

Feb. 28, 1928.

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H. F. DODGE

SOUND RESPONSIVE DEVICE

Filed Dec. 30, 1921

Fig. 1.

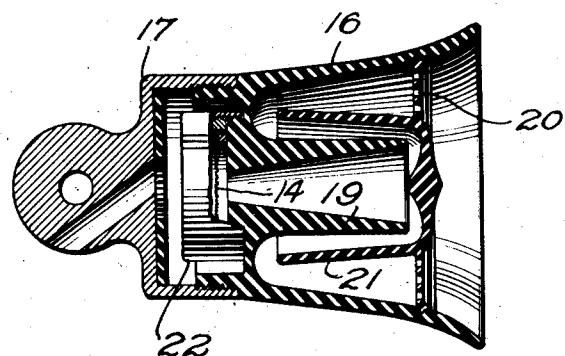
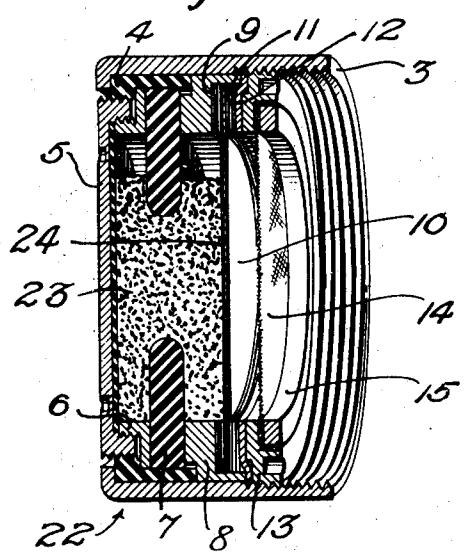


Fig. 2.



Inventor:
Harold F. Dodge
by *Jel L. Palmer* ATT'y

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HAROLD F. DODGE, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SOUND-RESPONSIVE DEVICE.

Application filed December 30, 1921. Serial No. 525,898.

This invention relates to telephonic or similar apparatus employing a diaphragm adapted to be actuated in accordance with sound waves. More specifically the invention relates to a mounting and controlling means for the diaphragm.

It is an object of this invention to provide a vibratory system which is substantially aperiodic and therefore, substantially 10 equally responsive to different frequencies of the same intensities. The means for mounting the diaphragm loosely supports it in the static state, but allows it to vibrate as a whole in the dynamic state and controls 15 its vibrations through the dynamic action of air films.

Another object of this invention is to provide an efficient device of the above type which is simple in construction and capable 20 of giving high quality in the sounds being transmitted or reproduced.

In general the invention provides means for controlling the vibration of and for mounting the diaphragm, consisting of air 25 films between a plurality of thin annular members or washers of light material located at the periphery of the diaphragm and on each side thereof.

A specific application of the invention, described more fully hereinafter, comprises 30 telephonic apparatus of the resistance varying type such as a telephone transmitter, wherein there is provided a structure in which a stiff or rigid vibratable closure of 35 the chamber containing the carbon granules or comminuted material is supported at its periphery by motion controlling means which permits the diaphragm to vibrate as a whole and which renders it substantially 40 aperiodic in character.

In the drawing, Fig. 1 is a sectional view showing an application of the transmitter of the invention;

Fig. 2 is an enlarged sectional view in 45 perspective, showing the invention in detail.

A cylindrical shell 3, flanged at one end and internally threaded at the other, supports therein an annular insulating member 4, partly covering the interior of the shell 50 and having a flanged portion partly closing the opening in the flanged end of the shell. Completing the closure is a disc 5, having a flanged edge internally and externally threaded. The external threads engage

threads on the insulator 4 to support the 55 disc in position, and the internal threads secure the annular electrode 6, which is insulated from the shell by means of the insulating member 4. The inner surface of disc 5 is preferably covered by a suitable 60 insulating material 23. Against electrode 6 and projecting into the interior of the chamber is an annular barrier 7 of insulating material. Disposed adjacent to barrier 7 is a second electrode 8 in contact with shell 3. Against electrode 8 is a number of very thin washers 9 made of paper or aluminum foil. A diaphragm 10, preferably of aluminum, having one side coated with insulating material 24, is loosely supported 70 when in the static state against these washers by a number of similar washers 11, spacer ring 12, and clamping ring 13. When the clamping ring 13 is secured in position, the space provided for the washers 75 and the diaphragm is slightly greater than the combined thickness of all the washers and the diaphragm thus loosely supporting the diaphragm when in the static state between the two banks of washers. These 80 washers may be crimped so as to provide a thin air space between adjacent washers, usually the warping or irregularities produced in handling them is sufficient to provide the necessary air spaces. This system 85 of mounting provides a constant elasticity for all displacements of the diaphragm at zero frequency. A small diaphragm thus supported is capable of vibrating at an amplitude comparable with that of the usual 90 large diaphragms employed in transmitters. This supporting means also provides effective air damping for controlling the amplitude of vibration of the diaphragm, and dynamic elasticity which increases with 95 frequency in such a way as to provide a vibrating system which is substantially aperiodic and equally responsive to vibrations of the different frequencies of the same intensities. Clamping ring 13 is provided 100 with a recess in which a moisture-proof diaphragm 14 of varnished linen, or some other suitable moisture-proof material, is supported by means of a wedge ring 15.

As shown in Fig. 1, which illustrates one 105 application of the invention, the transmitter is secured to a mouthpiece 16, which, in turn, is mounted in a case 17 provided with

a lug for supporting the device on desk stands and wall sets. It is also adaptable to the breast type transmitter employed by switchboard operators, thus producing a much lighter and cheaper device without any sacrifice in efficiency.

The mouthpiece shown in Fig. 1 is of the multi-reversal type, giving the advantages of a comparatively longer one without its disadvantages. It comprises a bell-shaped cup 16 to the base of which is secured the transmitter 22. Integral with the cup and projecting within it, is a cylindrical portion 19, which has a conical opening therein communicating with the transmitter. Supported near the other end of the cup 16 by means of a perforated grid 20 is a second cup 21 inverted with respect to cup 16 and projecting within it and over the portion 19. The effective length of the mouthpiece, therefore, is substantially that of the combined lengths of cups 16 and 21 and portion 19.

What is claimed is:

- 25 1. A telephone transmitter comprising a carbon containing chamber and a vibratable member for agitating the carbon within the chamber, and a plurality of washers of thin material located on each side of said member at its periphery to provide a plurality of air films between said washers for controlling the motion of said member.
2. A telephone transmitter comprising a carbon containing chamber and a sound responsive closure for said chamber and means for supporting said sound responsive closure at its periphery, comprising multiple layers of thin material located on each side of said closure and separated by air films, said clo-

sure being in operative relation to the carbon in the chamber.

3. A telephone transmitter comprising a carbon containing chamber, a diaphragm closure therefor adapted to vibrate as a whole to agitate the carbon in the chamber and means for controlling the motion of said diaphragm comprising a plurality of washers of thin material separated by air films and located on each side of the diaphragm at its periphery to render said diaphragm substantially aperiodic.

4. A telephone transmitter comprising a carbon-containing chamber, a diaphragm closure therefor adapted to vibrate as a whole, a plurality of thin annular members separated by films of air juxtaposed at the periphery of the diaphragm on each side thereof to control its vibrations.

5. A telephone transmitter comprising a carbon-containing chamber, a diaphragm closure therefor, a plurality of annular members of thin material juxtaposed on each side of the diaphragm at its periphery to form a plurality of air spaces between said annular members for controlling the vibrations of said diaphragm.

6. In combination a light diaphragm capable of vibrating as a whole and means for controlling the vibrations of said diaphragm comprising a plurality of washers of thin material located on each side of said diaphragm at its periphery to provide a plurality of air films between said washers.

In witness whereof, I hereunto subscribe my name this 27th day of December A. D. 1921.

HAROLD F. DODGE.