Dec. 17, 1940. 2,225,509

H. SCHOBER, MAIDEN-NAME MOERDER

APPARATUS FOR USE WITH TELEPHONE MOUTHPIECES

Filed Nov. 17, 1937 2 Sheets-Sheet 1

Fig. 1.

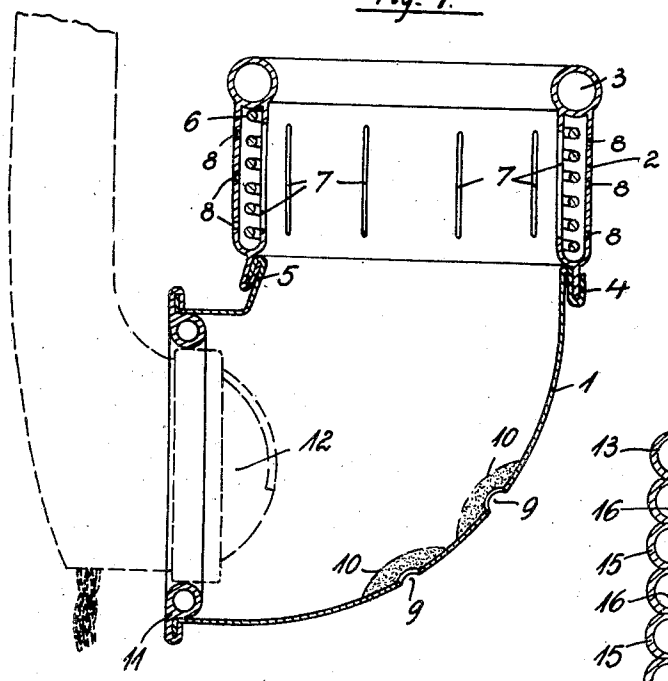


Fig. 2.

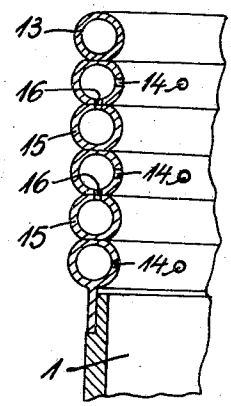


Fig. 4.

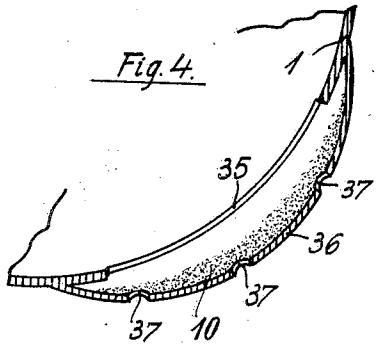
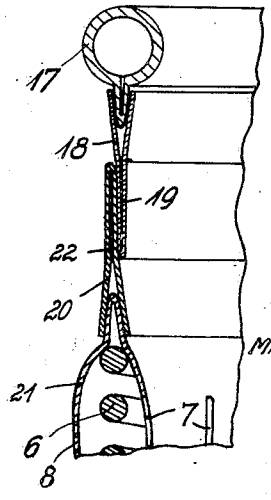


Fig. 3.



INVENTOR
HELENE SCHOBER
MAIDEN-NAME MOERDER

By Hart Nan
Attorney

Dec. 17, 1940. 2,225,509

H. SCHOBER, MAIDEN-NAME MOERDER

APPARATUS FOR USE WITH TELEPHONE MOUTHPIECES

Filed Nov. 17, 1937 2 Sheets-Sheet 2

Fig. 5.

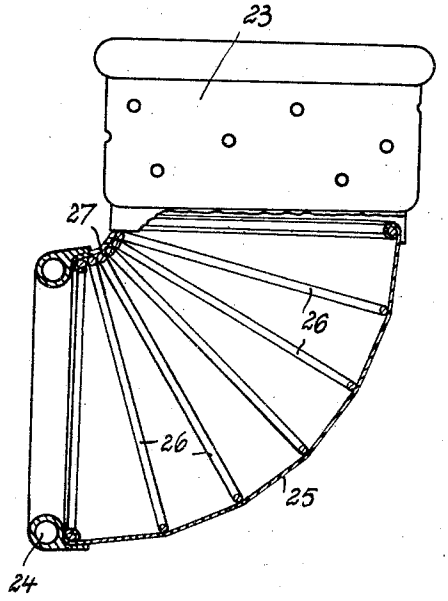


Fig. 6.

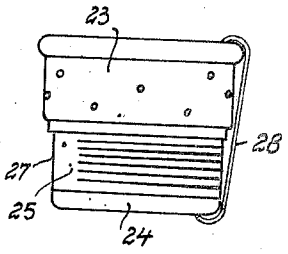


Fig. 7.

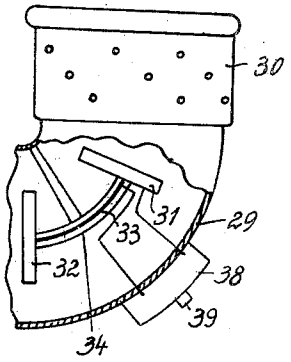
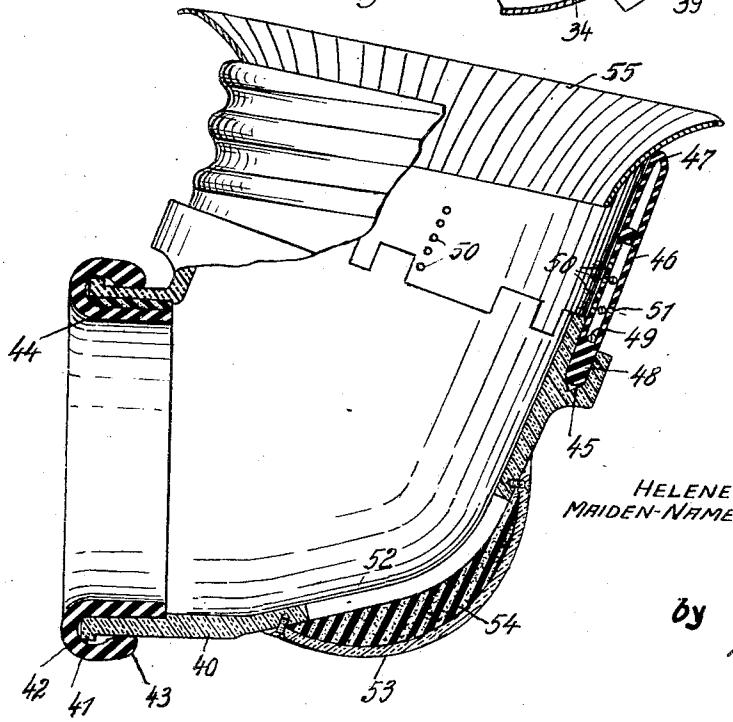


Fig. 8



INVENTOR
HELENE SCHOBER
MAIDEN-NAME MOERDER

by Karl Nau
Attorney

Patented Dec. 17, 1940 2,225,509

UNITED STATES PATENT OFFICE

2,225,509

APPARATUS FOR USE WITH TELEPHONE MOUTHPIECES

Helene Schober, maiden-name Moerder,
Berlin, Germany

Application November 17, 1937, Serial No. 174,938
In Germany November 21, 1936

3 Claims. (Cl. 181—34)

This invention relates to sound muffling appliances attached to the mouthpieces of the transmitters of telephones, whereby sound to be transmitted through such mouthpieces, though not impaired in transmission, is not heard by persons located in the vicinity of the transmitter.

It is an object of the invention to improve the quality of the sounds impressed upon the transmitter and at the same time to reduce the transmission of sound waves into the room wherein the speaker is located.

Another object of the invention is to provide an apparatus which may be used interchangeably with different transmitters and which, when not in use, can be collapsed to a very small space so as to assume "vest-pocket" size.

According to this invention, the device comprises a tubular body adapted to provide an acoustic connection between the mouth of the speaker and the transmitter and an acoustic filter at the mouthpiece of the tubular body, said filter having a damping range comprising the frequency range of the speech transmission.

The term "acoustic filter," as used in the present specification, is intended to define an arrangement providing one or more hollow spaces, the size, material and apertures of which are such that a predetermined range of acoustic frequencies only is damped by the filter while other frequencies are allowed to pass practically unattenuated. The laws according to which such acoustic filters have to be designed in order to attenuate a predetermined frequency range are well known in the art, therefore it will not be necessary to present a detailed description.

The invention will be better understood by reference to the following detailed description in connection with the accompanying drawings showing schematically by way of example some preferred embodiments of the invention, and wherein:

Figure 1 is a longitudinal section of an apparatus constructed in accordance with the invention,

Figure 2 is a fragmentary sectional view of the end portion of a modified form of a device according to Fig. 1,

Figure 3 is a fragmentary sectional view of an apparatus with a detachable end rim,

Figure 4 is a fragmentary sectional view showing a detail,

Figure 5 is a side view, partly in section, of a collapsible apparatus in operative position,

Figure 6 is a side view of the apparatus shown in Figure 5, in collapsed condition,

Figure 7 is a side view, partly in section, of an apparatus including an additional sound amplifier in the sound transmission channel,

Figure 8 is a side view, partly in section, of a preferred construction of a device according to the invention.

Referring to the drawings in greater detail, the bent tubular body 1 according to Figure 1 forms a sound conducting channel and may consist of sheet metal, artificial resin or other suitable light material. The upper portion of the said tubular body 1 is constituted by a double-walled cylindrical member 2 which forms an acoustic filter and is provided with a mouthpiece or rim 3. The member 2 and rim 3 may be integrally formed of rubber or a similar suitable flexible sound-absorbing material. According to the right hand half of Figure 1, the member 2 is connected to the body 1 by a double-fold connection 4, while according to the left hand half of Figure 1, the member 2 is connected to the body 1 by a single-fold connection 5. The cylindrical portion 2 has a hollow space in which there is arranged a resilient helical spring tending to stretch or spread the portion 2. The cylindrical portion 2 has longitudinal slits 7 in its inner wall which slits are distended or opened as the mouthpiece 3 engages the mouth of the speaker. Apertures 8 of smaller size and/or less number than the slits 7 are provided in the outer wall of the cylindrical double-walled portion 2.

The rim 3 is made hollow to form a resilient edge which readily adapts itself to the mouth of the user.

Further apertures 9 are provided in the bent tubular body 1 to facilitate the discharge of the air current accompanying the human speech. These apertures 9 are covered by members 10 which may consist of sponge rubber or may take the form of small acoustic filters or labyrinths, thereby permitting the air to escape while the sound waves are absorbed or damped or mutilated in such a manner as to become unintelligible to persons in the vicinity of the telephone transmitter.

Fitted to the transmitter-end of the body 1 is a resilient ring 11, for instance of rubber which may be secured to the tubular body 1 by a fold connection with its inner face adapted to engage the microphone 12 of the telephone transmitter indicated by dotted lines.

It will be understood that in operation the sound waves emitted from the speaker's mouth pressed against rim 3 will pass through the cylindrical portion 2 without substantial reflection

at the walls thereof, since these walls form an acoustic filter or consist of sound-absorbing materials while the air currents produced by the speech are discharged through the slits 7 and ports 8. Furthermore, in view of the fact that the cylindrical portion 2 represents an acoustic filter capable of damping certain frequencies, the frequencies which are not within the cut-off range of the filter, more particularly the high notes, can readily pass through the portion 2 and the bent portion 1 to the transmitter 12, while the frequencies within the "cut-off" range of the filter 2, more particularly the low notes, are damped or attenuated by the filter and thus act upon the transmitter with a reduced intensity.

As a result of this effect of the filter 2, a smooth and clear transmission is ensured and the impression of a closed resonance chamber obtained with the known devices of this kind is obviated. On the other hand, the speech vibrations, if reasonably reduced in sound intensity are not transmitted to the air outside the device 1, 2, but only unintelligible sounds, if anything can be noticed by bystanders.

A practical design of the acoustic filter 2 is shown in Figure 2, comprising a number of superposed hollow rings 14. The rings may consist of rubber and may be joined by a common vulcanizing process. The hollow rings 13 have inner ports 14 and outer ports 15 the latter being fewer in number and/or smaller than the ports 14. Further ports 16 are provided to connect the individual hollow spaces. The flexible top ring 13 serves to effect tight contact and good adaptation to the mouth of the speaker.

The acoustic filter 2 which in Figure 2 is formed by the superposed hollow rings 13, should always be arranged immediately adjacent to the mouthpiece so as to substantially avoid the production of detrimental reflections.

Figure 3 illustrates a detachable or interchangeable mouthpiece, comprising a resilient hollow ring 17 for instance of rubber attached to a sheet metal ring 18 stiffened by spot-welding at the points 19. The sheet metal ring 18 engages a ring 22 secured to the filter chamber 21 by forcing the rubber edges of the latter between the lower spread edge portions of ring 22 having their upper portions secured together by spot-welding at the points 22. The faces of the parts 19 and 20 engaging each other are slightly tapering to ensure tight engagement and easy interchange.

Referring to Figure 4, illustrating a fragmentary section of the bent portion 1, it will be seen that longitudinal slits 35 are provided covered by a cap 36 having portholes 37. The cap 36 is advantageously filled with viscose, sponge rubber, felt, reticular or similar damping material as shown at 10, Figure 1, so that the chamber thus formed serves as an additional muffler.

Referring to the embodiment according to Figure 5, the bent tubular body 25 of the device is constructed to be readily collapsible. To this end, it consists of rubber or impregnated fabric which in the operating position is spread by a helical spring 26 compressed and held together on one side by a clamp or the like as shown at 27 while in the non-operating position it can be collapsed to occupy a small space as shown in Figure 6 in that the walls of the device fold together concertina-fashion. A bracket or double-hook 28 may serve to hold the spring 26 in the compressed state. The filter portion 23 and the connecting portion 24 may be formed in any suitable manner in accordance with this invention.

I have found that the satisfactory transmission of speech is largely dependent on the upper frequencies of the audible spectrum. In order to improve the transmission of these upper frequencies while withholding the low frequencies I contemplate to use a device as illustrated in Figure 7, in which a selective frequency amplifier is embodied. This amplifier comprises a very small microphone 31 and a telephone 32 both being connected by a metallic tube 34 and an insulated conductor 33 through a battery 38 which may be connected by a push-button 39. The microphone 31 and telephone 32 are so designed that they receive, amplify and reproduce the higher speech frequencies only, thus improving the articulate and clear transmission which depends on the faithful and efficient reproduction of the higher frequencies.

A preferred form of my novel device is shown in Figure 8. A moulded tubular angle piece 40 of artificial resin, such as a phenol-formaldehyde condensation product, ebonite or the like, is provided at both ends with coupling means adapted to connect the angle piece 40 with the transmitter of a hand-set telephone on the one hand and to associate it with the mouth of the speaker on the other hand. To this end, the transmitter end of the piece 40 has a collar 41 adapted to receive a rubber sleeve 42 which is normally in a tubular form and spun with its free end over the collar 41, so as to engage the outer surface of the piece 40 with its collar 43. A sponge rubber or other resilient insert 44 may be provided between the throat of the tube 40 and the sleeve 42 to make up for possible inaccurate fitting and to ensure tight engagement between the tube 40 and sleeve 42. In this manner, the device can be readily attached to the transmitter and detached therefrom.

The upper end of the angle piece 40 is formed with an annular groove 45 adapted to receive the filter 46. The filter 46 consists of a double-walled rubber sleeve turned over at 47 and held together at 48 and formed with a collar at 49 to provide two communicating chambers in the lower of which is disposed a helical spring 49 tending to hold the sleeve in shape. Five sets of four ports 50 each are arranged in the inner wall and five single ports 51 are provided in the outer wall in a staggered relation to the ports 50. In view of the resiliency of the material, the sleeve 46, when forced into the groove 45, will be held therein by friction and the sleeve 46 will readily adapt itself to the mouth of the user by assuming a corrugated form as indicated in the left hand side of Figure 8.

The angle piece 40 is provided with two longitudinal slots 52 covered by a cap 53 secured thereto by screws. The hollow space thus formed is filled with sponge rubber 54 or a similar sound-absorbing material.

A paper ring 55 may or may not be placed over the mouth piece 46, so as to prevent direct contact with the latter and for sanitary and disinfecting purposes.

While I have herein shown and described certain preferred embodiments of my invention, I wish it to be understood that I do not confine myself to all the precise details herein set forth by way of illustration, as modification and variation may be made without departing from the

spirit of the invention or exceeding the scope of the appended claims.

I claim:

1. In a device of the character described, a rigid tubular member adapted to have one end thereof detachably secured to the opening of a telephone transmitter, a mouthpiece secured to the other end of said member being constituted by a double walled sleeve of easily yielding material capable of adapting itself to the mouth of a user, said sleeve forming a closed annular chamber and having portholes in the inner and outer walls thereof, the portholes in one wall of said sleeve being staggered relative to the portholes in the opposite wall of the sleeve thereby to form an acoustic filter capable of absorbing vibratory air pressure variations while allowing steady air currents to pass to the outside, and resilient stiffening means disposed between the walls of a portion of said sleeve adjacent to said tubular member.

2. In a device of the character described, a rigid tubular member adapted to have one end thereof detachably secured to the opening of a telephone transmitter, a mouthpiece secured to the other end of said member being constituted by a double walled rubber sleeve forming a closed annular chamber having portholes in its inner and outer wall portions adjacent to said tubular member, the portholes in one wall of said sleeve being staggered relative to the portholes in the opposite wall of the sleeve, whereby said sleeve forms an acoustic filter capable of absorbing vibratory air pressure variations while allowing steady air currents to pass to the outside and a helical spring disposed between the perforated wall portions of said sleeve.

3. In a device of the character described, a tubular member adapted to have one end thereof detachably secured to the opening of a telephone transmitter, a mouthpiece secured to the other end of said member being constituted by a closed double walled sleeve of easily yielding material capable of adapting itself to the mouth of a user, a collar within said sleeve to provide two communicating chambers, the chamber adjacent to said tubular member having portholes in the inner and ouer walls thereof, whereby said sleeve forms an acoustic filter absorbing vibratory air pressure variations at the rate of the higher speech frequencies, while allowing low frequency and constant air currents to pass to the outside, and resilient stiffening means disposed between the walls of said chamber adjacent to said tubular member.

HELENE SCHOBER,
MAIDEN-NAME MOERDER.