

April 23, 1963

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3,087,028

HEAD MOUNTING FOR CONTACT MICROPHONES

Filed Feb. 10, 1961

3 Sheets-Sheet 1

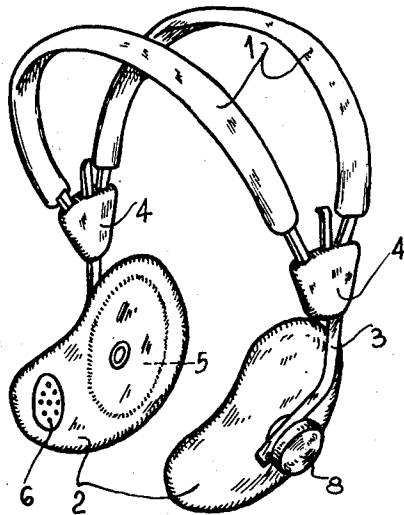


FIG 1

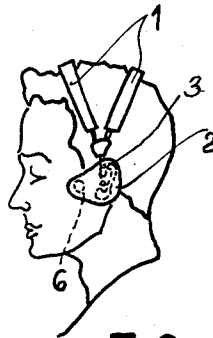


FIG 3

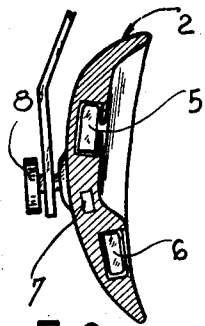


FIG 2

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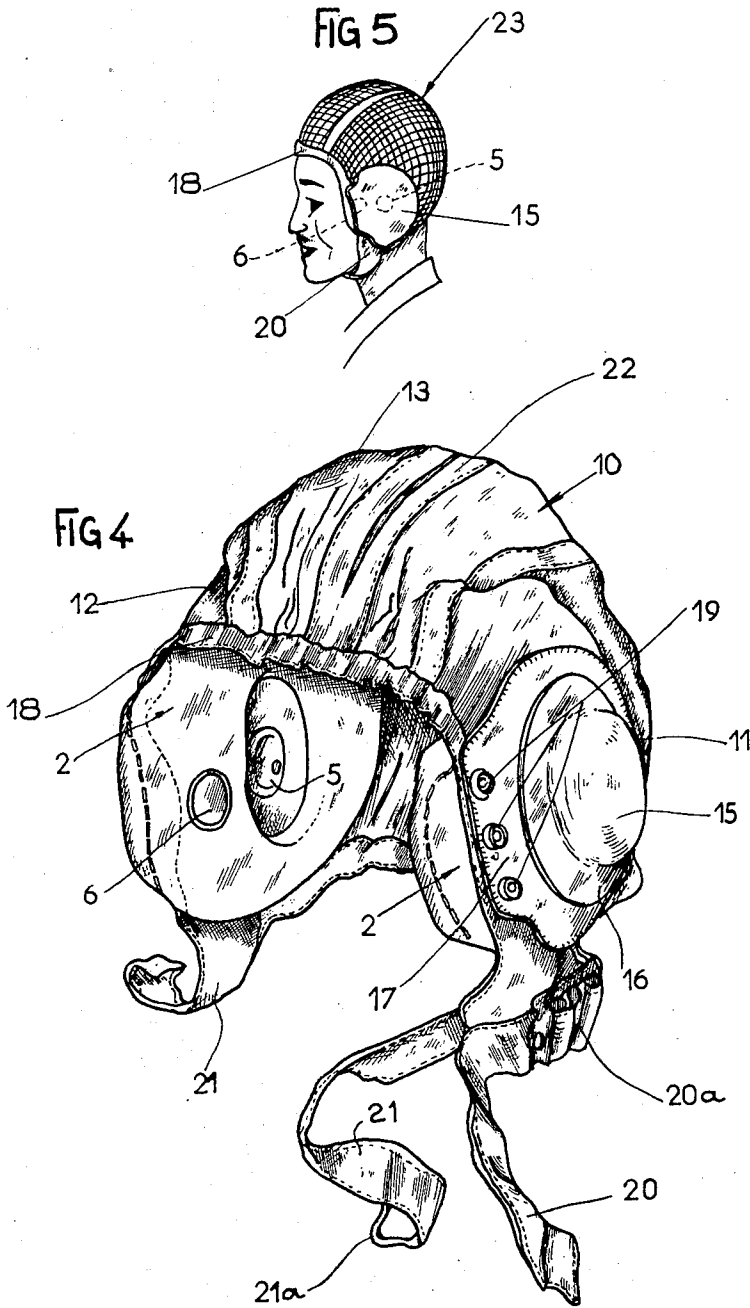
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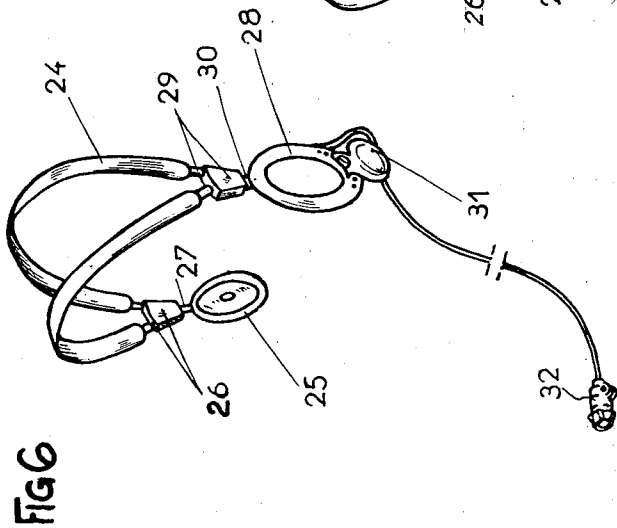
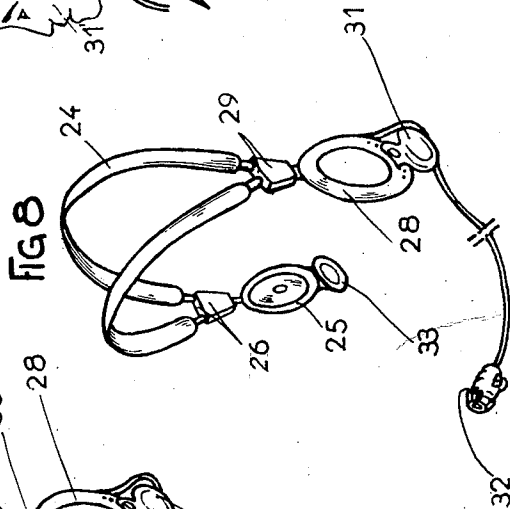
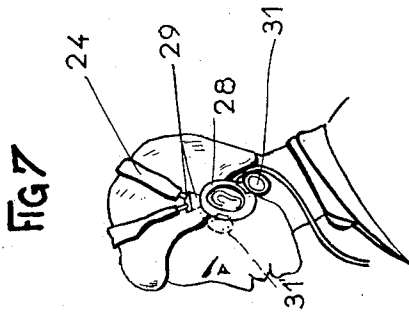
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3,087,028

HEAD MOUNTING FOR CONTACT MICROPHONES

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4 Claims. (Cl. 179-156)

This invention relates in general to contact micro-
phones and also has reference to a method of utilizing
microphones of this type.

It is known to use various types of piezoelectric micro-
phones, electromagnetic microphones, dynamic micro-
phones or carbon microphones, etc., as well as electro-
magnetic or carbon throat microphones, permitting the
modulation of amplifying or transmitting systems of any
types.

All known microphones have drawbacks. Thus, hand
microphones are characterized by the fact that they must
be held by the user and are hardly utilizable in noisy
media, even if they are of the differential type. When
they are operated in a combined set comprising an ear-
phone-carrying head-set, they are also objectionable in
that they are a source of discomfort for the user.

To avoid these drawbacks, throat microphones are
currently used which are generally better protected against
external noises than conventional microphones. How-
ever, they are also a source of discomfort in operation
and their reproduction quality is questionable due to
their poor efficiency in the high voice-frequency range.

It is the object of the present invention to eliminate
the inconveniences set forth hereinabove by providing a
novel method of mounting and utilizing contact micro-
phones which is remarkable notably in that it consists in
applying the microphone against a bony portion of the
user's skull or face.

Preferably, a contact microphone of the dynamic type
is used of which the characteristics outperform those of
electromagnetic or carbon throat microphones notably by
having the advantage of allowing to pass a spectrum
of the highest frequencies and therefore of improving the
reproduction of the acoustic spectrum.

Besides, irrespective of the type of contact microphone
used, it will be seen that the transmission has a better
quality with the arrangement according to this invention
than with conventional throat microphones.

Moreover, with the method broadly set forth here-
inabove, very practical combined microphones and ear-
phone head-sets can be devised.

Thus, this invention is concerned with a method of
constructing combined head-sets of this character which
is remarkable notably in that earphones and a contact
microphone are mounted on a common support adapted
to be secured on the user's head, the assembly being so
arranged that said microphone engages a bony portion
of the user's skull or face.

Preferably, the aforesaid support has an ear-flap or ear-
piece configuration, and an earphone associated with a
contact microphone is incorporated in said support, so
that the contact microphone will be located substantially
at the base of the temporal bone of the user.

Thus, it will be seen that by incorporating the contact
microphone in an earpiece consisting preferably of flex-

ible material such as polyvinyl foam, cellular rubber
or like materials having the property of absorbing noise,
the contact microphone is efficiently protected against
all external noises. This advantage is particularly valu-
able in the case of radio navigators on board aircrafts
in which, in spite of a high degree of soundproofing, a
substantial background noise still exists.

The combined head-set according to this invention is
advantageous in that the user keeps both hands free,
unlike conventional microphones, and that it is not at-
tended by any detrimental effect as in the case of
combined sets of the so-called rail microphone type.

This invention is also concerned by way of novel
industrial product with an apparatus constituting a com-
bined microphone and earphone head-set arranged in
accordance with the teachings of the method broadly
set forth hereinabove, which is remarkable notably in
that it comprises a support adapted to be secured on the
user's head, this support carrying on the one hand the
earphones and on the other hand a contact microphone,
the assembly being so disposed that said microphone
engages a bony portion of the user's skull or face.

According to a modified embodiment of the present
invention the combined microphone and earphone head-
set comprises a support adapted to be secured on the
user's head and, at the ends of this support, a pair of
earpieces adapted to engage the user's ears, one earpiece
incorporating (or consisting of) an earphone, the other
earpiece leaving the auditory duct unobstructed, a contact
microphone being secured on or incorporated in at least
one of said earpieces, and so arranged that it engages a
bony portion of the user's head.

Thus, in this last instance it will be seen that the user
can operate the apparatus of this invention while listen-
ing to external sounds. The use of this apparatus is not
tiresome for it has the same shape, and gives exactly
the same feeling, as conventional two-earphone head-
sets.

Other features and advantages of the present inven-
tion will appear as the following description proceeds with
reference to the accompanying drawings illustrating
schematically by way of example, a few typical forms
of embodiment of the combined head-set of this invention.
In the drawings:

FIGURE 1 is a perspective view showing a combined
microphone and earphone head-set constructed according
to a first typical form of embodiment of this invention;

FIGURE 2 is a fragmentary vertical section showing
the structure of one earpiece of the head-set of FIG-
URE 1;

FIGURE 3 illustrates schematically in lateral eleva-
tion, a combined microphone and earphone head-set of
FIGURES 1 and 2 fitted on the user's head;

FIGURE 4 is another perspective view showing a
helmet-shaped combined microphone and earphone head-
set constituting a modified embodiment of the invention;

FIGURE 5 illustrates a modified embodiment of the
apparatus shown in FIGURE 4;

FIGURE 6 is a perspective view showing another modi-
fied embodiment of a combined microphone and earphone
head-set;

FIGURE 7 is a schematical lateral elevational view
showing the apparatus of FIGURE 6 fitted on the user's
head; and

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FIGURE 8 illustrates in perspective view still another modified embodiment of the same apparatus.

As shown in the drawings, and notably in FIGURES 1 to 3 thereof, a combined microphone and earphone head-set constructed according to this invention comprises a helmet-shaped support 1 adapted to be secured on the user's head, and a pair of ear-flap or earpiece elements 2 mounted, for example, by means of adjusting rods 3 on the ends 4 of the helmet sides.

An earpiece such as 2 has incorporated therein an earphone 5 and a contact microphone 6, the latter being preferably but not compulsorily of the dynamic type. There is schematically shown in FIGURE 2 a voltage amplifier 7 associated with the circuit of microphone 6, which is also incorporated in the earpiece 2.

Preferably, this earpiece 2 consists of a flexible plastic material including the portion thereof in which the contact microphone 6 is embedded, in order to protect the latter from external noises.

Also preferably, both earpieces have the shape shown in the figures, so that the contact microphone 6 will lie substantially at the base of the temporal bone of the user, as shown in FIGURE 3, and will receive sound vibration indirectly therefrom.

Of course, any suitable adjustment means such as a screw 8 with a knurled head, or any other conventional means for adapting the apparatus to the user's head, may be associated with the apparatus.

It would not constitute a departure from the present invention to so position the contact microphone 6 as to cause same to engage another bony portion of the user's face or skull, this microphone being either incorporated in an earpiece of a shape differing more or less from the shape illustrated, or carried by the head-set or helmet, independently of the earphones, or carried by a separate, special support.

In the example illustrated in FIGURE 4, the earpieces already described hereinabove are also designated by the reference numeral 2 and each of them comprises an earphone 5 and a contact microphone 6. In this structure the earpieces 2 are made preferably of flexible plastic material and secured, for example, by sewing, gluing or otherwise on either side of a head-dress 10 consisting, if desired, and as illustrated, of two lateral portions 11, 12 assembled by means of a central strip 13.

The earpieces 2 are protected externally by caps 15 of leather or other adequate shock-resisting material. These caps are formed with substantially flat annular flanges or marginal portions 16 adapted to impart a certain stiffness to the head-dress portions fitting on the user's ears and cheeks. Each flange 16 is formed preferably with a front extension 17 following the marginal portion of the head-dress where the latter contacts the user's cheek, and the front portion of the head-dress is provided with an elastic strip 18 having its ends secured to the caps 15, for example by means of rivets 19. This elastic strip 18 causes the head-dress to properly fit on the user's forehead without applying any unpleasant pressure on his face, for the specific shape of the caps 15 limits the tension exerted by the strip 18 to the front portion of the user's head.

On the other hand, elastic or non-elastic belts or strips 20, 21, adjustable by means of buckles 20_a, 21_a, are provided for properly adjusting the head-dress 10 or the user's neck and chin.

The top portion of the head-dress comprises a longitudinal bellows 22 whereby the device can be adapted to heads of different shapes and sizes. Of course, the head-dress could comprise a plurality of these bellows of different shapes, dimensions and directions, without departing from the spirit and scope of the invention.

On the other hand, in order to ensure the user's comfort, the head-dress consists preferably of air-pervious fabric, for example of the so-called aerated type.

In the alternate embodiment illustrated in FIGURE 5,

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the head-dress 10, instead of consisting of fabric, is made of interlaced strips 23, for example of a slightly elastic material and similarly providing adequate aeration.

In the other modified embodiment illustrated in FIGURES 6 and 7 of the drawings, an apparatus constituting a combined microphone and earphone head-set comprises a helmet-shaped support 24 adapted to be secured on the user's head. An earphone 25 is mounted on one end 26 of the helmet sides, for example by means of an adjustable rod 27, and a ring-shaped or like member 28 is secured on the other end 29 of the helmet sides, for example through a similarly adjustable rod 30.

This ring-shaped member 28, when the helmet is carried by the user, is applied on or about the user's external ear somewhat in the fashion of the aforesaid earphone 25, but due to its shape it leaves the auditory duct unobstructed (see FIGURE 7). The ring-shaped member 28 carries at the same time a contact microphone 31, preferably of the dynamic type, which is fastened on said support, for example by means of screws, bolts or the like, so that the microphone 31 engages substantially the otic petrosal bone (position shown in full lines in FIGURE 7).

A voltage amplifier 32 is interposed in the microphone circuit and housed, for example, on the cord or conductor, in the connector as illustrated or in the support 24, etc.

According to a modified embodiment, the microphone is so secured on the support 24 it bears against the base of the temporal bone (position 31', shown in dotted lines in FIGURE 7).

FIGURE 8 illustrates another embodiment wherein the apparatus comprises two microphones, one microphone 31 being carried as in the preceding example by the member 28, and the other microphone 33 being secured on the earphone 25. The additional microphone 33 may be incorporated, if desired, in an earpiece carrying at the same time the earphone 25 of the type illustrated in FIGURES 1 to 5.

In certain cases, the microphone 31 carried by the ring-shaped member 28 may be dispensed with, and thus the apparatus will comprise only one microphone 33 carried by the earphone 25. In this case the only function of support 24 or member 28 will consist in maintaining the head-set on the user's head.

A voltage amplifier 32 may be interposed in the circuit of the microphone or microphones and located in the support 24, in the cord, in the connector, etc.

Of course, this apparatus may be associated with any desired and adequate adjustment means for adapting it to the user's head, and notably for utilizing this apparatus with the head-dress shown in FIGURES 4 and 5 and described hereinabove.

Although the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and appended claims.

What I claim is:

1. Apparatus constituting a combined earphone and microphone head-set, comprising at least one earpiece to be applied to the head of the user and surrounding the ear, said earpiece having disposed therein an earphone to face the auditory duct and a microphone to be applied against the base of the temporal bone, and supporting means for securing said head-set on the user's head.

2. Apparatus constituting a combined earphone and microphone head-set, comprising two earpieces to be applied to the head of the user and each surrounding an ear, each earpiece containing an earphone to face the associated auditory duct, at least one of said earpieces containing a microphone to be applied against the base

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of the temporal bone, and supporting means for securing said head-set on the user's head.

3. Apparatus constituting a combined earphone and microphone head-set, comprising a support adapted to be secured on the user's head, a pair of earpieces mounted on said support and adapted to be applied to the head surrounding an ear, one of said earpieces incorporating an earphone, the other earpiece consisting of a ring-shaped member surrounding the user's ear and leaving the auditory duct unobstructed, and a contact microphone incorporated in at least one of said earpieces to engage a bony portion of the user's head in the vicinity of the associated ear.

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4. Apparatus according to claim 3, wherein said microphone is carried by said ring-shaped member, and including means for adjusting the position of said member in relation to the user's face.

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