

Jan. 2, 1934.

H. KOCH

1,941,987

ACOUSTIC DEVICE

Filed Oct. 3, 1931

Fig. 2

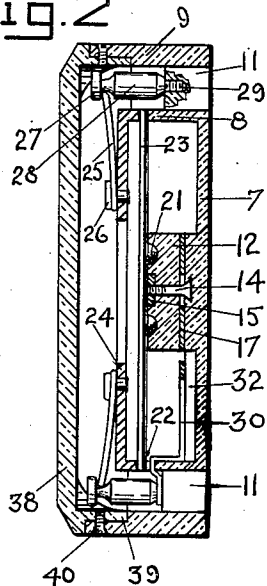


Fig. 1

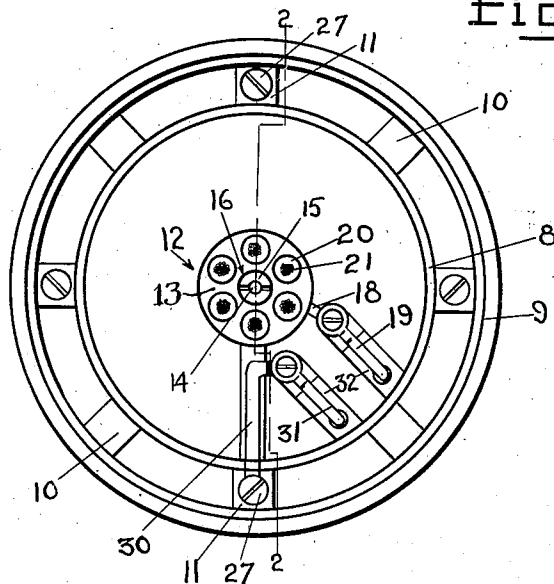


Fig. 4

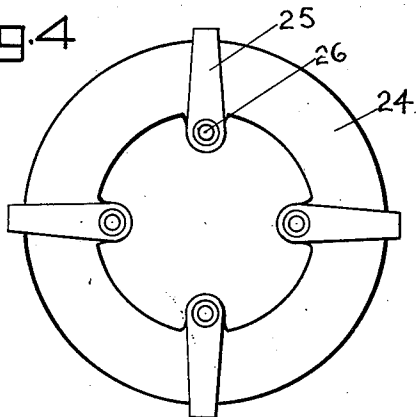


Fig. 3

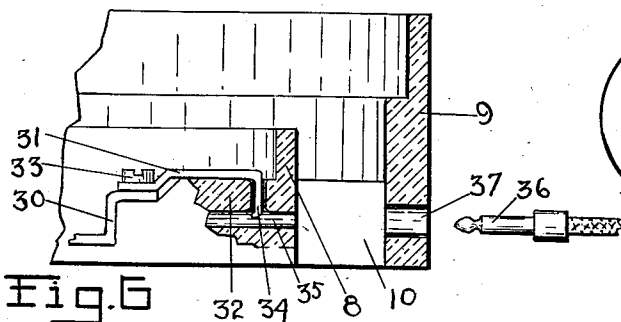
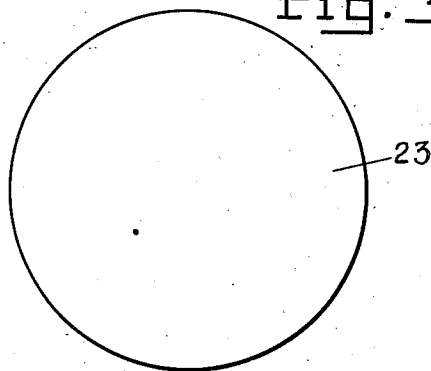


Fig. 6

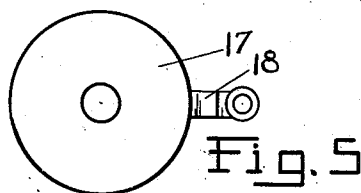


Fig. 5

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## UNITED STATES PATENT OFFICE

1,941,987

## ACOUSTIC DEVICE

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Application October 3, 1931. Serial No. 566,677

4 Claims. (Cl. 179-127)

This invention relates to acoustic devices and more particularly to transmitters, and has for a general object the provision of such a device which efficiently translates sound waves into electrical pulsations without superposing on them variations due to the mechanical structure of the transmitter, which when retranslated into sound waves constitute what are commonly termed "internal noises".

A more specific object of the invention is the provision of such a device, simple and rugged of structure, adapted for the efficient translation of sound waves into electrical pulsations in telephone devices adapted for use in auricular devices for the aid of persons afflicted with defective hearing, the mechanical moving parts of which comprise a diaphragm and a plurality of carbon particles supported in a manner which practically eliminates annoying sounds in a receiver, commonly termed "internal noises".

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a rear plan view of the transmitter of the present invention with the back, diaphragm and diaphragm securing device removed.

Fig. 2 is a transverse sectional view of the transmitter of the present invention taken on line 2-2 of Fig. 1, with the diaphragm, diaphragm securing device and back in position.

Fig. 3 is a plan view of the diaphragm.

Fig. 4 is a plan view of the diaphragm securing ring.

Fig. 5 is a plan view of the electrical conducting means adapted to engage the block in which are mounted the carbon particles; and

Fig. 6 is a sectional view of a portion of the transmitter with the back removed showing the construction of the conductor jacks.

Prior to the present invention, the mechanical structure of transmitters adapted for use in auricular devices for the aid of persons afflicted with defective hearing has been variously designed in attempting to eliminate features giving rise to annoying sounds in receivers, commonly termed

"internal noises". Such structures have accordingly been found to be extremely complicated and delicate, making probable frequent failures necessitating a great deal of costly and undesirable servicing. In accordance with the present invention, transmitters are provided which efficiently eliminate the above difficulties and insure efficient and continuous service.

Referring to the drawing, like numerals refer to like parts throughout. In Fig. 1 is shown a plan view of a transmitter of the present invention with parts removed, consisting of a base member 7 preferably molded from a suitable material, such as, for example, bakelite or hard rubber, provided with an annular diaphragm supporting flange 8 and a casing flange 9 spaced from the diaphragm supporting flange 8 by a plurality of members 10, 10, 10, 10 and 11, 11, 11, 11.

Inside of flange 8 is mounted a block 12 of carbonaceous material having a substantially flat face 13 substantially lying in the plane of the edge of the flange 8, as shown in Fig. 2. This block is secured to the base 7 in any suitable manner, preferably by means of bolt 14, the head of which has been molded into the base 7 and a nut 15 counter-sunk in a recess 16 on the face of the block. A suitable electrical conducting member 17 is preferably interposed between the base 7 and the block 12, and is provided with an integral arm 18 adapted to make electrical connection with the jack finger 19.

A plurality of shallow recesses 20 are formed in the face of the block 12 and a plurality of substantially spherical carbon particles 21 are loosely disposed in each of these recesses. Each of these recesses is only partially filled with the carbon particles to insure a freedom of movement of the particles.

A spacing ring 22 of any suitable material, such as, for example, paper, is superposed on the outer edge of the flange 8 which supports the diaphragm 23, as is shown in Fig. 2. The spacing ring 22 is of a dimension such that the diaphragm 23 does not contact with the block 12 and the escape of the carbon particles 21 from the recesses 20 is prevented. The diaphragm 23 is held in position by a metallic ring 24 provided with a plurality of pivoted spring members 25 pivotally mounted on the ring by any suitable means, such as, for example, the bolts 26. The outer end of each of these spring members projects beyond the circumferential edge of the ring 24 to engage beneath the head 27 of the stud 28, one of which is mounted on each of the spacing

members 11 in any suitable manner, such as, for example, by means of the threaded stud 29.

Electrical connection is made with the diaphragm through the ring 24, one of the spring members 25, stud 28 in contact therewith and the electrical conductive strap 30 as shown in Fig. 1 as being in contact with the jack finger 31.

In Fig. 6 is shown the construction of the jack through which electrical connection with connecting conductors is insured. On the base member 7 is formed a pair of supports 32, each of which is provided with a threaded hole to receive screw 33, which secures one of the conductive members 18 and 30 in contact with the jack finger 34, the end of which projects through a hole into a longitudinal passage 35. This passage is adapted to receive the tip 36 secured to the end of the connecting conductor which is projected through the hole 37 in the casing flange 9 in making the desired electrical connection.

In Fig. 2 is shown the back member 38 in position to enclose the internal structure of the transmitter. This back member is provided with an annular flange 39 adapted to fit inside the casing flange 9 and is secured to the latter by means of a plurality of screws 40. The inner face of this back member is shaped to direct against the diaphragm sound waves which impinge on this face after entering the transmitter through the apertures defined by flanges 8 and 9 and the spacing members 10 and 11.

In operation sound waves enter the transmitter from the front and impinge on the inner face of the back 38, which is shaped to direct them against the diaphragm 23. The diaphragm is accordingly vibrated and the flow of electricity in the electrical circuit is varied in accordance therewith, due to the disturbance of a plurality of carbon particles 21 in contact with the diaphragm.

It will thus be seen that the transmitter is simple and rugged in structure and provides for efficient translation of sound waves into electrical pulsations, the latter being accomplished by a plurality of loosely mounted carbon particles in contact with the vibrating diaphragm. The present structure utilizes the simple but novel and efficient diaphragm securing means to make ready electrical connection therewith without the necessity for mounting an additional conductor member in the sound wave chamber adjacent to or near the diaphragm.

It will thus be seen that in accordance with the present invention transmitters have been designed which efficiently attain the objects set forth above in an admirable manner.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof for obvious modifications will occur to a person skilled in the art, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A transmitter comprising a base member, a diaphragm supporting flange on said base mem-

ber, a casing flange surrounding and spaced from said diaphragm supporting flange, a plurality of bridging members disposed between said flanges defining sound wave entry apertures in said base member between said flanges, a diaphragm mounted on said diaphragm supporting flange, a plurality of anchoring members mounted on said bridging members, a plurality of clips adapted to cooperate with said anchoring members to secure said diaphragm in position on said diaphragm supporting flange, and an electrically conductive path to said diaphragm formed by structure comprising one of said clips which is formed from electrically conductive metal, one of said anchoring members which cooperates with said metallic clip and is formed from electrically conductive metal, and an electrical conductor terminal mounted on said base member in contact with said metallic anchoring member and adapted to be electrically connected to an electrical conductor having ingress through said casing flange.

2. In a transmitter the combination comprising a base member, an annular diaphragm supporting flange mounted on said base, a plurality of anchoring members on said base outside of said flange at least one of which is formed from metal, a diaphragm positioned on said flange, a metallic circular member positioned on said diaphragm, a plurality of clips at least one of which is formed from metal bridged between said circular member and said anchoring members to hold said diaphragm in position, and an electrical conductor in contact with said metallic anchoring member to complete an electrical circuit through said metallic anchoring member, said metallic clip, said metallic circular member and said diaphragm.

3. A transmitter comprising a base member, an annular diaphragm supporting flange mounted on said base, a casing flange surrounding and spaced from said diaphragm supporting flange, a plurality of bridging members disposed between said flanges, a plurality of headed metallic studs mounted on said bridging members and extending beyond said supporting flange, a diaphragm positioned on said supporting flange, a metallic ring having an annular flange engaging said diaphragm opposite said supporting flange, a plurality of spring fingers pivoted on said ring of a dimension such that the free end of each engages behind a head of one of said studs to hold said ring and diaphragm in position, and an electrical conductor mounted on said base and in contact with one of said studs.

4. A transmitter comprising a base member, an annular diaphragm supporting flange mounted on said base, a plurality of studs having enlarged heads mounted on said base outside said flange, a diaphragm supported by said flange, a ring superposed on said diaphragm, a plurality of spring members pivoted on said ring of a dimension such that a portion of each engages beneath a head of one of said studs to hold said ring and diaphragm in position and an electrical conductor having electrical connection with said diaphragm.

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