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MICROPHONE WINDSHIELD

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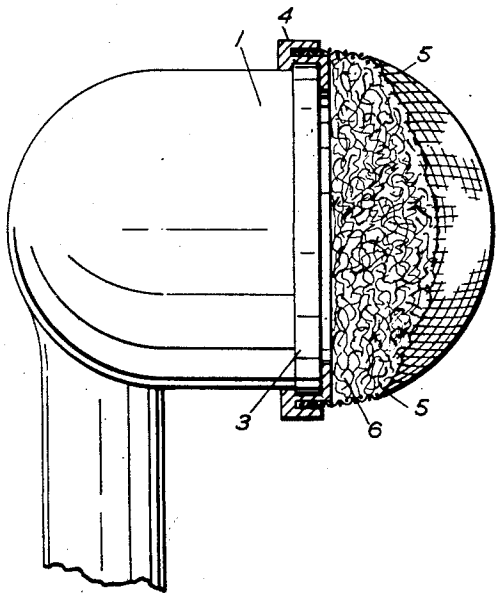

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MICROPHONE WINDSHIELD

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3 Claims. (Cl. 179—178)

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This invention relates to microphones such as are used for radio broadcasting and public address purposes and which may frequently be used out of doors.

The object of the invention is to devise special means to reduce the electrical or "noise" output of a microphone due to a high wind, without seriously depreciating the response frequency characteristic of the microphone or making it unwieldy.

In accordance with the main feature of the invention, a microphone is constructed so that none of its parts in the air path to its pressure sensitive electrical element has a cross sectional dimension substantially greater than .0075 inch in a plane normal to the direction in which the microphone is designed to respond or so that none of its parts in the aforesaid air path has a diameter substantially greater than .0075 inch.

The invention will be clearly understood from the following discussion of the problems to be met in windshielding and description of a preferred embodiment of the invention shown in the accompanying side view partly in cross section of a S. T. C. No. 4032 moving coil microphone with windshield.

When an obstacle is placed in a steady air stream eddies tend to be formed on the leeward side having a frequency of approximately $f=V/5d$, where V=velocity of air stream in distance units per seconds and d=diameter of obstacle in the same units.

Such eddies having frequencies in the upper sound range are known as Aeolian tones, while in the lower range they are known as eddy tones. On the assumption that 15 M. P. H. or 264 inches per second is the minimum wind speed likely to produce noise of a serious magnitude, tones of 7000 C. P. S. will be produced by a diameter of

$$\frac{.264}{5\times 7000} \text{ inch}$$

or about .0075 inch; e. g. wire of 36 S. W. G.; tones of 10,000 C. P. S. by a diameter of .0055 inch, and of 5000 C. P. S. by .011 inch. It is proposed therefore to avoid any solid section having a cross sectional dimension substantially greater than .0075 inch in a plane normal to any direction for which the microphone to be shielded is designed to respond.

At the other end of the sound range, the tones produced are known as eddy tones and such tones of frequency about 50 C. P. S. would be produced by a diameter of

$$\frac{264}{5\times 50} \text{ inches}=\text{roughly one inch}$$

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The overall diameter or lateral dimension of the shield should not be less than one inch, a requirement not likely to give rise to difficulty.

It will also be apparent that the optimum shape for a wind shield is spherical since any eddy tones will be a minimum for a stream lined body. The outer surface of the assembly should be free from sharp discontinuities and re-entrant surfaces which would generate eddy tones, and edge tones caused when an air stream is forced through a slit.

A wind shield should not appreciably reduce the sensitivity of a microphone to sound waves in the range 50–10,000 C. P. S. and the shield should be mechanically robust, easily attached and detached, and should not make the microphone unwieldy.

These desiderata have been substantially attained for a S. T. C. hand microphone of type No. 4032, by the following construction shown in the accompanying drawing in which the microphone 1 has a handle 2 and a front rim 3. The wind shield comprises a spring clamp ring 4 adapted to encircle the rim 3 and carrying a substantially hemispherical woven screen 5 supported by a roughly hemispherical block 6 of fine filaments, the material and the gauge and spacing of the screen and block being such that they share substantially equally in the shielding effect.

Preferably the screen 5 is woven from silk or stainless steel thread having a diameter of not substantially more than .0075 inch, which may if desired be reduced to about .0055 inch. The filaments are spaced about 50 threads to the inch.

Closer spacing up to 150 to the inch may be used but the risk is run of getting a film of water over the whole screen in wet weather, with consequent serious attenuation of the sound waves. The block is preferably of rubberised hair with an approximate density of 500 filaments to the square inch. Rubberised hair consists of horse hair or the like each with a thin coating of rubber which sticks the hairs together at spaced positions.

The windshield and microphone together have a substantially spherical form without sharp discontinuities. With this shield, the level of noise caused by winds in the range 10 to 30 M. P. H. is reduced between 12 and 16 db whilst the attenuation of sound waves in the range 50 to 10,000 C. P. S. is negligible, except at the extreme high frequencies where there may be an attenuation of about 5 db.

What is claimed is:

1. A wind shield for a microphone having a

housing and a sound receiving face, said shield comprising a substantially hemispherical screen adapted to be mounted on said housing in front of said face with the interior of said screen facing said face, said screen comprising a plurality of filaments having a spacing between 50 and 150 per inch and each filament having a cross section in a direction normal to a radius of said hemisphere intersecting the filament at least as small as .0075 inch, and a substantially hemispherical block of fine filaments mounted between said screen and said face with the hemispherical surface of said block facing said interior of said screen.

2. A wind shield for a microphone having a housing and a sound receiving face, said wind shield comprising a substantially hemispherical screen adapted to be mounted on said housing in front of said face with the interior of said screen facing said face, said screen comprising a woven fabric or filaments having a diameter between .0055 and .0075 inch and having a spacing between 50 and 150 per inch, and a substantially hemispherical block of rubberized hair mounted between said screen and said face with the hemispherical surface of said block facing said interior of said screen.

3. A wind shield for a microphone having a housing and a sound receiving face, said wind shield comprising a substantially hemispherical screen adapted to be mounted on said housing in front of said face with the interior of said screen facing said face, said screen comprising

a woven fabric of filaments having a diameter between .0055 and .0075 inch and having a spacing between 50 and 150 per inch, and a substantially hemispherical block of rubberized hair, said hair being distributed throughout said block substantially uniformly and with a density of substantially 500 hairs to the square inch and said block being mounted between said screen and said face with the hemispherical surface of said block facing said interior of said screen.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
588,034	Thorne	Aug. 10, 1897
1,901,065	Spotts	Mar. 14, 1933
2,200,097	Phelps	May 7, 1940
2,325,424	Rettinger	July 27, 1943
2,346,394	Rettinger	Apr. 11, 1944
2,433,250	Weibler	Dec. 23, 1947

FOREIGN PATENTS

Number	Country	Date
425,186	Great Britain	Mar. 8, 1935

OTHER REFERENCES

"Recording Sound for Motion Pictures," 1st edition, McGraw-Hill, pages 124 and 125.