

The single parts of the sound energy conducted to the rear of the diaphragm will reach the diaphragm by some separated ways without being joined indefinitely with one another. The single components of the sound energy are joined when reaching the zone directly behind the diaphragm. That means, they are joined in a region where in any case it is necessary to combine the different forces.

Referring now again to the drawings, and more particularly to FIGS. 3 and 4, an example of a principal arrangement of the microphone according to the present invention, is illustrated, comprising a back plate 3 which has grooves 9 crossing one another. Behind the diaphragm 1' an air slit 2' is provided. The back has six grooves 9 crossing each other. In the crossing points of the grooves 9, drilled holes 10 terminate. The acoustical resistance 11 belonging to the phase shifting network of the microphone, for instance, may be built of textures or wickerwork consisting of textiles, synthetic plastics or wires, or of a porous sintered material. The components of the microphone are mounted in a housing 14 by means of a shell 12 and a clamping ring 13, both elements consisting of non-conductive material.

In FIG. 4 the diaphragm 1 is not shown, to make visible the back plate 3 with the grooves 9 and the drilled holes 10.

Referring now again to the drawings, and in particular to FIG. 5, for example the mentioned acoustical resistance consists of a friction element formed by an air space as slit 17. An acoustical resistance formed in this manner may be built in a simple way. It is easily adjustable and of good stability, when adjusted. A perforated plate 15 is provided and has, for instance, twelve drilled holes 16 and is mounted at a very small distance spaced behind the back plate 3. Its drilled holes 16 are not aligned with the drilled holes 10 of the back plate 3 but are laterally displaced a small distance.

For instance, there is always one drilled hole 16 between two drilled holes 10, respectively, vice versa. The location of the drilled holes 16 behind the back plate 3 in FIG. 4 is clearly illustrated in the drawings.

The width of the slits 17 controls its acoustical resistance and may be adjusted by appropriate profiling of the back plate or of the perforated plates as well as by an intermediate layer, for instance in the form of a circle- or ring-shaped foil 18.

The other parts shown in FIG. 5 are identical with those disclosed in FIGS. 3 and 4 and bear the same numerals.

The arrangement of grooves instead of the known air-filled chamber described above, and instead of all similar arrangements, has the great advantage that no resonance effects and no unwanted phase shifts effected by those measures are experienced.

Indeed, a portion of the grooves theoretically is long enough to be effective as a tuned half-wavelength-line tuned in the audio frequency range, provided the dimensions of the microphone are of the commonly used size. Nevertheless, the tuned-line feature is disturbed by several crossing grooves in a way that no resonance effect can be remarked.

Unidirectional microphones constructed in accordance with the present invention in the critical frequency range between six and twelve kilocycles/sec. have the same good front-to-back-ratio as known unidirectional microphones only have in the frequency section below 6 kc.p.s. and above 12 kc.p.s. Moreover, the frequency response of the described microphones in the whole frequency range and for all angles of sound incidence, wherein the microphone receives at least some remarkable sound energy, is of excellent linearity.

Further, a microphone built in accordance with the present invention, may be manufactured by simpler methods than all unidirectional condenser microphones heretofore and its acoustical transducer features are of

better reproducibility than for all unidirectional condenser microphones manufactured until now.

While I have disclosed several embodiments of the present invention with certain useful variants thereof, it is to be understood that these embodiments are given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A unidirectional condenser microphone, comprising an electrically conductive diaphragm, a back plate metallized at least on its surface, said electrically conductive diaphragm and said back plate defining an air slit therebetween, means for connecting and insulating said diaphragm and said back plate and forming an opening at the rear of said microphone, an acoustical impedance means defined in said connecting means behind said back plate in said opening, a first electrical terminal secured to said diaphragm, a second electrical terminal secured to said back plate, said back plate having holes extending from the surface of said back plate in front of said diaphragm into said acoustical impedance means and from this impedance to said opening at the rear of said microphone, said back plate having surface grooves distributed over its surface in front of said diaphragm, and said holes terminating in said grooves.

2. The condenser microphone, as set forth in claim 1, wherein

said grooves in said back plate cross each other and are uniformly distributed on said back plate, and said holes terminating in the crossing points of said grooves.

3. The condenser microphone, as set forth in claim 1, which includes

a perforated plate disposed behind said back plate and having a plurality of additional holes, said additional holes being laterally displaced relative to said holes of said back plate.

4. The condenser microphone, as set forth in claim 3, which includes

a substantially ring-shaped foil disposed between said back plate and said perforated plate, in order to control the distance between said plates.

5. The condenser microphone, as set forth in claim 1, wherein

said acoustical impedance means includes at least one acoustical resistance member disposed adjacent the back side of said back plate.

6. The condenser microphone, as set forth in claim 5, wherein

said acoustical resistance member comprises fiber material.

7. The condenser microphone, as set forth in claim 5, wherein

said acoustical resistance member comprises porous sintered material.

8. The condenser microphone, as set forth in claim 1, wherein

said acoustical impedance means constitutes an air space behind said back plate.

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KATHLEEN H. CLAFFY, *Primary Examiner*.

LAURENCE A. WRIGHT, *Assistant Examiner*.

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