PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Microphone.

I, GEORG NEUMANN, of Michaelkirchstrasse, 15, Berlin SO. 16, Germany, a German Citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to a microphone, which preferably is to be operated as a condenser transmitter and its object is to attain in addition to high efficiency a true reproduction of sound oscillations by eliminating the disturbing natural oscillations of the membrane or diaphragm of the microphone or by systematically using the range of natural oscillations for eliminating distortions.

Electrostatic microphones having a thin, slightly stressed membrane, in which the restoring force is mainly determined by air cushions, are known per se.

According to this invention there is provided a microphone, particularly a condenser microphone, having a thin, slightly stressed membrane, the restoring force of which is mainly determined by air cushions characterised in that the fixed electrode is provided both with closed bores of such a diameter and such a size, that the air columns situated therein have a natural frequency above the audible range and also with bores, which possess a greater volume than the first mentioned bores or are connected with separate air chambers and favour the lowest frequencies by resonance.

The membrane must be extremely thin and arranged at a very small distance from the fixed electrode. It consists preferably of a collodion film covered on one side with beaten gold. Such unilaterally metallised membranes known per se can be produced with a thickness of one thousandth of a millimetre and less, so that the weight of an air column enclosed in the fixed electrode considerably exceeds the weight of the part of the membrane covering the air column and consequently the natural oscillations of the membrane are mainly determined by the air columns which are almost completely enclosed. The distance between the membrane and the fixed electrode amounts, for example, to about 0.05 mm. The membrane is secured, for example by pasting, on an edge of the fixed electrode projecting by an amount corresponding to this separation. The metallic coating of the membrane preferably does not extend up to the edge, so that the marginal zone of the collodion membrane itself serves as insulation between the electrodes.

The length of the closed bores depends on the mechanical properties of the membrane, in particular its thickness. In order that the air column existing in each bore may have a natural frequency lying above the range for acoustic recording and reproduction, for example, above 10,000 Hertz, the length of the bores when using a membrane having the above described properties must be about 8 mm.

The natural frequency can be further adjusted by the distance of the individual holes from one another and by associating different air volumes with the individual holes. In this way certain frequencies can be made predominant or resonances or irregularities in the frequency curve can be eliminated. For example, the smaller the distance between the individual bores, the lower the frequency at which damping occurs under otherwise equal conditions. In particular the lowest frequencies can be emphasised by providing large individual air cushions, whereby it becomes possible for example to employ in place of the microphone amplifier a transformer, which affords certain advantages, above all in respect of handling. With microphones without counter correction of distortion this assemblage is not possible since, as is known, transformers cannot be produced with such a high impedance for the low frequencies that an adaption to the small capacity is possible; a cutting off of the low frequencies thus takes place. The arrangement of the larger air chambers is effected according to the invention in a very simple manner, for example by providing the rear side of the fixed electrode with an annular air space, into which some bores extend.

In the arrangement of large air cushions according to the invention it is necessary, should temperature changes occur, to pro-