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SHIELD FOR RADIO AMPLIFIERS OR DETECTORS

Filed July 8, 1926

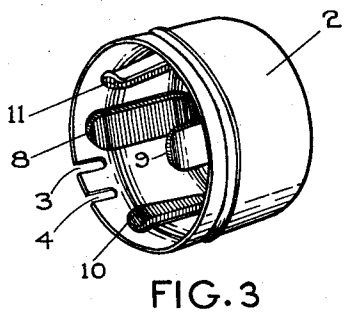


FIG. 3

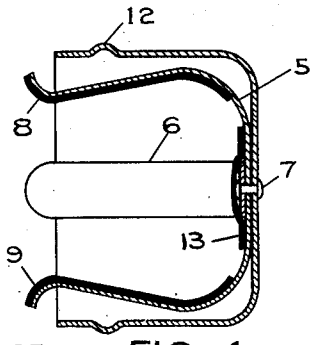


FIG. 4

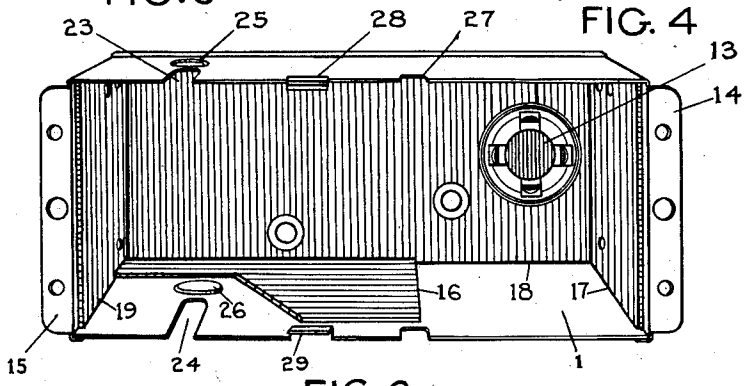


FIG. 2

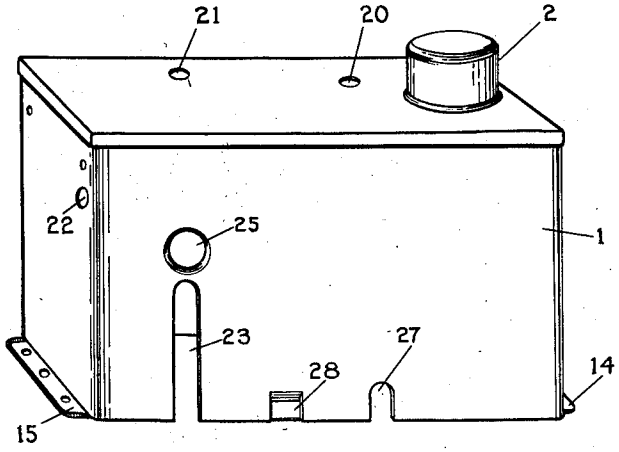


FIG. 1

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UNITED STATES PATENT OFFICE.

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SHIELD FOR RADIO AMPLIFIERS OR DETECTORS.

Application filed July 8, 1926. Serial No. 121,144.

This invention relates to a shield for a radio detector or amplifier tube and associated equipment.

One object of this invention is to provide a shield of proper size and shape to enclose a vacuum tube and its related apparatus, such as the tuning condenser, radio frequency transformers, etc.

Another object of this invention is the provision of a metal cap which fits into the top of the shield over the vacuum tube and so arranged as to be readily removed for giving access to the tube for replacement purposes.

Still another object of this invention is to construct the shield of metal such as copper of such strength and thickness as to protect the associated apparatus from mechanical injury and at the same time reduce the electrical resistance of the shield to strays, etc., thus preventing leakage into the shielded portions of the circuit.

A further object of this invention is the provision of dampening material such as felt attached to the inner portion of the shield and to the spring fingers of the cap for the purpose of preventing mechanical or acoustic vibrations reaching the tube elements and thus causing acoustic coupling or singing.

In the operation of high efficiency radio receivers such as the tuned radio frequency type it has been found very desirable to shield each tuned stage against the effect of strays, atmospherics and even signals and in accordance with this invention a heavy copper can with a removable cap is provided as shown in the figures of the accompanying drawing.

It has also been found very desirable in high efficiency radio receivers, especially when operating them with cone type loud speakers, to line the copper can or shield with some material which absorbs vibrations in the air and in the structure of the receiver. These vibrations if allowed to reach the vacuum tube, affect the tube electrodes to such an extent, particularly in connection with the detector, as to cause acoustic coupling which interferes with the reception of the desired signals. In accordance with this invention the copper can and cap are lined with felt.

It has also been found that the vibrations set up by a high quality loud speaker will sometimes cause the system to go into audio frequency oscillations by virtue of the coupling to the plates of the tuning condenser. In accordance with this invention the shield is made to enclose the tuning condenser and the felt lining of the can extends around this condenser, as well as the tube. Strips of felt are glued to the inner side of the spring fingers which are attached to the inner portion of the cap and these padded fingers grip the tube, thus serving as additional means for preventing vibration of the tube elements.

Referring to the accompanying drawing, Fig. 1 is a perspective view of the complete metal can or shield together with its associated metal cap.

Fig. 2 is a perspective view of the inside of the metal can showing by means of cross lines, the felt lining above referred to.

Fig. 3 is a perspective view of the inside of the metal cap showing the four spring fingers of this cap and by means of the cross lines, the felt strips attached to these fingers.

Fig. 4 is a horizontal sectional view which shows more clearly the means of attaching the spring fingers to the cap and in this figure the cross lines represent the metal portion of the cap and fingers, while the heavy black lines represent the felt material.

In the particular form of this invention disclosed in the drawings, the can 1 is constructed or heavy gauge copper, all seams being thoroughly soldered together for the purpose of reducing to a minimum the electrical resistance of this can to strays, etc. The metal cap 2 is formed of heavy gauge copper, the thickness being similar to that used for the can proper. At the open end of cap 2, portions 3 and 4 are cut out in order to cause this lower portion to act as a spring member for enabling the cap to be readily inserted in or removed from the top of the can and at the same time make a good electrical contact.

Spring members 5 and 6 are attached to the top central portion of the cap by means of a rivet 7 and these fingers have strips of felt 8, 9, 10 and 11 glued or cemented to their inner portions and are for the purpose of engaging or gripping the vacuum tube over which the cap 2 fits.

A ridge or ring 12 is formed around the lower portion of the cap and acts as a stop for gauging the proper location of this cap within the can top. This distance is so ar-

ranged that the felt washer 13 which is glued in the top of the cap rests on the top portion of the vacuum tube.

The can is formed with over-turned portions 14 and 15, which are for attaching the can to the frame or structure of the radio receiver and the holes shown in these portions are for the use of screws or rivets for thoroughly fastening the can to the frame.

As shown in Fig. 2 strips of felt 16, 17, 18, 19 (and another strip which is on the inner side of the top portion of this figure and which is not shown) are used for dampening purposes as above mentioned.

A hole 20 is drilled in the top of the can and is for the purpose of operating a switch, which in some cases may be used for switching different circuit connections of the radio receiver. Another hole 21 is placed in the top of the can and is used for the purpose of inserting a screw driver or other tool for making adjustments of the apparatus located inside the can.

Hole 22 drilled in one end of the can is also for use as a means for inserting an adjusting tool to make adjustments of certain parts of the apparatus.

Portions 23 and 24 are removed from the material forming the sides of the can and are for the purpose of inserting a condenser shaft which operates the condenser associated with the particular radio stage to which this can is attached.

25 and 26 represent depressions which are punched in the sides of the shield placed there for the purpose of making an electrical and mechanical connection between the can and the condenser bearing or other framework of the associated equipment. This is for more rigidly holding the can in position and is also for the purpose of more effectively grounding the bearing or the frame of the set to the shield.

Another portion 27 is removed from the lower side and is used to bring the electrical connections from the apparatus located inside the can out to the other portions of the circuit.

28 and 29 represent portions of the can which are punched or cut out in the form of flanges, and are used to clamp or bind the can to an up-turned portion of the frame, these flanges being also used to make a better connection, both mechanically and electrically with the framework of the radio receiver.

By means of the instrumentalities disclosed herewith, I am able to very materially reduce the effect of audio frequency vibrations, which ordinarily tend to interfere with the proper operation of the circuit. I am also able to markedly reduce the effect of high frequency currents such as interfering signals and static, ordinarily picked up by the transformer coils and condensers of a radio receiver.

Having now particularly described the nature of my invention and in what manner it may be used, I claim:

1. A shield for a vacuum tube and its associated apparatus, comprising a metal can for covering said vacuum tube and associated apparatus, a removable cap for said can, and a vibration insulating lining for said can.

2. A shield for a vacuum tube and its associated apparatus, comprising a metal can lined with vibration absorbing material, and a metal cap for said can containing spring members for gripping said vacuum tube.

3. A shield for a vacuum tube and its associated apparatus, comprising a metal can lined with vibration absorbing material, a metal cap for said can, spring members located within said cap for gripping said vacuum tube, and strips of felt attached to said members for contacting with said tube.

In witness whereof, I hereunto subscribe my name this 7th day of July, A. D. 1926.

M. E. JOHNSON.