W. SCHLOEMILCH & P. F. PICHON.

WAVE DETECTOR FOR WIRELESS TELEGRAPHY.

APPLICATION FILED APR. 14, 1906.

962,262. Patented June 21, 1910.

Fig. 1

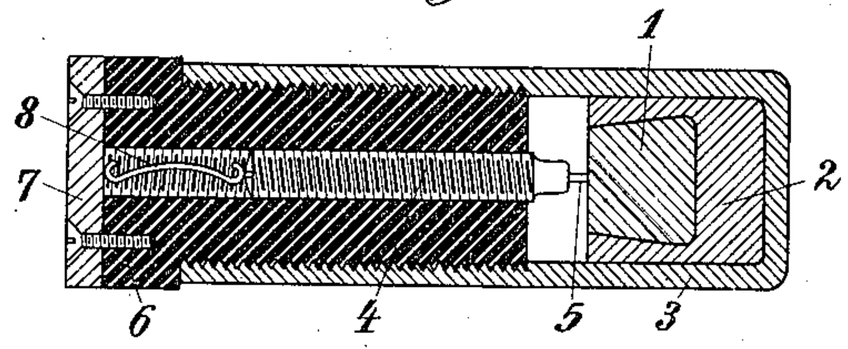


Fig. 2

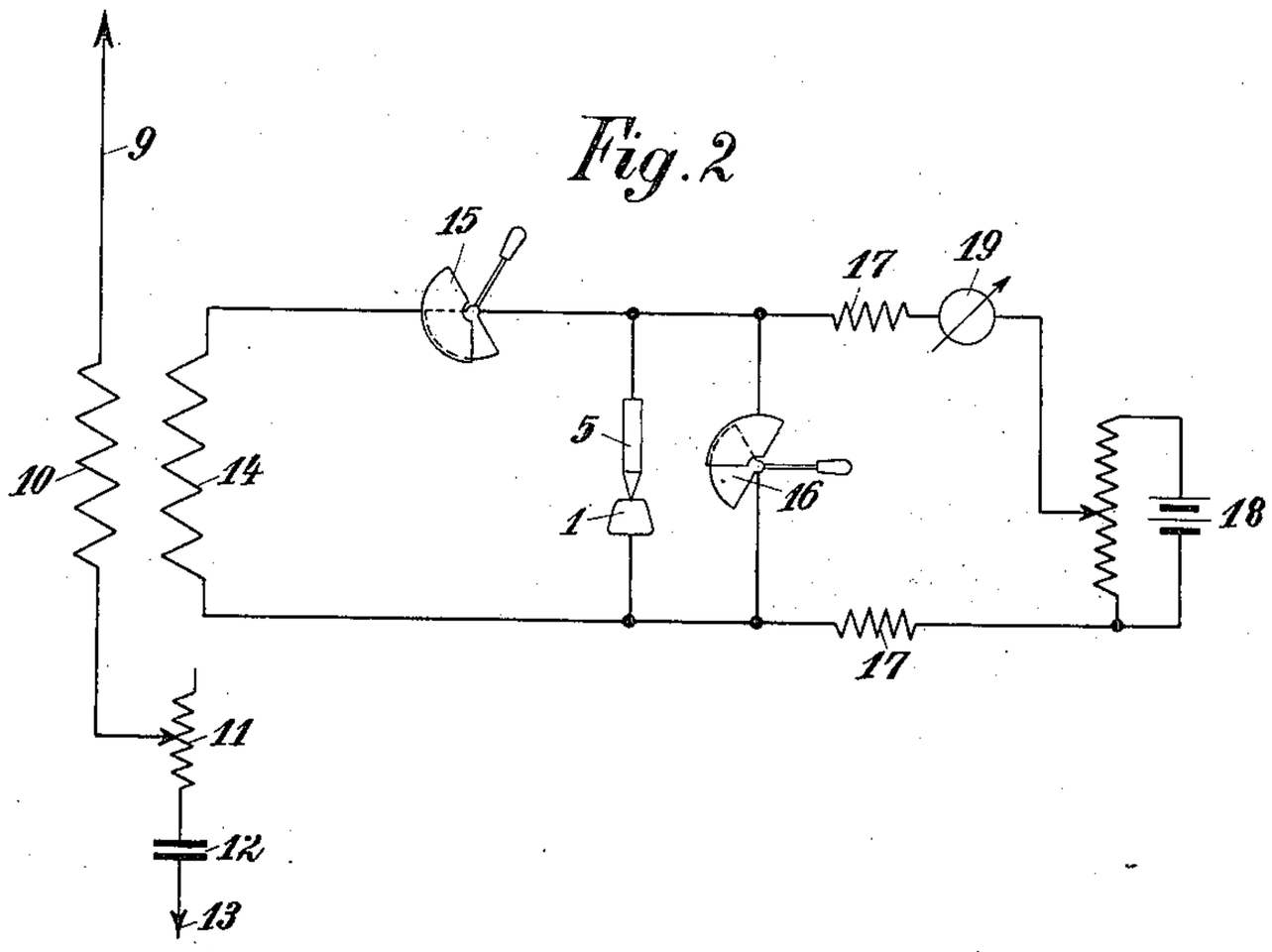
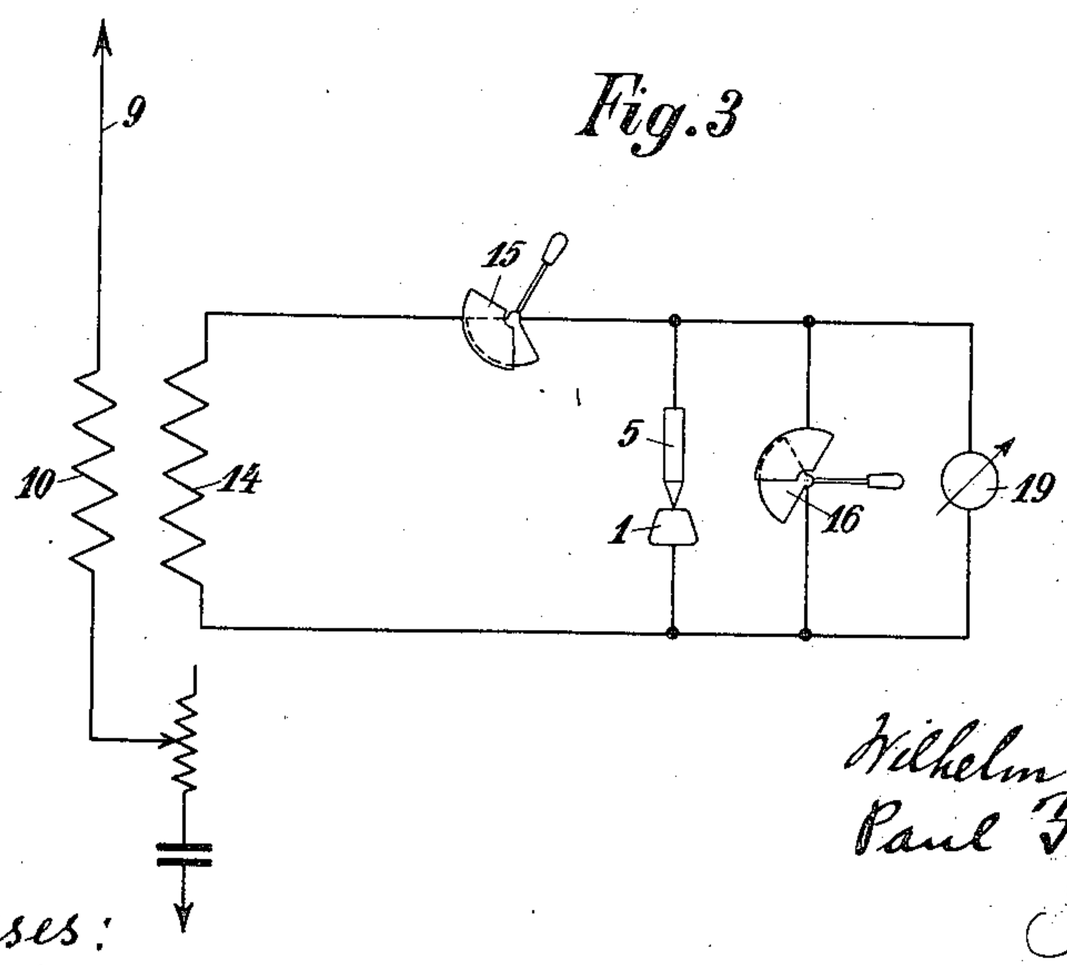


Fig. 3



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UNITED STATES PATENT OFFICE.

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WAVE-DETECTOR FOR WIRELESS TELEGRAPHY.

962,262. Specification of Letters Patent. **Patented June 21, 1910.**

Application filed April 14, 1906. Serial No. 311,678.

To all whom it may concern:

Be it known that we, WILHELM SCHLOEMILCH, a subject of the King of Prussia, residing at Berlin, Germany, and PAUL FERNAND PICHON, a citizen of the Republic of France, residing at Südende, near Berlin, Germany, have invented certain new and useful Improvements in Wave-Detectors for Wireless Telegraphy, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to detectors such as are employed in wireless telegraphy for indicating the presence of electric waves, and more particularly to those detectors which are formed of one or more contacts sensitive to wave action. To this class belongs the ordinary coherer and also the microphonic contact which is generally formed of two conductors of the first class which contact each other with slight pressure. This contact pressure is very small in the detectors hitherto employed of this kind, so that even very small vibrations which are unavoidable during working, suffice to alter the contact, which of course gives rise to disagreeable interruptions in working. If in the contacts hitherto known a higher pressure be employed which renders them independent of external vibrations, they lose the property of being sensitive to waves. Now this invention relates to a wave-sensitive contact which, owing to the use of certain materials for the contact elements, permits the use of a high contact pressure without losing its sensitiveness to waves. On the contrary it has been found that the wave sensitiveness where such materials are used comes out particularly favorable only at higher pressures at which the known contacts entirely lose their effect. The materials which exhibit the said properties are the naturally existing manganese compounds, as may be ascertained by experiments, for instance, psilomelane (barytiferous oxid of manganese), pyrolusite (peroxid of manganese), braunite (sesquioxid of manganese), manganite (hydrous-oxid of manganese) and others, in contradistinction to chemically pure compounds, such as manganese and the binoxid of manganese previously proposed for this purpose. The reason why the naturally found compounds have the desired property and not the chemically pure compounds is supposed to be that the naturally found compounds have moisture either chemically or mechanically combined with them. These materials may be employed for either both contacts or only one. It is, however, preferable to form one of the contact bodies of a good conducting material, preferably of a material which does not oxidize or only oxidizes with difficulty, for instance, platinum, gold, silver, aluminium and even lead are found to be very advantageous.

In the accompanying drawings: Figure 1 shows a form of construction of the wave sensitive contact piece. Fig. 2 shows a receiver connections in which the detector works with an auxiliary source of potential, and Fig. 3 a receiver connection in which the detector works without auxiliary potential.

In Fig. 1, 1 indicates a piece of psilomelan which is preferably embedded in tin 2 which is surrounded with a brass sheath or socket 3. Against the upper surface of the psilomelan a platinum pin 5 soldered to a screw 4 strongly presses. The screw is arranged in a vulcanite plug 6 which in turn is displaceably held by means of a screw thread in the brass sheath or socket 3. On the upper end of the vulcanite plug 6 a metal plate 7 is attached by means of screws and a short conductor 8 establishes an electric connection between the screw 4 and the metal plate 7. The connection of this detector and the contact members 1 and 5 respectively of the same with the circuits for the wireless telegraphy takes place by means of the brass socket or sheath 3 on the one hand and the metal plate 7 on the other. Of course the arrangement may be carried out in other ways, for instance, instead of the pressure screw 4 a pressure spring may advantageously be employed, as by the latter, the comparatively high pressure of the electrodes one upon the other may be easily kept constant. The form and size of the contact surfaces of both bodies according to the choice of the same have also been found to be of importance for obtaining favorable action. If, for instance, psilomelane and platinum be employed it is preferable to cause the platinum to act in the form

of a pencil on a polished surface of the psilomelane. If, in place of the platinum, lead be employed this is preferably used in the form of a large plate which is pressed with great pressure against the psilomelane.

The connection of this improved detector with the circuits for wireless telegraphy may be made in the same way as the connection of the ordinary detectors at present employed for similar objects such, for instance, as coherers, electrolytic cells or microphone contacts. A method of connecting up the improved detector is shown as an example in Fig. 2. The receiver circuit is here composed of an aerial wire 9, primary transformer coil 10, variable self-induction coil 11, an adjustable condenser 12, and a connecting wire 13 carried to earth or to an equivalent. The detector circuit is inductively coupled with the receiver circuit, and also contains in addition to the secondary coil 14, the adjustable condenser 15, and wave sensitive contact 1, 5, in connection with which an adjustable condenser 16 is inserted in parallel. The wave sensitive contact is connected over choking coils 17 with the potentiometer 18, which serves for producing the necessary potential at the electrodes of the wave sensitive contact. An equalization of the potentiometer potential over the coil 14 is prevented by the condenser 15. 19 indicates an energy indicator (telephone, galvanometer or the like) for enabling the alterations which take place in the detector under the influence of the electric waves to be ascertained. The coupling of the receiver circuit with the detector circuit may of course instead of being inductive also be made conductive.

The auxiliary potential to be impressed upon the wave sensitive contact 1, 5, varies according to the kind of material employed and is also dependent on the shape and kind of contact surface. Thus it is not possible to fix a given preferable value for the auxiliary potential to be employed. This for psilomelan is about 1 volt, if it be desired to obtain a maximum sensitiveness with the smallest amount of sound in the telephone. If it be intended to increase the maximum strength of the sound, it is necessary to increase the auxiliary potential, whereby however the sensitiveness decreases. In using psilomelan very good results have been obtained by having a permanent current of about one to two milliamperes flowing through the wave sensitive contact part. The initial resistance here amounted to several thousand ohms.

If the pressure contact 5 (Fig. 1) be formed of a body which, regarding its electrical property, differs from that of the feeding contact 2, the detectors will also operate without the use of an auxiliary potential.

Fig. 3 shows connections in which the detector operates without auxiliary potential. In this arrangement of connections the potentiometer is omitted, and the sensitive contact 1, 5 is in addition to being connected in parallel with a condenser 16, also directly connected with an energy indicator 19.

The physical properties of the bodies found to be effective to bring about the improved action have not hitherto been ascertained. As regards this, it may be pointed out that all hitherto discovered naturally found manganese compounds contain to a high extent moisture or water chemically or mechanically combined. It has not been possible up to the present to discover whether the improved action is perhaps to be ascribed to these properties of the bodies alone, or not.

Having explained our invention, what we do claim and desire to secure by Letters Patent is:

1. A wave detector for wireless telegraphy, consisting of two contact bodies, one of which is formed of one of the naturally found manganese compounds containing moisture.

2. A wave detector for wireless telegraphy, consisting of two contact bodies, one of which is formed of one of the naturally found manganese compounds containing moisture, and the other of a material which oxidizes with difficulty.

3. A wave detector for wireless telegraphy, consisting of two contact bodies, one of which is formed of one of the naturally found manganese compounds containing moisture, and the other of a material which oxidizes with difficulty, said contacts touching each other with a predetermined pressure.

4. A wave detector for wireless telegraphy consisting of two contacting bodies, one of which is formed of psilomelane.

In witness whereof, we hereunto subscribe our names this 31st day of March A. D. 1906.

WILHELM SCHLOEMILCH.
PAUL FERNAND PICHON.

Witnesses:
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