Aug. 12, 1958 F. W. MÜLLER 2,847,326

MICROPHONE COMPRISING A MAGNET SYSTEM

Filed July 28, 1952 2 Sheets-Sheet 1

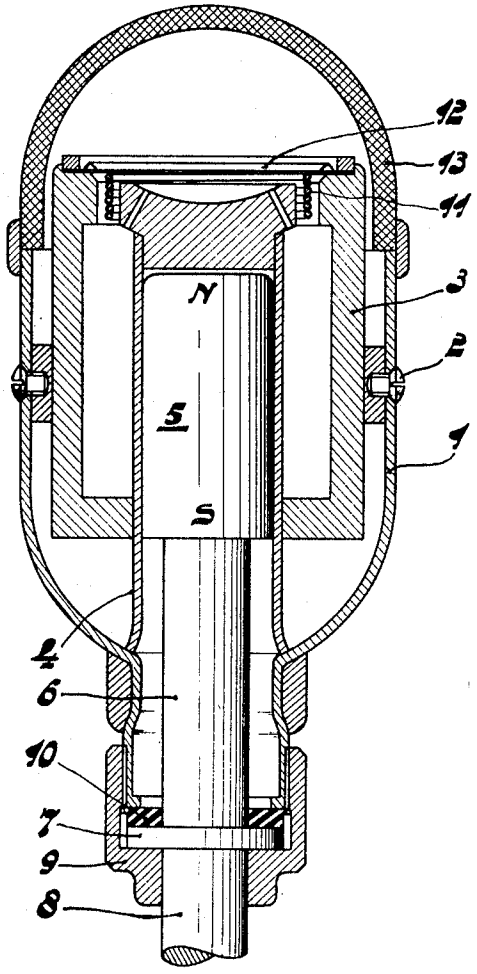


Fig. 1.

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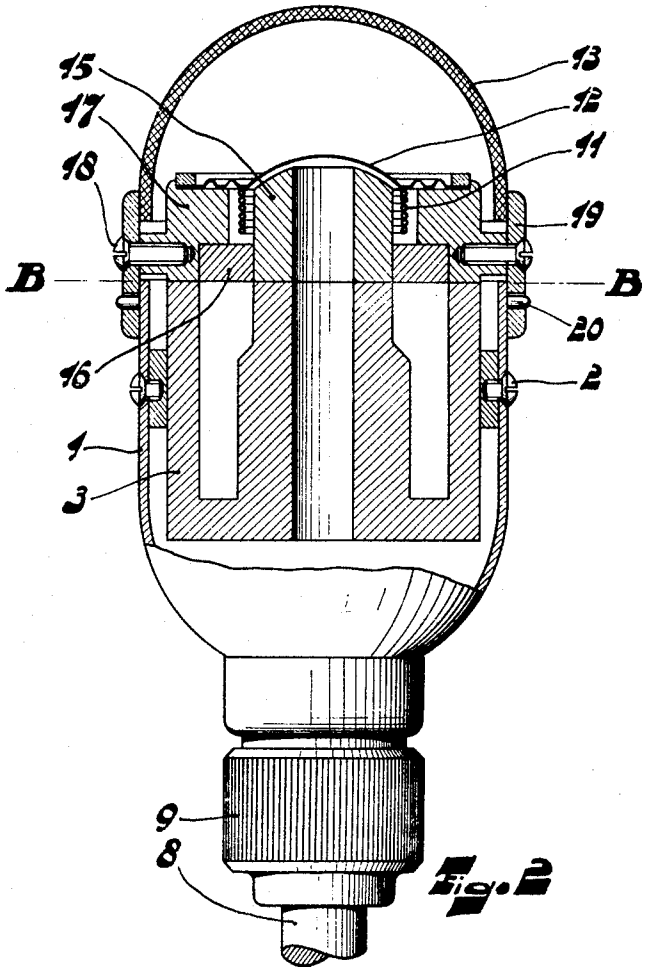


Fig. 2

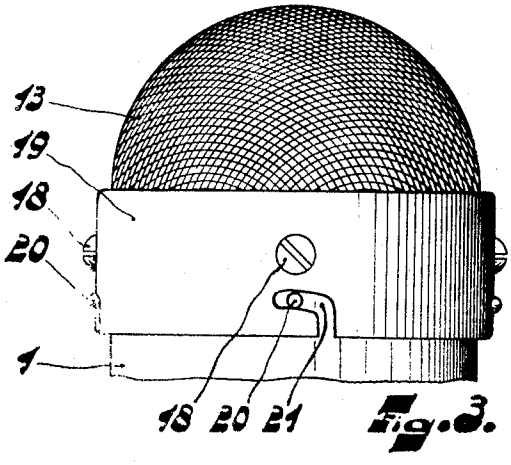


Fig. 3.

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MICROPHONE COMPRISING A MAGNET SYSTEM

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3 Claims. (Cl. 179—115.5)

The present invention relates to a microphone assembly. More particularly, the invention relates to a microphone assembly comprising a magnet.

With electro-acoustical transmitting systems it may occur that, particularly in windy weather, a microphone which is not sufficiently protected becomes inoperative, at least temporarily, due to the penetration of dust, sand, rain and the like. It may, moreover, be desirable to vary the characteristics of the sound recording apparatus during the recording operation in order to present scenes performed in the neighborhood or at a distance.

However, for aesthetical and economical reasons it is rarely possible to provide an adequate series of separate, different and complete microphones having their own stand, cable and, if required, pre-amplifier, to be used as reserve microphones or for different characteristics. It is therefore efficient to arrange the microphones, more particularly electro-dynamic microphones, so as to be exchangeable on the stand. In this case, a small number of stands, cables and pre-amplifiers may suffice and only the desired number of reserve microphone heads need be kept at hand and may, for example, be easily carried by the operator in a service case. With microphones comprising a magnetic system, particularly with electro-dynamic microphones, the weight of the microphone, which is primarily determined by the magnetic system, becomes objectionable, under such circumstances, after a time.

According to the invention, the weight of the exchangeable part (the microphone head) of such a microphone, preferably an electro-dynamic microphone, may be reduced by about 50% or more, if part of the microphone system, which comprises more particularly the permanent magnet, is rigidly secured to the holder and the other parts of the microphones (microphone heads), when arranged on the holder, automatically assume a position such that the required magnetic field traverses the coil. Since the weight is primarily determined by the permanent magnet and the weak iron parts of the magnetic system, it is efficient to construct an exchangeable microphone according to the invention in a manner such that, as far as possible, only the parts essential for the adaptation of the system are comprised in the exchangeable microphone head, while the other parts of the magnetic system are rigidly secured to the holder. Provision must particularly be made that the parts at the edge of the microphone head are, as far as possible, not subjected to variations and that the parts which are particularly critical for the adaptation are protected.

According to the invention, with a microphone in which the permanent magnet is arranged centrally in an axial direction, the central part is made hollow in a manner such that the permanent magnet secured to the holder fits exactly in the cavity (sleeve), the sleeve having an efficient groove or bore to allow air to flow away. The cavity is preferably tubular and provided with a

non-magnetic wall; the permanent magnet also is shaped in the form of a cylinder.

After the exchangeable part has been arranged, the oscillating system, preferably the coil, must be connected electrically to the conductors provided in the microphone stand for the cable of the pre-amplifier. For this purpose, provision is made of a plug device of known construction, so that, when arranging the microphone on the holder, the electrical connections are automatically established.

In order that the invention may be readily carried into effect, it will now be described in detail with reference to the accompanying drawing, wherein:

Fig. 1 is a schematic diagram, partly in section of an embodiment of a microphone assembly of the present invention;

Fig. 2 is a schematic diagram, partly in section, of another embodiment of a microphone assembly of the present invention; and

Fig. 3 is a schematic diagram of a portion of Fig. 2.

Referring to Fig. 1, a housing **1** comprises, for example, a cylindrical magnetic system **3**, secured by means of screws **2**, a permanent magnet **5** being arranged in the center of this system in a non-magnetic sleeve **4**. A coil device **11**, comprising a diaphragm **12**, is positioned over the magnetic system **3**.

The magnet **5** is secured over a stem **6**, having a strip **7**, to a preferably hollow, flexible support **8**. By means of a cap nut **9** and an intermediate stuffing **10**, the housing **1** is secured mechanically to the support **8** and by means of a plug device (not shown) the coil is, if necessary, connected electrically also.

A wire grate **13**, which is preferably welded for strengthening purposes, allows the sound oscillations to pass, and protects the coil system from mechanical damage, but not from dust, rain and the like.

If the microphone (the housing **1** and the parts secured mechanically thereto) must be exchanged, the cap nut **9** is loosened, after which the magnet **5** can be pulled out of the sleeve, so that the microphone head can be removed.

Fig. 2 shows a microphone according to the invention, which can be detached approximately on the line B—B. By means of screws **2** a permanent magnetic system **3** is secured to the housing **1**. The housing **1** is secured mechanically by means of a cap nut **9** to a stand **8** (shown only diagrammatically) and secured electrically, for example, by means of plug devices (not shown). In this embodiment, the detachable head of the microphone comprises an internal iron ring **15**, which is surrounded by a layer of synthetic resin **16**, by which the ring is secured to an external profiled iron ring **17**. The ring **17** is secured by means of four screws **18** to a cylindrical holder ring **19**, which supports a wire grate **13**, which is preferably secured by soldering. The coil **11** and diaphragm **12** are positioned over the iron rings **15** and **17**. The electrical connection of the coil **11** to the conductor, which is preferably made through the stand **8**, may be established in known manner, for example, by means of plugs or sliding contacts and cables and such connection is therefore not shown.

Fig. 3 is a side view of a microphone head as shown in Fig. 2, to illustrate the method of securing the head **19**, **13** to the housing **1** by means of pins **20** and slots **21**. The head **19**, **13**, which comprises only a small part of the magnetic system and is therefore comparatively light, may be exchanged, if required, in a simple manner. The magnetic system **3** and the iron rings **15** and **17** are ground for example in the plane B—B as to be flat relative to one another and are pressed tightly together by the fastening device **20**, **21**, so that there is no clear-

ance space at the area of detaching. It is desirable to enclose the exchangeable upper parts in dust-tight boxes before moving them.

While the invention has been described by means of specific examples and in specific embodiments, I do not wish to be limited thereto for obvious modifications will occure to those skilled in the art without departing from the spirit and scope of the invention.

What I claim is:

1. An exchangeable microphone assembly comprising a support, a housing including a portion permeable to sound waves, a microphone magnetic system having a central cavity disposed in said housing and comprising a permanent magnet in engagement with said cavity for producing a magnetic field, a coil disposed in said field, and a diaphragm secured to said housing and said coil and responsive to sound waves passing through the permeable portion of said housing, said permanent magnet being rigidly secured to said support, said housing being detachably secured to said support.

2. An exchangeable microphone assembly comprising a support, a housing including a portion permeable to sound waves, a microphone magnetic system having a central tubular cavity disposed in said housing and comprising a cylindrical permanent magnet in engagement with said cavity for producing a magnetic field, a coil disposed in said field, and a diaphragm secured to said housing and said coil and responsive to sound waves passing through the permeable portion of said housing, said permanent magnet being rigidly secured to said support, said housing being detachably secured to said support.

3. An exchangeable microphone assembly as claimed in claim 2 in which detachable means are provided for effecting external circuit connection to said coil.

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