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J. WEINBERGER
ACOUSTIC SHIELDING
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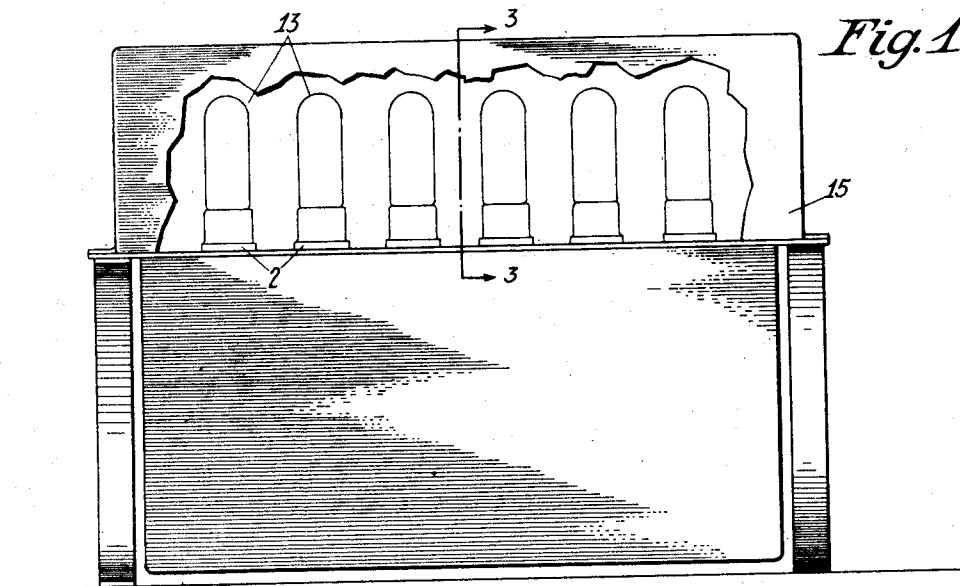


Fig. 2

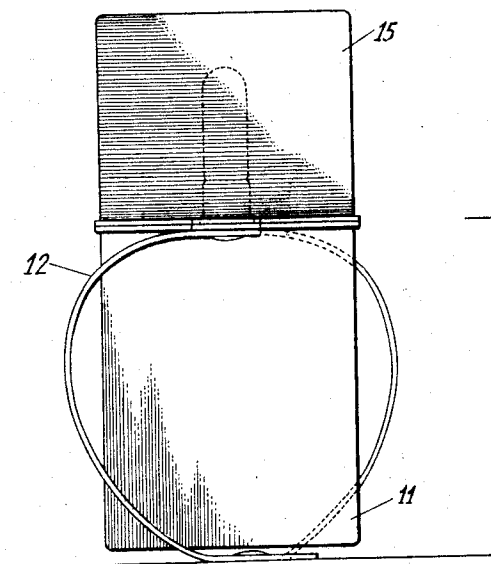
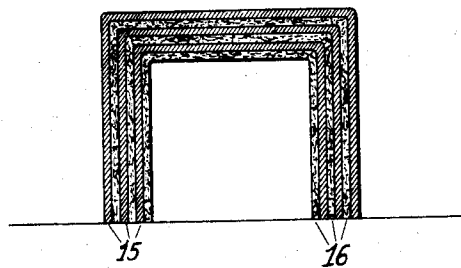


Fig. 3



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ACOUSTIC SHIELDING

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This invention relates to the art of radio broadcast reception and deals more particularly with an acoustic shielding device for a receiving set.

5 In the usual type of radio broadcast receivers employing a loud speaker and vacuum tube amplifiers there is found to be a very undesirable effect which is known as acoustic feed back. This phenomenon as at
10 present understood is due to certain air vibrations being sent out from the loud speaker which strike the envelope of one of the vacuum tubes in the receiving set and by causing the elements of the tube to vibrate
15 give rise to certain electrical oscillations at an audible frequency, which oscillations are again transmitted to the loud speaker through the various stages of the receiving set and are made evident by a very disagree-
20 able and annoying howl or squeal.

It is well known in the art at the present time that certain mechanical vibrations of the vacuum tubes transmitted to them through the supporting elements will give
25 very undesirable audible effects in the output of the set and to eliminate this undesirable effect the mountings of vacuum tubes are at present designed to have an extremely low natural frequency. This type of
30 mounting sufficiently reduces the transmission of mechanical vibrations to the tubes, so as to practically eliminate undersirable effects due to this cause.

35 However, in addition to these mechanical vibrations of the tubes the phenomenon of acoustic or air feed back takes place in receiving sets employing loud speakers. The heretofore yieldable mountings for the tubes
40 are not sufficient to eliminate the howls and squeals due to this acoustic feed back and it is, therefore, an object of this invention to provide an acoustic shield for a radio receiving set.

45 It is a further object of this invention to

shield the vacuum tubes of a radio receiving set from any external air vibrations.

It is a further object of this invention to provide a non-resonant acoustic shield for the vacuum tubes of a radio receiving set.

It is a further object of this invention to provide a sound proof shield for the vacuum tubes of a radio receiving set.

The manner in which I carry out the present invention will be best understood when read in connection with the accompanying drawing in which Figure 1 is a front elevation of a conventional catacomb embodying my invention, and showing the acoustic shield applied thereto.

Figure 2 is an end view of the catacomb shown in Figure 1.

Figure 3 is a section of a modified acoustic shielding means taken on the line 3—3 of Figure 1.

Referring to the drawing 10 indicates a catacomb which may be of any of the well known constructions which consists of the base portion 11, which carries the electrical connections and sockets 2 for the vacuum tubes 13. In order to eliminate so far as possible, the transmission of mechanical vibrations to the vacuum tubes the catacomb is constructed to have considerable weight and is also mounted on very heavy springs 12. As a result of this construction the entire system has a very low frequency of vibration, for example, one to two cycles per second which, of course, is so far below audibility that it has no effect on the acoustic properties of the receiving set.

There is, however, another source of mechanical vibration of the vacuum tubes which is not prevented by the above described spring mounting, and this is the above-mentioned acoustic feed back. To prevent this acoustic feed back I provide a shield or casing 15 made of a metal of very high specific gravity, preferably sheet lead or block tin or similar metals having relatively consider-

able thickness such as $\frac{1}{32}$ or $\frac{3}{32}$ of an inch, which offers an exceedingly high resistance to the passage of sound therethrough. Also I may use various other materials which will form sound proof casings such as bakelite or other molded compositions. While I have shown the casing 15 enclosing all of the tubes of the set it is sometimes merely necessary to enclose 1 or 2 of the tubes, but for the purposes of illustration of this invention we may consider all the tubes as being enclosed.

In a modified form of this invention it has been found advantageous to provide a layer 16 of felt, flake asbestos, or other fibrous materials, upon the interior of the heavy metal casing. This layer serves the purpose of rendering the interior of the casing non-resonant. Thus any sound that might pass through the metal shield would ordinarily find an enclosed resonant chamber and thus give very undesirable audible vibrations, but the presence of the felt serves to damp these vibrations and render the cavity non-resonant.

It is within the purview of this invention to use a single thickness of the metal alone, or a single thickness of the metal together with a layer of felt or similar material or a laminated shield made up of alternate layers of metal and felt which may be used as found desirable. I have shown a laminated structure consisting of three layers of metal and three layers of felt but this particular number of layers is not absolutely essential, and some of them may be eliminated or more added as the case might require.

It is to be clearly understood that while the theory of the phenomenon of acoustic feed back has been set forth above, the carrying out of this invention does not rely strictly on this theory and that it is offered merely as a possible explanation for the undesirable noises which are emitted by the loud speaker and which this invention eliminates.

Having thus described my invention what I desire to claim and secure by Letters Patent of the United States is:

1. In radio apparatus employing electron discharge devices, means for shielding said devices from acoustic disturbances comprising a casing of a heavy metal.

2. In radio apparatus employing a plurality of electron discharge devices, means to protect said devices from vibrations in the air, said means comprising a single sound proof casing for all of said devices.

3. In a radio receiving set employing vacuum tubes, means to shield said vacuum tubes from external air vibrations comprising a casing having a non-resonant chamber.

4. In a radio receiving set employing vacuum tubes, means to shield said tubes from acoustic disturbances, said means comprising a casing of a heavy metal, and a layer of fibrous material on the interior of said casing.

5. In a radio receiving set employing vacuum tubes, means to shield said tubes from acoustic disturbances, said means comprising a laminated casing.

6. In a radio receiving set employing vacuum tubes, means to shield said tubes from acoustic disturbances, said means comprising a casing of alternate layers of heavy metal and fibrous material.

7. In a radio receiving set employing vacuum tubes, means to shield said tubes from acoustic disturbances, said means comprising a casing of alternate layers of lead and felt.

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