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MICROPHONE.

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Fig. 1.

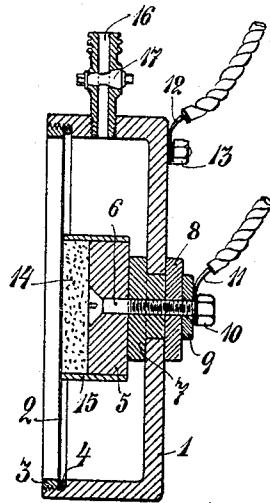
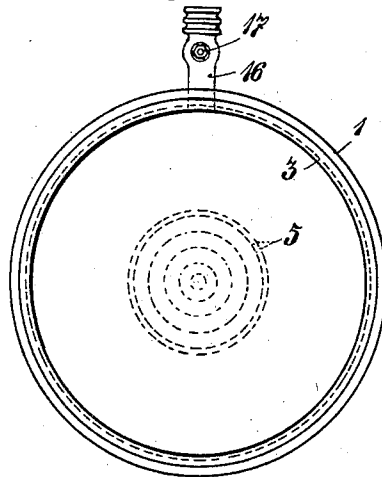


Fig. 2.



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UNITED STATES PATENT OFFICE.

CARL EMIL EGNÉR, OF STOCKHOLM, AND JOHAN GUNNAR HOLMSTRÖM, OF SALTSJÖ-STORANGEN, SWEDEN.

MICROPHONE.

935,897.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CARL EMIL EGNÉR, a subject of the King of Sweden, and resident of Blekingegatan 63^A, Stockholm, in the Kingdom of Sweden, and JOHAN GUNNAR HOLMSTRÖM, a subject of the King of Sweden, and resident of Saltsjö-Storangen, in the Kingdom of Sweden, have invented certain new and useful Improvements in Microphones, of which the following is a specification.

As is well known, a microphone comprises a diaphragm and one or more free contact pieces or electrodes, mounted inside the diaphragm, through which contact-pieces an electric current is led and the resistance of which to the said current is changed, when the contact-pieces are displaced by some means or other, in practice, by air vibrations caught by the ear as sounds. In order that the microphone may be effective, the energy, changed by the microphone into variations of the current, must be as great as possible, i. e. the amplitude of the oscillations must be great without discontinuity being effected. In microphones, now generally used, one, at least, of the contact-pieces is made of carbon, the contact-pieces freely bearing against each other consisting of particles of granules. The continuous variations are effected by the said particles being separated by the vibrations for a greater or less distance, a bridge in the insulating layer being formed, most nearly resembling an electric arc or spark, and it is the resistance of the said bridge, microscopical it is true, which varies and results in the action of the microphone. Under such circumstances the insulating layer and not the conducting parts, evidently, is of the greatest importance for the action of the microphone.

The object of this invention is to essentially increase the effect of the microphone by providing, between the free contact-pieces of the microphone and around the same, an insulating substance, which permits an easy generation of crossing bridges but at the same time effects great variations in the resistance of the said bridges when shortened and elongated by the vibrations. However suitable an insulating liquid would be for the purpose, the thought of the same must be rejected, owing to the forcible mechanical deadening effect upon the vibrating

pieces which should be caused by the liquid. On experiments for ascertaining if another gas used as an insulating layer between the contact pieces of the microphones, would be more advantageous than air, the remarkable fact has been ascertained that ordinary air perhaps is the most unsuitable, as it effects lesser variations of the resistance than almost any other gas. The greatest variations of the current were, on the other hand, caused by hydrogen or gases containing hydrogen. It is difficult theoretically to explain the reasons, but the said fact seems to be connected in a certain manner with the capacity of conducting heat and the velocity of formation of ions, which qualities are great in hydrogen and gases containing hydrogen.

This invention relates to the increasing of the effect of a microphone in a simple manner through an arrangement founded on the said observations. This is effected by placing the contact pieces of the microphone in a chamber hermetically sealed, from which the air has been exhausted and in which hydrogen or hydrogen containing gas has been completely or partially substituted for the air. The tension of the current, the nature of the contact pieces, the possibility of sealing the chambers etc. are in each case determining factors for the choice of the gas to be used as to richness in hydrogen. When the contact pieces of the microphone are inclosed in the hermetically sealed chamber, care must be taken that such inclosing is not effected at the expense of the action of the vibrating diaphragm upon the contact-pieces, but the contact-pieces must be so inclosed that the vibrations, effected by the person speaking in front of the diaphragm, strike the diaphragm directly, and that the contact-pieces of the microphone are located behind the diaphragm and directly acted upon by the same, hermetically inclosed and surrounded by the said gas.

In the accompanying drawing, Figure 1 is a cross section, and Fig. 2 a front elevation of a microphone, provided with means for the introduction of hydrogen or a gas containing hydrogen.

1 is the casing of metal, 2 the diaphragm held by the ring 3, which is in screw-threaded engagement with the casing; 4 is a tightening ring of caoutchouc or the like between the diaphragm and the casing; and 5 is a

carbon disk fixed by a screw 6, which is isolated from the casing 1 by means of a sleeve disk 7 of ebonite or the like, while a plate 8 of ebonite is located about the outer end of the screw.

9 is a metal disk, between which and the nut 10, one end of the conducting wire 11 is jammed. The other conducting wire 12 is fixed to the casing 1 by means of a nut 13.

14 are the carbon granules, held in position by a ring 15 of felt.

The current passes through 11, 6, 5, 14, 2, 3, 1 and 12.

16 is a pipe communicating with the casing.

The joint of the screw bolt 6 and the plates 7, 8 can be tightened by means of paraffin or the like.

Hydrogen or other gas containing hydrogen, is introduced into the casing 1 by first pumping out the air through the pipe 16, then admitting the gas through the said pipe. This operation is repeated until one is sure, that the casing contains the gas in desired richness. A cock 17 mounted in the pipe is then shut.

Having thus fully described our invention, what we claim is:

1. In a microphone, a sealed casing having one wall formed by the vibratory diaphragm and containing the sound transmitting mechanism in an atmosphere consisting largely of hydrogen.

2. In a microphone, a sealed casing having one wall formed by the vibratory diaphragm and containing the sound transmitting mechanism in an atmosphere of hydrogen.

3. In a microphone, a sealed casing having one wall formed by the vibratory diaphragm and containing the sound transmitting mechanism, and means to charge the casing with a gas consisting largely of hydrogen.

In witness whereof, we have hereunto signed our names in presence of two subscribing witnesses.

CARL EMIL EGNÉR.

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Witnesses:

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