Dec. 10, 1929. F. E. GRESWOLD 1,738,575

RADIO SPEAKER DIAPHRAGM

Filed Oct. 27, 1925

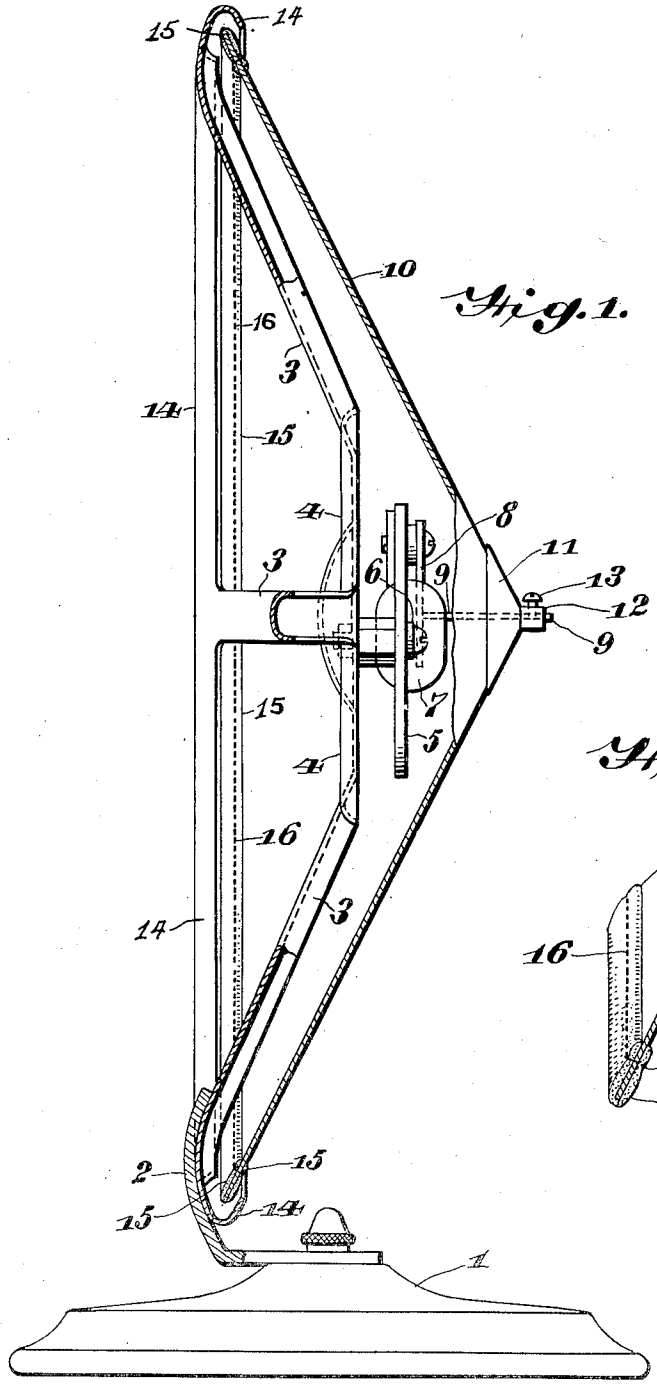


Fig. 1.

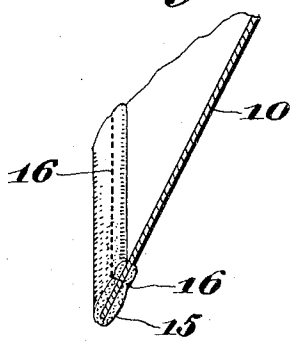


Fig. 2.

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UNITED STATES PATENT OFFICE

FORREST E. GRESWOLD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO ATWATER KENT MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

RADIO SPEAKER DIAPHRAGM

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My invention relates to diaphragms of telephonic apparatus, and more particulary to conical diaphragms of large diameter for amplifying telephones, loud speakers or radio speakers utilized in connection with radio receiving systems.

In accordance with my invention, the diaphragm, of paper, or similar material easily deformed or injured, particularly at its outer end or periphery, has its periphery or outer end free and unconfined, and has applied thereat a stiffening or strengthening member, preferably embracing the edge of the diaphragm, and serving as a protective structure, of cloth, felt, or equivalent material.

Further in accordance with my invention, there is provided a further guard or protective element, of rigid material, as metal, substantially spaced from the diaphragm and from the protective structure directly applied to the diaphragm adjacent its outer edge.

My invention resides in diaphragm structure of the character hereinafter described and claimed.

For an illustration of one of the forms my invention may take, reference is to be had to the accompanying drawing, in which:

Fig. 1 is a vertical sectional view, partly in elevation, of structure embodying my invention.

Fig. 2 is a fragmentary sectional view, partly in elevation, on enlarged scale.

Referring to the drawing, 1 is a base to which is secured one of the arms 3 of a structure for supporting the magnet system, diaphragm and guard structure therefor. Carried by the arms 3 is the member 4, upon which is secured the magnet system comprising the permanent magnet field frame or yoke 5, pole piece structure 6, magnet winding 7, and vibratile armature bar or member 8 secured at its one end to the yoke 5 and having its free end operatively related to the pole piece structure 6.

Secured to the vibratile armature member 8 is the pin or rod 9 constituting the sole support for the diaphragm and serving to vibrate it. The conical diaphragm 10, of paper, sheet metal or equivalent material, is of relatively large diameter, as upwards of six inches, and has secured thereto at its apex or center sheet metal conical structure 11, to which is secured the member 12 by which the diaphragm is secured to the pin 9 by set screw 13.

The arms 3 carry the annular shield or guard member 14, which surrounds but is spaced from the outer end or periphery of the diaphragm 10, allowing it to vibrate freely throughout without restraint by or contact with the guard structure 14.

Applied to the diaphragm 10 at its periphery or outer edge is the reinforcing or protecting member 15, of cloth, felt or equivalent material, applied or held by stitching 16, by adhesive, or other suitable means. The member 15 preferably extends throughout the circumference of the diaphragm at its periphery, and preferably both on the inside and outer side of the diaphragm, and preferably in a single piece embracing the edge of the diaphragm.

The member 15 serves to protect the diaphragm 10 against distortion or deformation at or adjacent its periphery in event the guard structure 14 be bent or deformed to position closely adjacent to or in contact with the diaphragm. And when the guard structure 14 is not utilized, the member 15 nevertheless serves to strengthen and protect the diaphragm adjacent its periphery against distortion, deformation or breakage, leaving the diaphragm to vibrate freely and unrestrainedly at its outer periphery, the material 15 being sufficiently light or small in mass or quantity as not to materially impede or dampen the diaphragm vibrations.

The diaphragm is free of restraint at its periphery, and is supported solely at its apex or center, and there the vibrations of the vibratile armature member 8 are imparted to it.

As indicated, the guard member 14 is substantially spaced from the diaphragm 10 itself, and in addition, from the protective member 15, which too in vibration is unrestrained and does not come into contact with the guard 14, which latter, as indicated, preferably extends around or embraces the periphery or outer edge of the diaphragm 10

and the member 15, and throughout is substantially spaced from both.

What I claim is:

1. A sound-reproducing diaphragm of the free edge type having attached thereto at its periphery a protecting element.

2. A conical diaphragm of large diameter having a freely vibrating periphery and a protecting element of fibrous material attached to said periphery.

3. A conical diaphragm of large diameter having a freely vibrating periphery, and a protecting element of fabric attached to said periphery.

4. A sound-reproducing diaphragm of the free edge type having attached thereto at its periphery a protecting element extending circumferentially of said periphery.

5. A sound-reproducing diaphragm of the free edge type having attached thereto at its periphery a protecting element on each side thereof.

6. A conical diaphragm of large diameter having a freely vibrating periphery, and a protecting element attached to said periphery on each side thereof and continuous across the edge thereof.

7. A conical paper diaphragm of large diameter having a freely vibrating periphery, and a protecting element of cloth stitched thereto and embracing the edge thereof.

8. In combination, a semi-flexible conical diaphragm of large diameter having a free, vibratable periphery, a protecting element attached to said periphery, and a guard member surrounding the periphery of the diaphragm and substantially spaced from said protecting element.

9. In combination, a semi-flexible conical diaphragm of large diameter having a free, vibratable periphery, a protecting element attached to said periphery, and a guard member embracing the periphery of the diaphragm and said protecting element and substantially spaced therefrom.

10. A sound-reproducing diaphragm of the free edge type, and an circumferential element attached thereto at the periphery of said diaphragm having a width small as compared to the distance to the center of the diaphragm.

11. A conical diaphragm of the free edge type, and an element attached thereto at the periphery of said diaphragm having a width small as compared to the distance to the vertex of the cone.

12. In combination, a sound-reproducing diaphragm of the free edge type, a protecting element attached to the periphery of said diaphragm, and a guard element surrounding said periphery and substantially spaced from said protecting element.

13. In combination, a sound-reproducing diaphragm of the free edge type, a protecting element attached to the periphery of said diaphragm and a guard member embracing said periphery and said protecting element and substantially spaced therefrom.

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