

Sept. 12, 1944.

R. E. POLK

2,358,099

TONE CONTROL FOR TRANSMITTERS

Filed Aug. 26, 1942

2 Sheets-Sheet 1

FIG. 1

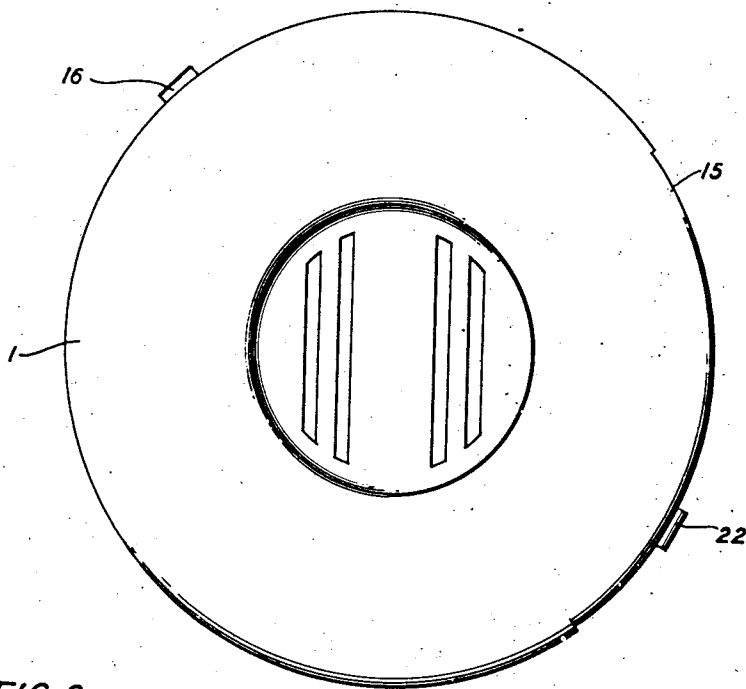


FIG. 2

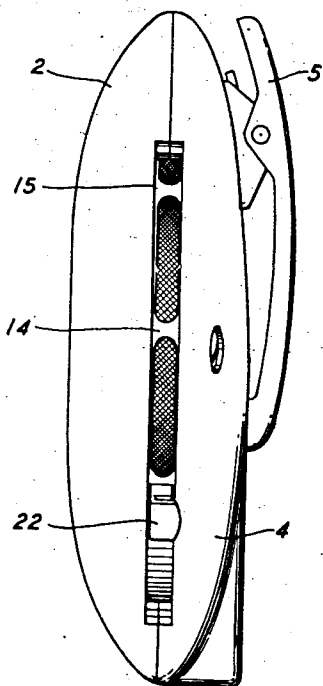
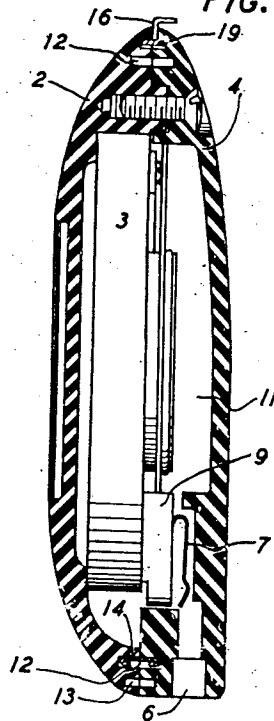


FIG. 3



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2 Sheets-Sheet 2

FIG. 4

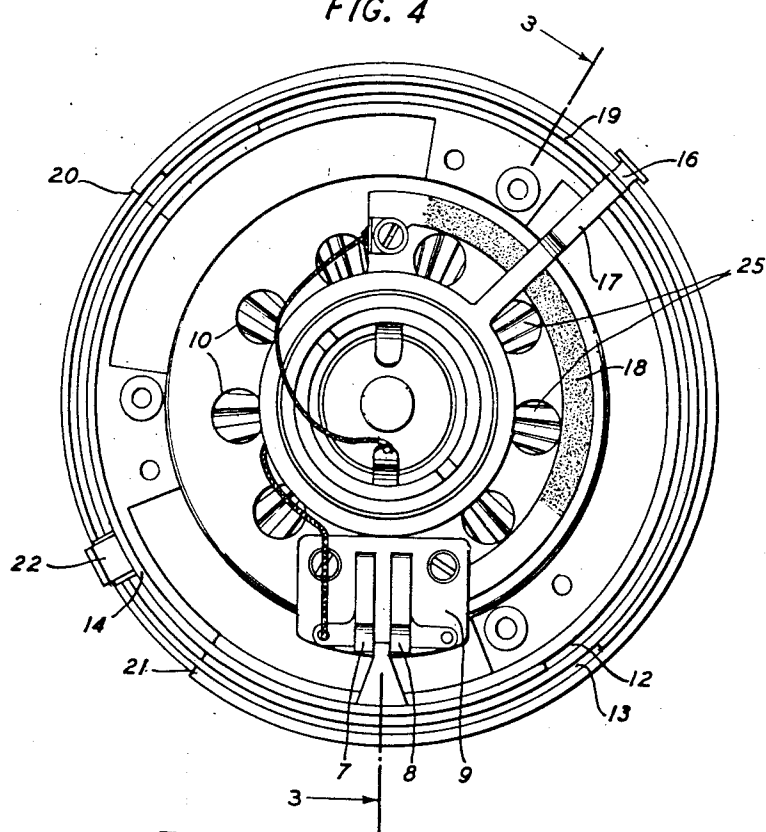


FIG. 5

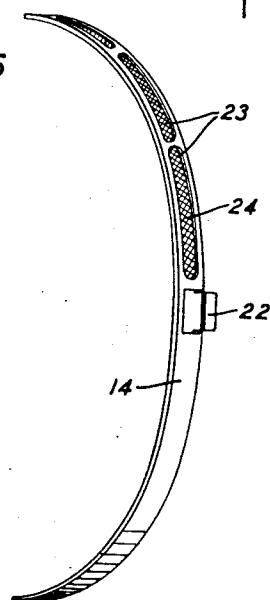
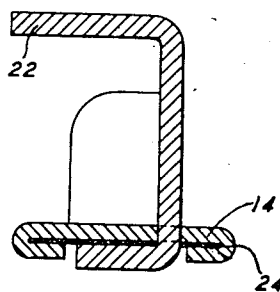


FIG. 6



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TONE CONTROL FOR TRANSMITTERS

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Application August 26, 1942, Serial No. 456,159

2 Claims. (Cl. 179—180)

This invention relates to sound pick-up transmitters and the object of the invention is a transmitter in which the frequency response characteristic may be easily and quickly adjusted at any volume level to suit the preference of the particular user.

An adjustable frequency response characteristic is particularly desirable in the case of an audiphone transmitter not only because of the wide variation in the audiograms of audiphone users but also because under certain conditions, such for example, as in the presence of low frequency rumbling noises, it is often advisable to sacrifice low frequency response in order to improve intelligibility.

According to the present invention the response characteristic of a transmitter is varied by admitting sound energy under proper control to the rear of the transmitter diaphragm to oppose the sound pressures on the front of the diaphragm. The normally closed back cavity of the transmitter has an elongated slot extending along the periphery of the housing and an apertured member or shutter mounted in slidable relation to the slot provides a convenient means for varying the effective area of the slot opening and hence the response of the diaphragm.

This acoustic tone control will be more clearly understood from the following detailed description and the accompanying drawings in which:

Fig. 1 is a front view of a transmitter embodying the invention;

Fig. 2 is a side view of the transmitter showing the slot in the casing and the shutter for varying the opening;

Fig. 3 is a sectional view showing the transmitter unit and the shutter guide;

Fig. 4 is a back view of the transmitter with the back cover removed;

Fig. 5 is a detail view of the shutter; and

Fig. 6 is a detail view showing the shutter operating handle.

The transmitter casing 1 comprises a front portion 2 in which the transmitter unit 3 is mounted and a back cover 4 having a mounting clip 5 and an opening 6 for inserting the pin type plugs of the transmitter cord which contact the springs 7, 8 on the terminal block 9 (Fig. 4).

The transmitter unit may be a carbon button or any other known equivalent device which is actuated by a diaphragm 25 responsive to sound waves entering the casing through the grille openings shown in Fig. 1. The back plate of the unit has a number of large openings 10 connect-

ing the space behind the diaphragm of the unit with the chamber 11 between the unit and the cover 4.

As shown more clearly in Figs. 3 and 4 the front portion 2 of the casing is provided with two concentric grooves 12 and 13. Both parts of the casing are recessed at one side over an angle of about 90 degrees to form for the shutter 14 a slot 15 the width of which will of course vary with the design of the transmitter but which is large enough to admit sufficient acoustic energy to produce the attenuation required. In this particular case the slot opening is formed by recessing both the front and back cover of the casing equally to give a slot about $\frac{1}{4}$ inch wide.

The back cover is also recessed on the opposite side to form a slot through which extends the volume control 16 which may comprise an arm 17 contacting a resistance element 18 and adapted for sliding contact therewith by being rotatably mounted on the transmitter unit as shown. In order that the slot necessary for this volume control shall not affect the response of the transmitter there is secured to the arm 17 a shutter 19 sliding in the groove 13 and effectively closing the slot for all positions of the volume control.

The shutter 14 slides in the groove 12 and is slightly longer than twice the length of the slot 15 as shown so as to engage the groove beyond the ends 20 and 21 of the slot 15 for all positions of the handle 22 in the center of the shutter. On one side of the shutter there are several large holes 23 which together give substantially full slot opening and these holes are covered with silk 24 or any other material suitable for admitting acoustic waves and excluding dust. The other half of the shutter is of solid material so that in one extreme position of the handle 22 the slot is fully closed. The shutter is conveniently made from thin strip metal with the edges folded over to provide smooth sliding surfaces and clamp the dust excluding member 24 in place as shown in Fig. 6.

When this acoustic tone control is used with a transmitter casing of the order of $2\frac{1}{2}$ inches in diameter it has no effect on the frequencies in the upper and middle portions of the range but for frequencies below about 1500 cycles per second the acoustic pressure cancellation effect produced by admitting sound waves to the rear side of the diaphragm becomes progressively greater until at the lowest frequencies to which the transmitter normally responds the attenuation introduced may be as much as 20 decibels.

This tone control therefore permits the user to take full advantage of the normal high quality reproduction of the transmitter whenever it is practicable and also by a very simple adjustment to reduce the level of irritating and disturbing noises to the extent necessary to retain the intelligibility even under very adverse pick-up conditions. It will be noted that the tone and volume controls are both located in convenient operating positions and that either may be operated without affecting the other thereby giving the user a wide choice of tones at any desired volume level.

While the invention has been described for purposes of illustration with reference to an audiphone transmitter it is equally applicable to transmitters for other purposes and the specific structure shown may be modified in various ways within the scope of the following claims.

What is claimed is:

1. In a transmitter the combination with a transmitter unit including a diaphragm and a casing enclosing the unit and having an aperture for admitting sound energy to one side of

the diaphragm, of means for regulating the low frequency response of the transmitter comprising a peripheral opening in the casing for admitting sound energy to the other side of the diaphragm and a movable arcuate member for varying the area of the opening, said member being of a length at least twice that of the opening and being provided over about one-half its length with large perforations covered with porous dust-excluding material.

2. In a transmitter the combination with a transmitter unit including a diaphragm and a casing enclosing the unit and having an aperture for admitting sound energy to one side of the diaphragm, of means for regulating the low frequency response of the transmitter comprising a long narrow peripheral opening in the casing for admitting sound energy to the other side of the diaphragm, a groove within the casing and a perforated arcuate member of at least twice the length of the opening sliding in the groove for varying the effective area of the opening.

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