Aug. 9, 1949. L. S. SCHER 2,478,783

TELEPHONE MOUTHPIECE VOICE SILENCER WITH PLURAL SILENCING CHAMBERS

Filed June 17, 1946 2 Sheets-Sheet 1

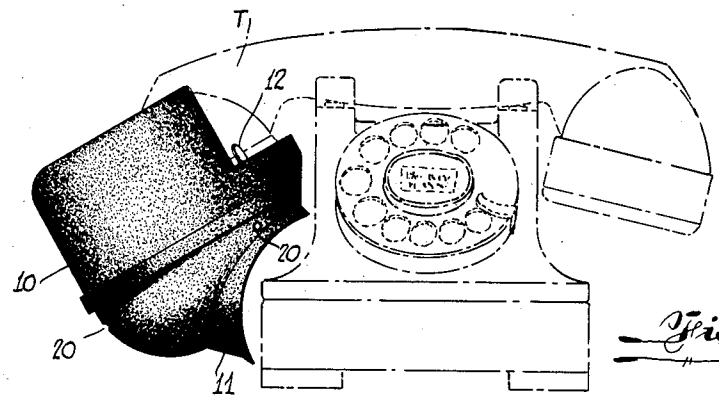


Fig. 1.

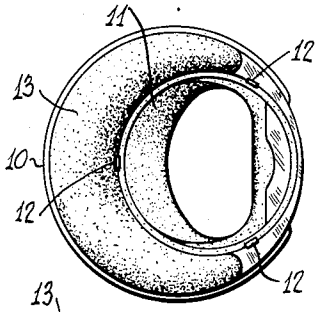


Fig. 3.

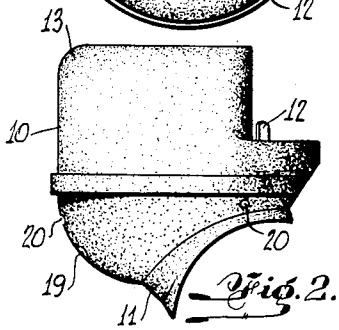


Fig. 2.

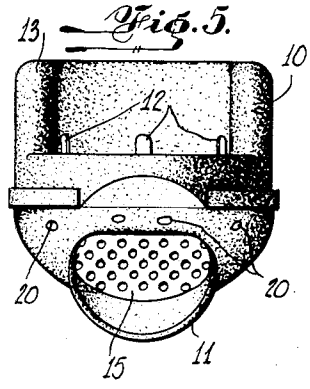


Fig. 5.

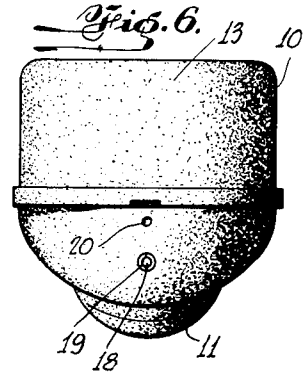


Fig. 6.

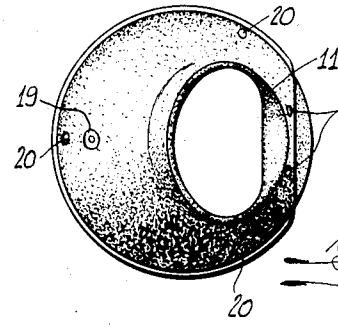


Fig. 4.

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TELEPHONE MOUTHPIECE VOICE SILENCER WITH PLURAL SILENCING CHAMBERS

Filed June 17, 1946 2 Sheets-Sheet 2

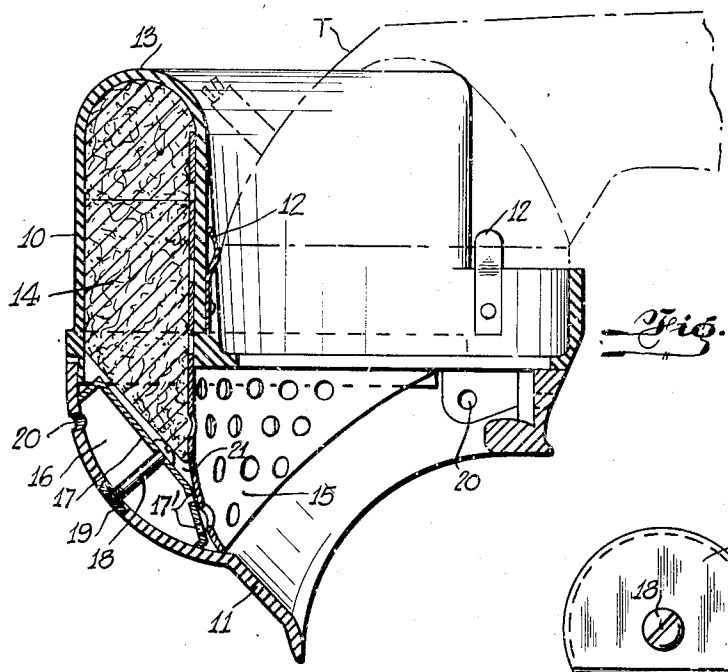


Fig. 7.

Fig. 8.

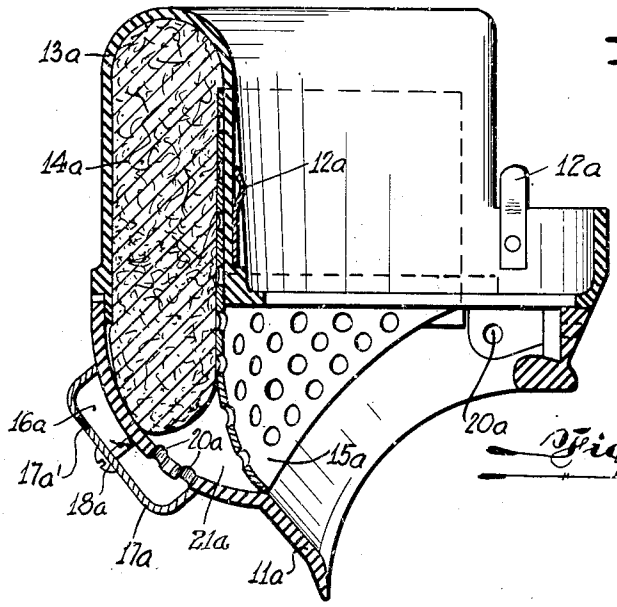


Fig. 9.

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UNITED STATES PATENT OFFICE

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TELEPHONE MOUTHPIECE VOICE SILENCER WITH PLURAL SILENCING CHAMBERS

Louis S. Scher, New York, N. Y.

Application June 17, 1946, Serial No. 677,389

6 Claims. (Cl. 181—34)

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The present invention relates to an attachment for telephones by means of which the voice of the speaker can be substantially completely muffled to ensure privacy in the presence of others.

Voice silencers for telephones are well-known. These essentially comprise a chamber lined or provided with sound-deadening material such as felt, to provide acoustic absorption. While these devices are reasonably satisfactory and give a substantial amount of privacy to telephone conversations, they do have recognized disadvantages which have not, so far, been overcome. One such disadvantage resides in the fact that the voice of the speaker is unclear to the listener at the other end of the line. This is partly due to interference caused by out-of-phase reverberation or fixed low pitched resonance, and partly the result of the building up of back-pressure where incorrect venting or lack of venting exists. Although such back-pressure is slight, it has an extremely adverse effect, probably due to air pressure on the transmitter diaphragm, besides low pitched resonance increasing undesirable tonal qualities. Whatever the precise cause or explanation, prior voice mufflers for telephones have not been entirely satisfactory either from an acoustical or from a mechanical or constructional point of view.

It is, consequently, an object of this invention to overcome the deficiencies of prior telephone voice mufflers and to provide a new and improved device which is correctly designed acoustically and which is mechanically and structurally perfected, as for instance, shaping the muffler to conform to the telephone stand as well as the mouth of the user, without any mechanical interference; the voice muffler being so shaped, it will not interfere with normal lifting and hanging up of the telephone handset.

Another object of the invention is to provide a telephone voice muffler which ensures privacy without need of reducing the volume excessively for the listener at the other end of the line, and without appreciable loss of fidelity of tone.

A further object of the invention is to construct a telephone voice muffler in which back-pressure or sound distortion cannot be built up during even forceful use and in which correct and adequate venting is provided for, at the same time setting the natural pitch of the voice muffler considerably higher than would be the case without venting.

A still further object of the invention resides in the use of a relatively large mass of sound-absorbing material of unusual effectiveness without excessive sound absorption and without adverse effect on the venting of the muffler as a whole.

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Other objects and advantages lie in the various structural combinations and details hereinafter described.

In the accompanying drawings:

Fig. 1 illustrates my new telephone voice muffler as applied to a modern telephone.

Fig. 2 is an elevational view of the muffler per se.

Fig. 3 is a plan view of Fig. 2.

Fig. 4 is a bottom view of Fig. 2.

Fig. 5 is a view looking from right to left of Fig. 2.

Fig. 6 is a view looking from left to right of Fig. 2.

Fig. 7 is an enlarged sectional view of my new muffler showing in broken lines a portion of the associated telephone.

Fig. 8 is a detail view of the exhaust box used in the form of muffler shown in Fig. 7.

Fig. 9 is a view similar to Fig. 7, of a somewhat modified construction of muffler.

My new voice muffler is essentially comprised of a telephone transmitter engaging portion 10 and a mouthpiece portion 11, each of which is composed of a suitable plastic material of rigid non-deformable nature. Bakelite, acetate and other materials of similar types or rigid waxed paper or cast lightweight metal are eminently satisfactory for this purpose.

Portion 10 is of generally annular form and is provided with a plurality of equispaced springs 12, usually three in number, which engage and hold the muffler in place on the telephone transmitter T, the outer edge of which is received within the annulus of portion 10, as best shown in Fig. 7 of the drawings. Portion 10 has an upstanding portion 13 of the inverted U-shaped cross-section which extends partially around the annulus of portion 10, somewhat more than a semi-circle. In plan, portion 13 is crescent-shaped, as will be best appreciated from Fig. 3. Due to the construction, just recited, it will be apparent that a crescent-shaped chamber is formed within portion 13 and this chamber is substantially filled with sound-absorbing or sound-deadening material 14 which is not the conventionally employed felt. I have found that artificial or synthetic sponge constitutes a unique and highly efficacious material and that it is light and resilient, properties rendering it highly suitable for the present purpose. It is, moreover, characterized by numerous small passages form-

ing a veritable network into which sound waves can penetrate and be absorbed. This material can be removed and rinsed in water or sterilized and used over again when dried. It does not have the massiveness or weight of felt and, therefore, results in more satisfactory sound absorption which renders the voice more intelligible to the listener at the other end of the line. It does, however, effectively muffle the voice of the speaker to those within normal hearing range. An arcuate perforated shield 15, preferably fabricated from a light metal such as aluminum, is disposed between the inner surface of material 14 and the inner wall of portion 13.

It will be noted that material 14 does not completely fill the crescent-shaped chamber formed by the combined transmitter-engaging portion and mouthpiece portion and that the lower edge of shield 15 extends below the material 14. This arrangement forms a chamber 21 within mouthpiece portion 11. This chamber is in communication with the mouthpiece via the perforations in shield 15. The chamber is maintained against diminution in size or change of shape by means of an exhaust box 17 forming a chamber 16 which is held in place by a suitable fastening instrumentality, such as the screw 18, the threaded end of which engages a nut 19 countersunk in the plastic body of the mouthpiece portion 11, as shown.

It will be further noted that mouthpiece portion 11 is provided with a plurality of openings 20. These openings are located at critical points and constitute an important feature of the present invention; they not only provide an evenly distributed escapement for back pressure, but also raise the natural resonance pitch of the voice muffler as in an open flutepipe versus a closed pipe, a well-known fact in the science of sound. Since exhaust box 17 is also provided with strategically located apertures, it will be understood that back-pressure escapement will pass through chamber 16 without appreciable escapement of sound. All other escapement openings 20 form long restricted passages in the thick sections of mouthpiece portion 11, also create resistance to escapement of sound from the voice muffler.

In Fig. 9, the structure is substantially the same as that already described except that in some instances it has been found desirable to place the exhaust box 17*a* on the exterior of mouthpiece portion 11*a* rather than in the interior as in Fig. 7. In this way, the chamber 16*a* is exterior and communicates with the reduced chamber 21*a* within portion 11*a*. Back-pressure is avoided since through communication is provided via apertures 17*a'*, openings 20*a*, and the perforated guard 15*a*.

The foregoing is presented as illustrative and not as limitative as other modifications may be resorted to without departing from the spirit or principles hereof. In particular, soft fabric inserts may be employed instead of springs 12 and 12*a* or any other suitable means may be provided for engaging and holding a telephone transmitter of any of the usual designs. The two main portions of the present muffler are readily assembled and disassembled and all members can be conveniently sterilized without damage thereto.

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

1. A voice muffler comprising a telephone transmitter-engaging portion and a mouthpiece portion readily attachable to and detachable from each other, sound absorbing material of non-fibrous nature within said transmitter-engaging portion and means for preventing back-pressure in said muffler during use, said telephone transmitter-engaging portion being of generally annular form and having an upstanding inverted U-shaped portion of crescent shape, the said sound-absorbing material being disposed within and completely filling the said upstanding portion and extending therebeyond into said mouthpiece portion, and a hollow exhaust box having openings communicating with the interior of said mouthpiece portion.

2. A voice muffler comprising a telephone transmitter-engaging portion and a mouthpiece portion readily attachable to and detachable from each other, sound absorbing material of non-fibrous nature within said transmitter-engaging portion and means for preventing back-pressure in said muffler during use, said telephone transmitter-engaging portion being of generally annular form and having an upstanding inverted U-shaped portion of crescent shape, the said sound-absorbing material being disposed within and completely filling the said upstanding portion and extending therebeyond into said mouthpiece portion, a hollow exhaust box having openings communicating with the interior of said mouthpiece portion, and a perforated shield along one side of said sound-absorbing material in the transmitter-engaging portion and extending into said mouthpiece portion.

3. A voice muffler comprising a telephone transmitter-engaging portion and a mouthpiece portion readily attachable to and detachable from each other, sound absorbing material of non-fibrous nature within and completely filling said transmitter-engaging portion and means for preventing back-pressure in said muffler during use, said back-pressure preventing means including a series of openings through the muffler wall communicating the interior of the muffler with the outer atmosphere, certain of which openings being laterally located to improve tonal qualities, and a hollow exhaust box communicating with the muffler to introduce a tortuous path for the relief of air pressure without impairing the efficiency of the sound-retaining qualities.

4. A voice muffler comprising a telephone transmitter-engaging portion and a mouthpiece portion, sound absorbing material within said transmitter-engaging portion and means for preventing back-pressure in said muffler during use, said telephone transmitter-engaging portion being of generally annular form and having an upstanding inverted U-shaped portion of crescent shape, the said sound-absorbing material being disposed within and completely filling the said upstanding portion and extending therebeyond into said mouthpiece portion, a hollow exhaust box on the wall of the mouthpiece portion, and having openings communicating the interior of said exhaust box with the interior of the mouthpiece portion and having other openings communicating the interior of the exhaust box with the outer atmosphere.

5. A voice muffler comprising a telephone transmitter-portion and a mouthpiece portion, sound absorbing material of non-fibrous nature within said transmitter portion and means for preventing back-pressure in said muffler during use, said back-pressure preventing means including a series of openings through the muffler wall communicating the interior of the muffler with the

outer atmosphere, certain of which openings being laterally located to improve tonal qualities, and a hollow exhaust box communicating with the muffler to introduce a tortuous path for the relief of air pressure without impairing the efficiency of the sound-retaining qualities.

6. In a voice muffler having a telephone transmitter engaging portion, which is of generally annular form and has a hollow upstanding inverted U-shaped part of crescent shape, and a mouthpiece portion readily attachable to and detachable from said transmitter-engaging portion; sound-absorbing material of non-fibrous nature within and completely filling said upstanding part and extending therebeyond into said mouthpiece portion, the mouthpiece portion having walls of non-uniform thickness, means for preventing back-pressure in said muffler during use, said means including a series of openings through the thickened part of the walls of said mouthpiece portion forming narrow restricted passages communicating the interior of the muffler with the outer atmosphere, and being laterally located to improve tonal qualities, and a hollow exhaust box having openings communicating with the

mouthpiece portion, and having other openings communicating the exhaust box with the outer atmosphere to introduce a tortuous path, all for relieving of air pressure without impairing the efficiency of the sound-retaining qualities.

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