

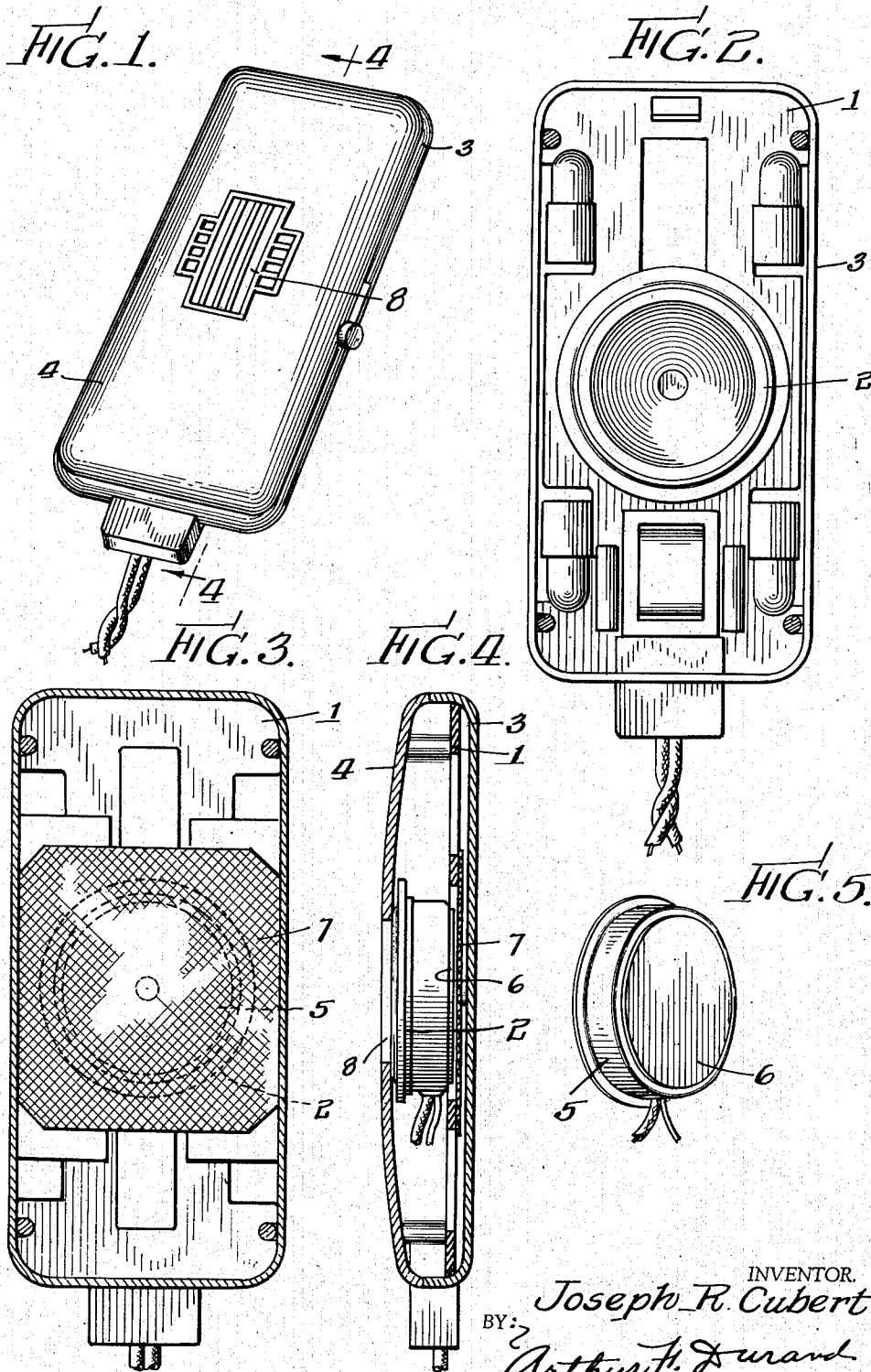
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MICROPHONE

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UNITED STATES PATENT OFFICE

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MICROPHONE

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17 Claims. (Cl. 179—107)

This invention relates to microphones for use as a part of a hearing aid apparatus, of the kind that can be worn under the lapel of a coat, or under a garment, or concealed in some other way.

Generally stated, the object of the invention is to provide a novel and improved construction and arrangement whereby impacts on the outside casing of the instrument, or scratching thereon, even by the clothing of the person wearing the apparatus, or things other than what the user desires to hear, will not be conveyed to the microphone mounted within the casing, the said microphone being preferably of the well known crystal type, and being very sensitive.

It is also an object to provide certain details and novel features of construction tending to increase the general efficiency and desirability of a hearing aid microphone of this particular character.

To the foregoing and other useful ends, the invention consists in matters hereinafter set forth and claimed and shown in the accompanying drawing, in which—

Fig. 1 is a perspective of a microphone instrument embodying the principles of the invention.

Fig. 2 is a top or front view, with the front cover of the casing removed.

Fig. 3 is a rear elevation or back view of the microphone and the frame by which it is mounted in the outside casing, showing the latter in section.

Fig. 4 is a longitudinal section on line 4—4 in Fig. 1 of the drawing.

Fig. 5 is a perspective of the annular microphone that is enclosed in the outside casing.

As thus illustrated, the invention comprises an inside frame or chassis 1, on which the microphone 2 is mounted, and on which the amplifying tubes and other things are also mounted. This frame or chassis is suitably fastened in the casing 3 that preferably has a removable front cover 4, as shown in the drawing.

The invention resides in the method of mounting the microphone proper on the said frame or chassis, and in the weighting of the microphone over and above what is commonly or ordinarily done, in order to prevent vibrations, set up in the outside casing, from traveling through the said frame or chassis to the microphone, thereby creating a disturbance in the receiving instrument worn in the ear, or back of the ear, if bone conduction is employed. With the ordinary construction, even the brushing and rustling and friction of clothing against the outside casing cre-

ates a disturbance in the said receiving instrument, to the annoyance of the user thereof.

Therefore, to prevent such disturbance and annoyance, an ordinary crystal microphone having an annular aluminum body 5, of light material, may have a lead back 6 of the requisite weight, thereby to give the microphone enough inertia for the desired purpose, and in addition, lead is not a transmitter of molecular vibrations, or of sound vibrations. In addition, a sheet of silk 7 is stretched on the back of the chassis or frame 1, and the said lead back 6 is cemented to the said sheet of silk or other flexible material. In this way, of course, the microphone proper is insulated against any vibrations that might be set up in the outside casing and that might be communicated therefrom to the said chassis or frame 1, and from the latter to the casing of the microphone, and then to the crystal inside. In other words, the microphone has a floating support and is insulated against structural vibration of the instrument as a whole, so that the crystal can only be energized or agitated by the sound vibrations coming in from the atmosphere through the louvre openings 8 in the front cover of the casing, these openings being opposite the front of the microphone.

It will be understood, of course, that instead of providing the lead back 6 in an aluminum microphone frame, as shown, the entire annular frame or casing of the crystal microphone can be thickened and increased in weight to the point where the desired degree of inertia will be insured for the microphone proper; but it will be understood that too much weight is not desirable, and that hence a moderate amount of weight, plus the silk mounting, or other mounting of flexible material, is more desirable as an expedient for preventing structural vibrations in the outside casing of the instrument from being finally conveyed to the crystal element in the microphone. It is found that in this way, tapping or brushing or friction or scratching on the outside casing does not create a disturbance in the ear of the user of the hearing aid apparatus.

In other words, the invention broadly considered prevents all vibrations from reaching the elements of the microphone proper, except those that are desired to be heard by the user of the instrument.

It will be seen that the plate 1, which in effect forms a frame, has an opening 9 through which the back of the microphone 2 extends and is cemented to the thin flexible sheet 7, which is stretched flat on said frame.

What I claim as my invention is:

1. In a portable microphone instrument to be worn on the person, as a part of a hearing aid apparatus, having an outside casing therefor, a microphone enclosed thereby and freely movable bodily therein and insulated against the communication thereto of vibrations set up in the said outside casing by scratching or contact or friction thereon.

2. A structure as specified in claim 1, said microphone having a mounting or support by material having a low degree of vibration-communicating capacity.

3. A structure as specified in claim 1, said microphone having a mounting or support by material having a low degree of vibration-communicating capacity, said material being a sheet of flexible non-vibration transmitting material stretched on a frame or chassis mounted inside of said casing.

4. A structure as specified in claim 1, said microphone being of greater weight than is commonly or ordinarily employed, thereby to give it the desired degree of inertia within the said casing.

5. A structure as specified in claim 1, said microphone having greater weight than is usual or ordinary in instruments of this kind, to give it greater inertia, and having a mounting or support of non-vibration-communicating material within said casing.

6. A structure as specified in claim 1, the said microphone having a hollow body which is enclosed in said outside casing and which is provided, to a more or less extent, with lead metal to retard molecular vibration and to provide the desired degree of inertia for the microphone.

7. The combination of a casing having a complete microphone mounted and freely movable bodily within limits therein, and preventive means inside the casing, intervening between the latter and said microphone, acting to insulate the microphone against communication thereto of vibrations set up in the outside casing, said means comprising a lead weight at the back of the microphone proper inside said casing.

8. A portable microphone comprising a casing of hard material, of a size and shape that can be easily and conveniently carried in the pocket of a coat or under the clothing, a plate rigidly fastened in place in said casing, forming a frame, a sheet of thin flexible non-metallic material stretched flat on said frame, with freedom of diaphragmatic vibration, but incapable of transmitting any molecular vibrations of disturbance communicated to said frame, and a microphone instrument attached to said sheet and freely movable therewith, thereby preventing any vibration of said casing from reaching the active element of said instrument, the front wall of the casing

having one or more openings through which sound waves may reach said instrument.

9. A structure as specified in claim 8, said material being cloth to which the back of said instrument is cemented.

10. A structure as specified in claim 8, and including a weight secured to said instrument within said casing to dampen and retard movement thereof relative to said casing.

11. In a portable microphone instrument to be worn on the person, as a part of a hearing aid apparatus, having an outside casing therefor, a microphone enclosed thereby and freely movable bodily therein and insulated against the communication thereto of vibrations set up in the said outside casing by scratching or contact or friction thereon, said microphone having a casing formed with a flat back, and a suitably supported flat sheet of non-metallic flexible material cemented flatwise to said flat back.

12. A structure as specified in claim 11, said back being of relatively heavy material that is sound deadening in character.

13. A structure as specified in claim 11, said back being formed by a thickness of lead.

14. A structure as specified in claim 11, said sheet of material being of a fibrous nature and a non-conductor of sound.

15. In a portable microphone instrument to be worn on the person, as a part of a hearing aid apparatus, having an outside casing therefor, a microphone enclosed thereby and freely movable bodily therein and insulated against the communication thereto of vibrations set up in the said outside casing, from within or by scratching or contact or friction thereon, or by attachments thereto, said microphone having a casing and a suitably supported sheet of flexible material fastened to the casing of the microphone and mounted on the outside casing.

16. In an amplifier hearing aid: a casing of hard material, of a size and shape that can be easily and conveniently carried in the pocket of a coat or under the clothing; a microphone housed in said casing; and supporting means including sheet elements of flexible material carrying said microphone in a relatively movable position within said casing so as to prevent vibrations imparted to the outside casing by scratching or the like from reaching the microphone.

17. In a portable microphone instrument to be worn on the person, as a part of the hearing aid apparatus, having an outside casing therefor, a microphone enclosed thereby and freely movable bodily therein and insulated against the communication thereto of vibrations set up in the said outside casing by scratching or contact or friction thereon, one element of said microphone having a mass of substantial inertia.

JOSEPH R. CUBERT.

CERTIFICATE OF CORRECTION.

Patent No. 2,304,339.

December 8, 1942.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 55, claim 8, for "of" read --or--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of May, A. D. 1943.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.