A method of producing sensitive electrical resistances comprising in combination sealing one end of a thin iron wire covered with a metal layer into a glass tube, clamping the free end of said wire and the glass tube by means of a clamping device, immersing an electrode into said glass tube, filling the glass tube with an alkaline liquid, applying a voltage between the wire and the electrode so that electric current passes through the liquid for removing the metal layer from the iron wire, draining off the liquid and removing the electrode from the glass tube, sealing the free end of the iron wire into the open end of the glass tube, evacuating the glass tube, filling the tube with an inert gas and sealing the extension provided on the glass tube for evacuating and filling said tube.

2. A method of producing sensitive electrical resistances comprising in combination sealing one end of a thin iron wire covered with a silver layer into a glass tube, clamping the free end of said wire and the glass tube by means of a clamping device, immersing an electrode into said glass tube, filling the glass tube with an alkaline liquid, applying a voltage between the wire and the electrode so that electric current passes through the

liquid for removing the silver layer from the iron wire, draining off the liquid and removing the electrode from the glass tube, sealing the free end of the iron wire into the open end of the glass tube, evacuating the glass tube, filling the tube with an inert gas and sealing the extension provided on the glass tube for evacuating and filling said tube.

3. A method of producing sensitive electrical resistances comprising in combination sealing one end of a thin iron wire covered with a metal layer into a glass tube, clamping the free end of said wire and the glass tube by means of a clamping device, immersing an electrode into said glass tube, the electrode being a copper wire, filling the glass tube with an alkaline liquid, applying a voltage between the wire and the electrode so that electric current passes through the liquid for removing the metal layer from the iron wire, draining off the liquid and removing the electrode from the glass tube, sealing the free end of the iron wire into the open end of the glass tube, evacuating the glass tube, filling the tube with an inert gas and sealing the extension provided on the glass tube for evacuating and filling said tube.

4. A method of producing sensitive electrical resistances comprising in combination sealing one end of a thin iron wire covered with a metal layer into a glass tube, clamping the free end of said wire and the glass tube by means of a clamping device, immersing an electrode into said glass tube, filling the glass tube with an alkaline liquid, applying a voltage between the wire and the electrode so that electric current passes through the liquid for removing the metal layer from the iron wire, draining off the liquid and removing the electrode from the glass tube, neutralizing the uncovered iron wire, sealing the free end of the iron wire into the open end of the glass tube, evacuating the glass tube, filling the tube with an inert gas and sealing the extension provided on the glass tube for evacuating and filling said tube.

5. A method of producing sensitive electrical resistances comprising in combination sealing one end of a thin iron wire covered with a metal layer into a glass tube, clamping the free end of said wire and the glass tube by means of a clamping device, immersing an electrode into said glass tube, filling the glass tube with an alkaline liquid, applying a voltage between the wire and the electrode so that electric current passes through the liquid for removing the metal layer from the iron wire, draining off the liquid and removing the electrode from the glass tube, sealing the free end of the iron wire into the open end of the glass tube, evacuating the glass tube, filling the tube with hydrogen and sealing the extension provided on the glass tube for evacuating and filling said tube.

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