

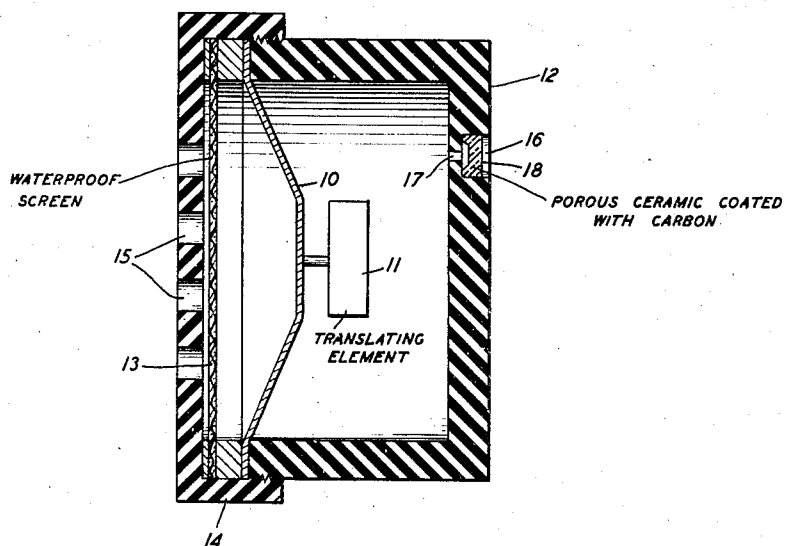
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MOISTURE IMPERVIOUS VENT

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MOISTURE IMPERVIOUS VENT

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This invention relates to vents and more particularly to compensating vents pervious to air and substantially impervious to water and especially suitable for use in sound translating devices such as telephone receivers and transmitters.

Such devices comprise, in general, a diaphragm having one or both faces adapted to be acted upon by or to produce sound waves, a translating element, for example a magnetic unit or a carbon granule unit, associated with the diaphragm, and a casing enclosing the diaphragm and translating element. In such instruments which may be exposed, in the course of use, for example on ships or in regions near the sea, to water spray or to accidental immersion, in order to protect the translating element or both the element and the diaphragm against deleterious effects due to water, the casing may be made of solid walls and, hence, both air and water tight.

In such construction, as will be appreciated, substantial variations of the external temperature result in corresponding variations in the pressure within the casing, due to expansion and contraction effects of the air within the casing, and consequent inequality between the internal and external pressures. Such inequality in devices of the type wherein only one face of the diaphragm is active in the translation of sound impairs the operation of the device by creating an undesired unbalance in the forces acting on the diaphragm, and if the inequality is great, also may result in shearing or distortion of the diaphragm or other elements, for example a moisture proof protective membrane adjacent the diaphragm. Similarly, in devices wherein both faces of the diaphragm are active, impairment of operation or destruction of elements of the device may occur.

Further, in telephone instruments used on aircraft, substantial variations of the external pressure occur, particularly in aircraft employed in high altitude flying. Such variations, in instruments having closed casings, produce inequalities between internal and external pressures so that the deleterious effects aforementioned may result.

One object of this invention is to maintain substantial equality between the internal and external ambient pressures in a sound translating device, for a wide range of temperatures and external pressures and to realize also substantial protection of the elements of the device against water.

In accordance with one feature of this invention, in a telephone transmitter or receiver of

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the general construction described above, the casing is provided with a vent which is pervious to air but substantially impervious to water. More specifically, in accordance with a feature of this invention, the vent comprises a body of porous ceramic treated with a penetrating coating of carbon such that the vent will allow sufficient flow of air therethrough to maintain substantial equilibrium between the external and internal pressures but will prevent the passage of water for even substantial water pressure heads.

The invention and the above-noted and other features thereof will be understood more clearly and fully from the following detailed description with reference to the accompanying drawing in which the single figure is a view mainly in section of a telephone instrument illustrative of one embodiment of this invention.

The instrument shown in the drawing comprises a diaphragm 10 cooperatively associated with a translating element 11, such as a carbon granule or electromagnetic unit, one face of the diaphragm being enclosed by a casing 12. The diaphragm 10 may be secured to the casing, together with an air and moisture impervious membrane 13, by a cap 14 threaded to the casing and provided with a plurality of apertures 15.

The casing 12 is provided, for example in the rear wall thereof, with a recess 16 having communication with the interior of the casing by way of an aperture 17. Fitted within the recess 16 is a vent member 18 which is pervious to air and substantially impervious to water.

Specifically, the vent member 18 is a molded disc of finely divided ceramic, for example aluminum oxide, treated with a penetrating coating of carbon. The carbon coating may be produced by heating the ceramic disc to a high temperature, of the order of 1000° C., in an atmosphere of methane and nitrogen gas whereby carbon is liberated in the atmosphere and deposited both upon the external surfaces and in the interstices of the disc. The thickness of the coating is determined by the duration of the heating period so that, as will be apparent, the porosity of the vent may be controlled accordingly and an optimum coating obtained.

Carbon so deposited, because of its character, is not wet by water so that a large contact angle obtains at the interface of the carbon and water. Consequently, a large hydrostatic pressure is necessary to overcome the surface tension of the water and permit passage of water through the pores of the disc. Hence, the vent permits flow

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of air therethrough but prevents passage of water for hydrostatic pressures below a large value. For example, in a specific construction, a disc coated in the manner described above for a period of the order of one hour, has been found impervious to water for pressure heads of substantially four feet.

Thus, the vent protects the internal elements of the instrument against water but allows seepage of air therethrough to maintain substantial equilibrium between the internal and external pressures whereby damage of the diaphragm 10 or membrane 13 and deleterious affecting of the operating characteristics of the instrument by differences between these pressures is prevented. Hence, the instrument is capable of being used safely under a wide range of temperatures and external pressures and the internal elements thereof are protected against water even though the instrument be accidentally immersed.

Although aluminum oxide has been mentioned above as the disc material, other ceramics, for example porcelain and steatite, may be utilized. Also, although a specific embodiment of the invention has been shown and described, it will be understood that this embodiment is but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined in the appended claims.

What is claimed is:

1. In a device comprising a casing having a wall, means in said wall defining a vent pervious to air and substantially impervious to water, said

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means comprising a porous ceramic body having thereon a firmly adherent, penetrating coating of a material having a contact angle with water of the order of that for pure carbon.

2. In an enclosure pervious to air and substantially impervious to water and including a casing having an aperture in a wall thereof, a ceramic body impregnated with substantially pure carbon extending across said aperture.

3. In a device including a casing having a vent therein, a member pervious to air and substantially impervious to water extending across said vent, said member being a ceramic body impregnated with carbon deposited thereon from a hydrocarbon gas.

4. In an enclosure including a casing having an opening in one wall thereof, means in said opening pervious to air but substantially impervious to water comprising a porous body of aluminum oxide having thereon a firmly adherent penetrating coating of substantially pure carbon.

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