June 26, 1923. 1,460,034

R. L. MURRAY

TELEPHONE TRANSMITTER

Filed Aug. 24, 1921

Fig.1.

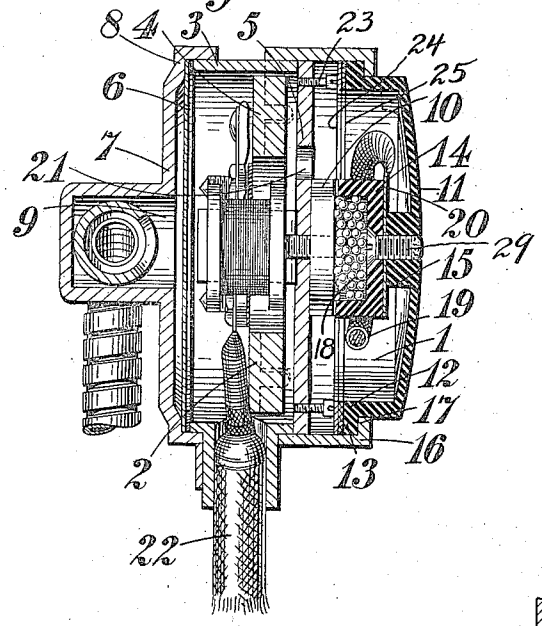


Fig.3.

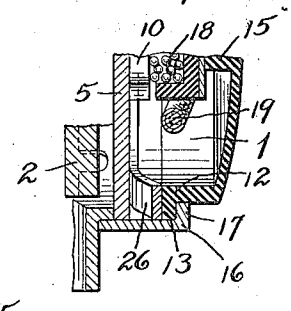
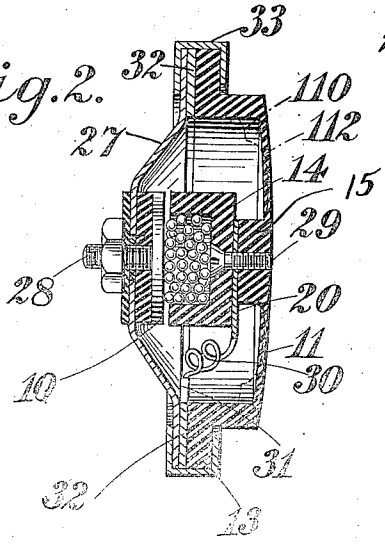


Fig.2.



Inventor

Robert Lambert Murray,

by Byrnes, Latbrop, Burgess & Parmelee

his Attys.

Patented June 26, 1923. 1,460,034

UNITED STATES PATENT OFFICE.

ROBERT LAMBERT MURRAY, OF BUSHEY HEATH, ENGLAND, ASSIGNOR TO TELEPHONE MANUFACTURING COMPANY LIMITED, OF LONDON, ENGLAND.

TELEPHONE TRANSMITTER.

Application filed August 24, 1921. Serial No. 494,771.

To all whom it may concern:

Be it known that I, ROBERT LAMBERT MURRAY, a subject of the King of England, residing in Bushey Heath, Hertfordshire, England, have invented certain new and useful Improvements in Telephone Transmitters, of which the following is a specification.

This invention relates primarily to telephone transmitters or that type in which the diaphragm or a "pad" thereon is intended to be held in contact with a surface of portion of the user's person, hereinafter referred to in a general way as the throat, in contradistinction to the type intended to be held near the mouth to receive sound transmitted through the air. The term "pad" is intended to denote any projecting part carried upon the diaphragm itself so as to be situated between the diaphragm and the surface against which it is to be pressed so that vibrations are transmitted to the diaphragm mechanically and directly through the said projecting part, irrespective of any that may be transmitted through the air also.

The object of the present invention is to provide a construction of transmitter of the aforesaid type which shall be better adapted for application to the user's throat than those heretofore constructed, and which moreover shall be less liable than are transmitters of the ordinary construction, to become momentarily inoperative owing to the position in which it is being held.

According to the present invention there is provided in a telephone transmitter, the combination with a support, and a microphone comprising a fixed element carried by the support and a movable element arranged to co-operate with the fixed element, of a diaphragm that is domed so as to present an external convex surface and is secured solely at its circumferential margin to said support, which diaphragm is provided with an integral central boss, to which the said movable element of the microphone is secured.

Preferably the boss is of a diameter not exceeding three-quarters of the diameter of that portion of the diaphragm which is comprised within the circumferential margin that serves to connect it to its support, in order that the diaphragm may have the requisite degree of flexibility.

Other features of the invention will be described hereinafter and pointed out in the claims.

The embodiments of this invention shown in the accompanying drawings serve further to illustrate the nature of the invention. In the drawings—

Figure 1 is a central section through one construction of transmitter according to this invention,

Figure 2 is a similar view of an alternative construction, and

Figure 3 is a detail sectional view, similar to Fig. 1, illustrating a further modification.

The transmitter 1 is built, together with a receiver 2, upon a foundation ring 3 common to them both. The receiver magnet 4 is encircled by the ring and is mounted upon a base-plate 5 by screws (not shown) passing through the magnet and into the base plate. The solenoid cores of the magnet are L-shaped and have each one limb gripped between the magnet ring 4 and the base plate. The base plate 5 serves to close one otherwise open side of the ring, and the other open side is closed by the receiver diaphragm 6 which is covered by a dished flanged cap 7, whereof the flange 8 surrounds the ring and is secured to the latter by screws not shown. The concavity of the cap is towards the diaphragm and a duct 9 leads from the chamber thus formed between the diaphragm and the cap to the the ear pieces.

On the opposite side of the base-plate 5 to that on which the receiver magnet is mounted, is a carbon disc 10 conductingly attached to the plate. A transmitter diaphragm 11 is prepared in the form of a cup-like cap having a substantially cylindrical body portion 12, and whereof the lip has an externally directed radial flange 13 and from the centre of the bottom whereof springs a small cylindrical boss 15 integral with the diaphragm. This diaphragm, or combined diaphragm and cap as it may be described, is made in one piece of ebonite. Upon the boss 15 is mounted a carbon cup 14 whose open mouth is directed towards the disc 10.

A metallic securing ring 16 is provided for the combined diaphragm and cap, arranged to encircle the foundation ring 3 and provided with a small inwardly directed flange 17 to engage the flange upon the lip 13. The

securing ring 16 is made fast in any convenient way to the foundation ring.

The carbon cup is charged with carbon shot or granules 18, and, when the parts are assembled, is closed, and the granules thereby retained in position, by the disc 10.

Connection is made to the carbon cup 14 by an insulated wire 19 passing from a metallic washer 20 through a hole 21 in the foundation 5, although this portion of the wire 19 is omitted for the sake of clearness. Its end within the receiver is, together with the necessary connections for the receiver magnet winding, connected in the usual manner to a multiple way flexible cable 22 serving to complete the circuit in any convenient way with the remainder of the telephone system. The connection to the fixed element 10 of the microphone is not shown, but preferably consists of a strand of the cable 22 connected in any convenient manner to the ring 4 which is in electrical connection with the carbon disc 10.

Two alternative constructions with regard to further detail are shown in Figures 1 and 3.

As shown in Figure 1, screws 23, four in number, are arranged to project from the base-plate towards the diaphragm flange or lip 13, and serve as adjustable distance-pieces therefor. Between the flange 13 and the projecting ends of the screws a metallic washer 24 and a washer 25 of resilient material, such as rubber, are interposed. The function of the screws is to enable the working distance between the disc 10 and cup 14 to be adjusted, while the function of the resilient washer 25 is to enable the degree of rigidity with which the diaphragm is held at its circumference to be varied by the consequent variation in the degree of compression applied by the securing ring 16 to the washer.

In the construction indicated in Figure 3, the screws 23 and washers 24 and 25 are replaced by a resilient metallic washer, such for example as an ordinary spring washer 26.

The construction shown in Figure 2 is similar to that shown in Figure 1 in its general features, but differs in detail as is necessitated partly by the fact that it is not mounted to constitute an unitary device with a receiver. Thus, for example, the foundation ring 3 and base-plate 5 are replaced by the dished stamping 27 of metal upon which the disc 10 is insulatingly supported and held by a screwed stem 28, insulated, as shown, from the stamping 27. In this construction, as well as in that shown in Figure 1, the cup 14 is secured to the boss by a screw 29 whose tip does not, however, pass to the outer surface of the diaphragm 11. The hole for it may, however, be drilled clear through and the outer end subsequently plugged in any convenient way. Connection to the cup is, in the construction of Figure 2, made by means of a flexible wire 30 whereof one end is secured to a tab 31 projecting from a metallic washer 32 and the other end to the washer 20.

The lip or flange 13 is held upon the foundation stamping 27 by means of a clip-ring 33 of any convenient construction but preferably one whereof one of the inwardly directed radial flanges is in the form of pliable lugs which may readily be bent over and form in effect a mutilated flange.

The substance of the diaphragm, as will readily be understood, is made as thin as practicable over the majority of the surface lying between the outer margin and the centre but is of course thickened at the centre by the presence of the aforesaid boss. It may also be thickened near the margin as indicated in chain line at 110 in Figure 2, by being formed with an annular projection so that the resilience of the support afforded to the carbon cup resides principally in portion 112 of the diaphragm lying between the said annular thickening and the boss.

Instead of the diaphragm being formed with a cylindrical body or extension that is flanged, the flange may be omitted and the diaphragm secured by its body alone, or again alternatively the cylindrical portion may be absent and the diaphragm merge imperceptibly into the flange which may be held by the securing ring as above described. Furthermore, although the diaphragm is above described as being made of non-conducting material, it may be made of metal, if preferred, and it may, if desired, not be made entirely in one piece whether of metal or not.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a telephone transmitter, a support, a microphone comprising a fixed element carried by the support and a movable element arranged to co-operate with the fixed element, a resilient compression member carried by said support, a flexible diaphragm which bears by its circumferential portion on said resilient member, said diaphragm being domed to present an external convex surface and having on its inner face an integral central boss to which said movable microphone element is secured, said boss being of a diameter that does not exceed three-quarters of the diameter of that portion of the diaphragm comprised within its circumferential margin, and clamping means carried by said support and arranged to clamp the circumferential portion of said diaphragm against said resilient member.

2. In a telephone transmitter, a support, a microphone comprising a fixed element in the form of a disc carried by the support and a movable element comprising a cup-shaped member having carbon granules therein ar-

ranged to co-operate with the fixed element, a diaphragm domed to present an external convex surface, said diaphragm being secured solely at its circumferential margin to said support, and provided with an integral central boss to which said cup-shaped element is attached with its open mouth directed towards but spaced away from said fixed element.

3. In a telephone transmitter, a support, a microphone comprising a fixed element in the form of a disc carried by the support and a movable element comprising a cup-shaped member having carbon granules therein arranged to co-operate with the fixed element, a resilient compression member carried by said support, a flexible diaphragm supported by its circumferential portion on said resilient member, said diaphragm being domed to present an external convex surface and having on its inner face an integral central boss to which said cup-shaped element is secured with its open mouth directed towards said fixed element and clamping means carried by said support and arranged to clamp the circumferential portion of said diaphragm against said resilient member.

In testimony whereof I affix my signature.

ROBERT LAMBERT MURRAY.

Witnesses:
L. E. GREENACRE,
T. J. OSMAN.