PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in Ribbon Microphones

We, RADIO GRAMOPHONE DEVELOPMENT COMPANY LIMITED, a British Company, of Pale Meadow Print Works, Hospital Street, Bridgnorth, Shropshire, and HORACE FOLEY DUFFELL, a British subject, of The Lodge, Wenlock Road, Shrewsbury, Shropshire, do hereby declare the nature of this invention to be as follows:

This invention relates to microphones of the kind in which a thin corrugated ribbon of metal is mounted by supports at its ends so that it lies between and in the plane of two long narrow pole pieces of a magnet. The ribbon forms part of an electric circuit, and its vibration in the magnetic field under the action of sound produces the translation from sound waves to electric waves. This type of microphone is known as a "ribbon microphone."

In a ribbon microphone, it is important that the gap at each side of the ribbon should be small and uniform. The present procedure in constructing the microphone is to build up the magnet structure with a defined gap space and then to fix the ribbon in this space. Owing to the thinness of the ribbon (say 3 mils.) and its corrugated form and the practicable methods of construction, the mounting of the ribbon in the gap is a delicate operation, and even in skilled hands does not necessarily give the best results in all cases. By the present invention we provide an improved construction by making the pole pieces of the magnet independently adjustable in position and fixing the ribbon on the structure on which the pole pieces are mounted, and finally adjusting each pole piece into proximity and parallelism with the adjacent edge of the ribbon.

In a convenient form of carrying out the invention, each pole piece is a flat strip of sheet steel, one of the long narrow edges of which is to serve as the pole face. Each strip is mounted with one of its wider faces clamped on the magnet, the clamping being at some distance from the gap. The clamping arrangement for each plate includes a pair of adjusting screws each of which can be turned in a hole in the support of the pole piece and has an eccentric portion working in a hole in the pole piece. These two adjusting screws are in opposite ends of the pole piece so that by turning them the pole piece may be moved bodily towards and away from the ribbon and may be tilted slightly by adjusting one end to be in advance of the other.

The ribbon is mounted with a reasonable approach to the correct position on the structure and then each pole piece is adjusted so that the edge forming the gap face is brought close to and parallel with the adjacent edge of the ribbon. The whole operation can be done by a relatively unskilled person and with the attainment of a close approach to the optimum conditions.

Dated this 30th day of June, 1947.

R. L. CLEAVER,
Agent for the Applicants,
Cable Research House, Barter Street,
London, W.C.1.

COMPLETE SPECIFICATION

Improvements in Ribbon Microphones

We, RADIO GRAMOPHONE DEVELOPMENT COMPANY LIMITED, a British Company, of Pale Meadow Print Works, Hospital Street, Bridgnorth, Shropshire, and HORACE FOLEY DUFFELL, a British subject, of The Lodge, Wenlock Road, Shrewsbury, Shropshire, do hereby declare the nature of this invention and in what

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manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to microphones of the kind in which a thin corrugated ribbon of metal is mounted by supports at its ends so that it lies between and in the plane of two long narrow pole pieces of a magnet. The ribbon forms part of an electric circuit, and its vibration in the magnetic field under the action of sound produces the translation from sound waves to electric waves. This type of microphone is known as and will hereinafter be referred to as a "ribbon microphone."

In a ribbon microphone, it is important that the gap at each side of the ribbon should be small and uniform. The present procedure in constructing the microphone is to build up the magnet structure with a defined gap space and then to fix the ribbon in this space. Owing to the thinness of the ribbon (say 3 mils.) and its corrugated form and the practicable methods of construction, the mounting of the ribbon in the gap is a delicate operation, and even in skilled hands does not necessarily give the best results in all cases. By the present invention we provide an improved construction by making the pole pieces of the magnet independently adjustable in position and fixing the ribbon on the structure on which the pole pieces are mounted, and finally adjusting each pole piece into proximity and parallelism with the adjacent edge of the ribbon.

In a convenient form of carrying out the invention, each pole piece is a flat strip of sheet steel, one of the long narrow edges of which is to serve as the pole face. Each strip is mounted with one of its wider faces clamped on the magnet, the clamping being at some distance from the gap. The clamping arrangement for each plate includes a pair of adjusting screws each of which can be turned in a hole in the support of the pole piece and has an eccentric portion working in a hole in the pole piece. These two adjusting screws are in opposite ends of the pole piece so that by turning them the pole piece may be moved bodily towards and away from the ribbon and may be tilted slightly by adjusting one end to be in advance of the other.

A ribbon microphone in accordance with the invention will hereinafter be described as an example with reference to the accompanying drawings, in which Figure 1 is an elevation of part of the microphone, Figure 2 is a cross-section on line II—II in Figure 1, and Figure 3 is a cross-section on line III—III in Figure 1.

Referring to the drawings, the magnet structure consists of two U-shaped magnets 1, 2, two bars 3 and 4 of magnetic material (of which 4 is shown chain-dotted), and two flat pole pieces 5 and 6 of magnetic material. All of these parts are supported on a base plate 7 of non-magnetic material, each of the bars 3 and 4 being bolted to the plate 7 by two bolts 8 and the magnets 1 and 2 being clamped against the ends of the bars 3 and 4 by clamping screws 9 and 10. The pole pieces 5 and 6 are freely mounted between the plate 7 and the bars 3 and 4 in recesses formed on the bars (see Figure 3). Each pole piece is formed with two pairs of holes 11 and 12. The holding-down bolts 8 for the bars 3 pass through the holes 11, and in the holes 12 are arranged discs 13 which are rigidly mounted eccentrically on the ends of threaded pins 14. The outer ends of the pins 14 are slotted so that they can be turned with a screwdriver to alter the position of the pole pieces. Since each pole piece is provided with an adjusting pin 14 located near each end by rotating both pins in the same direction, the pole piece can be moved bodily towards or away from the ribbon 17, or by rotating one only of the pins it can be tilted to bring it into parallelism with the edge of the ribbon. Each of the pins 14 is provided with two locking nuts 15, spaced from the plate 7 by fibre washers 16, so that the pole pieces can be firmly clamped into position when the adjustment is complete. The ribbon 17, which consists of a corrugated strip of aluminium foil $\frac{3}{16}$" wide and 3 mils. thick, is mounted between two pairs of clamping strips 18 and 19 bolted to the plate 7 across an aperture in the plate 7. The normal electrical connections (not shown) are provided between the ends of the ribbon 17 and the microphone transformer, and the plate 7 is flexibly mounted on suitable supports in an outer casing.

In the manufacture of the microphone, after the magnetic structure has been assembled on the plate 7, the pole pieces 5 and 6 are moved apart by adjusting the pins 14; the ribbon 17 is fixed in position and the pole pieces 5 and 6 are then adjusted into proximity and parallelism with the adjacent edges of the ribbon by again adjusting the pins 14. This adjustment may be facilitated by projecting a shadow image of the ribbon and the pole pieces on a ground glass screen. When this adjustment is complete the pole pieces are locked in position by means of lock nuts 15. The whole operation can be done by a relatively unskilled person with the attainment of a close proximity to the optimum conditions.

Having now particularly described and ascertained the nature of our said inven-

tion and in what manner the same is to be performed, we declare that what we claim is:—

1. A ribbon microphone in which each of the pole pieces is movable independently in the plane of the ribbon to enable it to be adjusted into proximity and parallelism with the adjacent edge of the ribbon.

2. A ribbon microphone in which the magnet structure, including the pole pieces, and the ribbon are mounted on a common support and adjustable means are provided for moving each of the pole pieces independently with respect to the said support to adjust them into proximity and parallelism with the adjacent edge of the ribbon.

3. A ribbon microphone with means substantially as described with reference to and shown in the accompanying drawings for adjusting the pole pieces.

Dated this 29th day of June, 1948.

R. L. CLEAVER,
Agent for the Applicants,
Cable Research House, Barter Street,
London, W.C.1.

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FIG. 1.

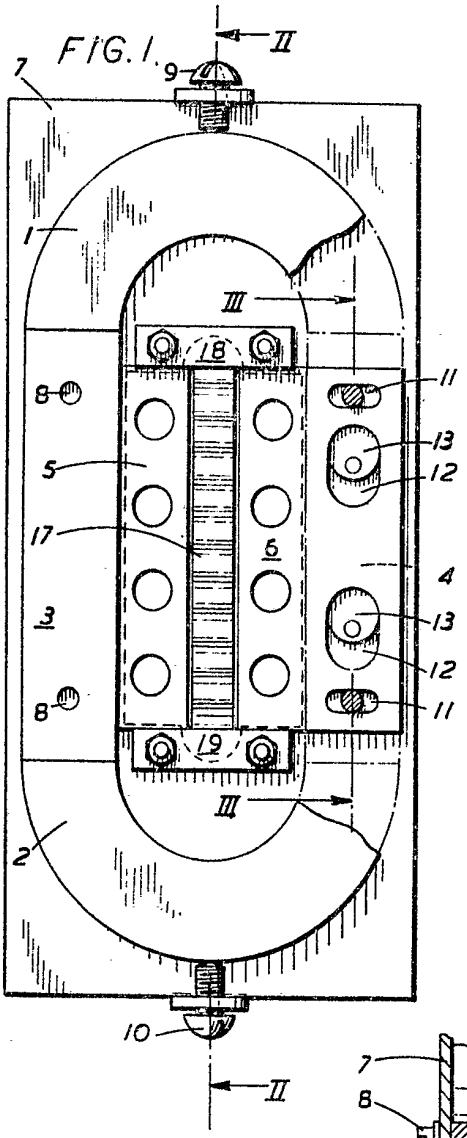


FIG. 2.

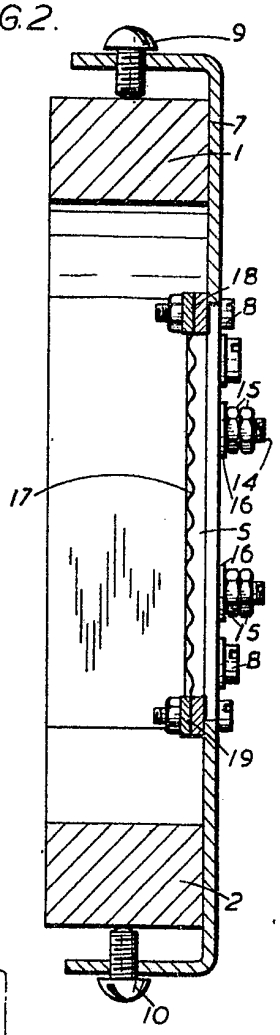
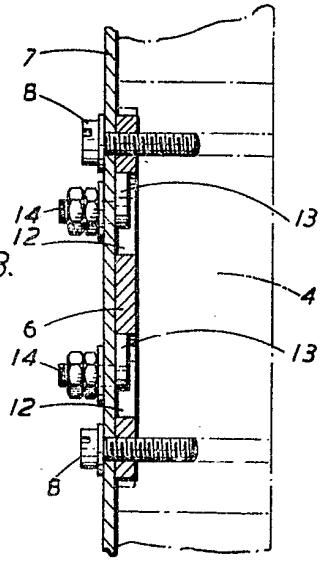


FIG. 3.



H.M.S.O. (Ty.P.)