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L. W. CHUBB

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MOUNTING FOR AMPLIFIER DEVICES

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Fig. 1.

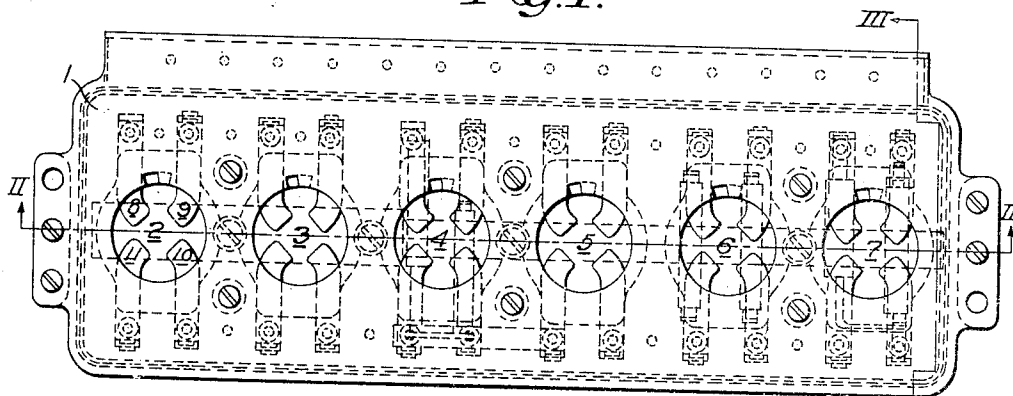


Fig. 2.

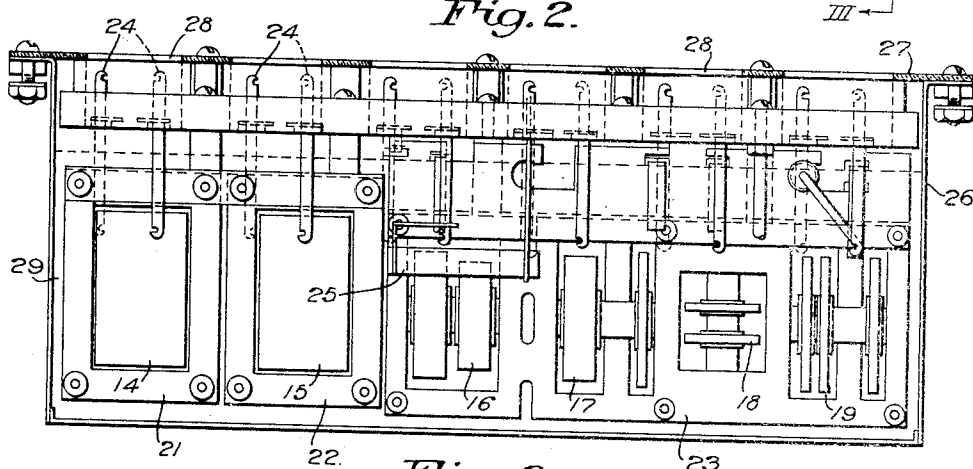
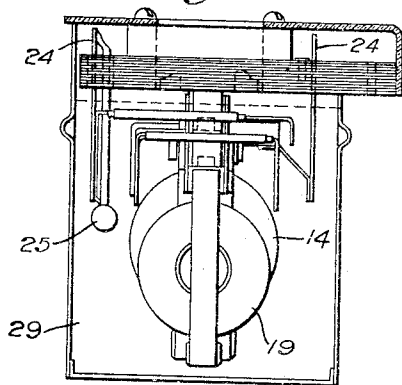


Fig. 3.



WITNESSES:

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MOUNTING FOR AMPLIFIER DEVICES

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My invention relates to radio signalling systems and particularly to mounting and supporting means for amplifier systems.

5 An object of my invention is to produce a radio receiving system comprising amplifier means in which relative movement of impedance devices is prevented and change in the natural resonant frequency of the circuits from such movement, prevented.

10 Another object of my invention is to provide a radio receiving system having its impedance elements supported in a mass of embedding insulating material.

15 Another object of my invention is to provide, in a radio receiving system an improved insulation means.

20 Another object of my invention is to provide in a radio receiving system, means for combining the various elements of an amplifier system into an integral unit.

25 Another object of my invention is to provide a unitary assemblage of essential parts of a radio signalling system whereby in case of defect or injury one unit is adapted to be replaced conveniently by another.

30 Another object of my invention is to provide a unitary assemblage of essential parts of a radio signalling system whereby the individual impedance elements may be mounted without individual cases, binding posts, etc., and to reduce the cost of manufacture.

35 Another object of my invention is to provide a resiliently mounted unitary assemblage of essential parts of a radio signalling system whereby the natural period of vibration is lowered to a value near the lower limit of audibility.

40 Another object of my invention is to provide a unitary assemblage of essential parts of a radio signalling system whereby protection is furnished to the small conductors therebetween by a wax embedding material.

45 Another object of my invention is to provide a unitary assemblage of essential parts of a radio signalling system, whereby the precise details of the circuits and the constants thereof may be concealed and tampering prevented.

50 In the construction of radio receiving devices it has been customary to provide a plu-

55 rality of impedance elements such as amplifying transformers, inductance coils, feedback coils, fixed condensers, grid leaks, etc. which are connected to the various units of a group of vacuum tube sockets.

60 This construction has been found particularly useful in connection with the superheterodyne radio receiving system, but it has been subject to the difficulty that minor changes in the positions of the various elements of the system caused changes in the electrical values of the various units, particularly in the capacitance therebetween and thereby caused changes in the tuning and amplifying constants of the system. Such changes resulted in undesirable noises and irregularities in the operation of such receiving systems at frequencies corresponding to the natural frequency of mechanical vibration of the various parts.

70 I have found that by embedding the entire impedance unit structure of such a system in a mass of wax, relative motion between the various elements is prevented, and much more permanent, uniform and quiet operation of the system is thereby secured. I have found also that a single low mechanical vibration frequency is substituted for the several higher frequencies, thus bringing sounds resulting therefrom near to the lower limit of audibility.

85 I have further found that by surrounding the embedded system and the embedding wax by a metal container I am able to prevent the influence thereon of many stray inductive influences which otherwise would cause undesirable noises in the system. I have further found that by supporting the system, in its embedding wax and metal container, upon a resilient supporting means I am enabled to provide a system which is much less affected by jar and vibration because of the fact that the unit, as previously mentioned, has a very much lower natural mechanical vibration frequency, which frequency may readily be so low as to be either inaudible or not troublesome to the operator of the apparatus.

100 Other objects and structural details of my invention will be apparent from the follow-

ing description when read in connection with the accompanying drawings, wherein

Figure 1 is a phantom plan view showing various elements therein of a unit comprising an embodiment of my invention,

Fig. 2 is a view in vertical section along the line II—II of Fig. 1, and

Fig. 3 is a view in vertical section of the structure of Fig. 1 along the line III—III.

In the form illustrated in the drawings, a plate 1 preferably of insulating material, has therein a plurality of holes 2, 3, 4, 5, 6 and 7. Formed on the underside of the plate 1 are a series of grooves terminating in the holes, each groove having fitted therein a spring. Four grooves and four springs 8, 9, 10 and 11 are provided for each hole. To the under surface of the plate 1 are attached in any desired manner, a plurality of impedance devices. These may be the radio-frequency and the audio-frequency amplifying transformers of the superheterodyne radio receiving system or they may be the transformers and other elements of other radio systems.

In Figs. 2 and 3 are shown audio-frequency amplifying transformers 14 and 15, and radio-frequency amplifying transformers 16, 17 and 18 and the oscillation generator coupling inductances 19. The audio-frequency transformer 14 illustrated consists of the coil marked 14 and an iron core member 21. The transformer 15 similarly has a core 22. A single core 23 having a multiplicity of openings cooperates with the radio-frequency amplifying transformers 16, 17 and 18 and also the oscillation generator coupling coils 19.

Connectors 24 are attached to the various springs 8, 9, 10 and 11, and extend downwards toward the amplifying transformers. The various leads from the amplifying transformers are attached to these connecting means preferably by soldering. Other impedance devices, such as a grid leak 25, are attached to certain of the connectors 24 similarly, preferably by soldering.

A casing 26, which may be of cast aluminum or may be of drawn or folded metal is, of suitable size for convenient fit with the plate 1 and the various attached impedance devices. A cover 27 having apertures 28 adapted to cooperate with the openings in the plate 1 may likewise be provided. The plate 27 is adapted to be attached to the case 26 and has supported from it the plate 1 and its cooperating assembly of impedance devices. After all connections are made the case 26 is filled with a mass of insulating embedding material 29 which may be preferably a wax compound which will surround the impedance elements previously mentioned.

The filling of wax 29 is preferably placed within the container case 26, melted and while in a fused state the impedance elements dipped in and the whole allowed to cool and harden. The structure so assembled provides

protection for the impedance units against moisture and the possibility of a reduction in insulation resistance through the presence of moisture and it likewise provides supporting means which prevent movement of the various parts of the assemblage with respect to each other under the influence of jars or vibration. The wax filling is desirably so proportioned as to cover the whole of the impedance elements and the major portion of the connector members 24 but to have its surface a short distance below the under surface of the socket plate 1 at the line 31 in order that no interference may occur when the terminals of the vacuum tubes are placed against the contact springs on the socket plate.

The complete unitary assembly is then conveniently mounted upon a resilient support such as sponge rubber which will transmit a minimum amount of vibration from the case of the set, or from its support, to the unitary structure containing the inductances and the vacuum tube sockets.

This construction provides a mounting for the various impedance units and sockets of the radio circuit which has but a single case for all of the elements, thereby reducing substantially the number of manufactured items. It likewise has a much smaller number of binding posts and terminal structures than would be the case if the various elements were mounted in independent cases, thereby further reducing the number of manufactured items required.

The unitary system is also adapted to convenient replacement, since in the event of injury to any portion of the apparatus, the assemblage as a whole may be removed from the outside case and replaced by an intact unit, restoring the system to operative condition, and the injured unit may be repaired at the convenience of the manufacturer.

In the operation of my device, the presence of the metallic case 26 surrounding the impedance elements prevents the influence thereon which otherwise would be exerted by extraneous electromagnetic and electrostatic influences. Simultaneously, the presence of the wax filler maintains the high insulation value required for satisfactory operation of a radio set and prevents relative movement among the various elements and the connections thereto which would otherwise require rigid and expensive mountings. My construction prevents undesired inductive and capacitive effects which cause undesired noises and instability.

I have produced a radio receiving system in which much greater protection against extraneous influences such as electrical phenomena, moisture and vibration is obtained and whereby a much more quiet radio receiving system is obtained. The construction as described further provides a substantial meas-

ure of secrecy for the various circuits and constructions of the radio system inasmuch as it is not adapted to inspection except by rather complete destruction of the unitary system, thereby putting the radio apparatus out of operative condition. The system provides also a substantial measure against tampering since it would likewise result in material injury to the system.

10 While I have shown but a single embodiment of my invention in the accompanying description, it is capable of various modifications therefrom without departing from the spirit thereof and it is desired, therefore, 15 that only such limitations shall be imposed thereon as are indicated by the prior art or by the appended claims.

I claim as my invention:

1. The combination, in a high-frequency 20 signal-receiving apparatus, of a receptacle, a block of insulating material which fits into the top of said receptacle, and a plurality of electrical devices suspended from the under side of said insulating block, the space with- 25 in said receptacle surrounding said devices being filled with a solid insulating material.

2. The combination in a high-frequency signal-receiving apparatus of a receptacle, a block of insulating material which fits into 30 the top of said receptacle, and a plurality of transformers adapted for use in a high-frequency signal-receiving system secured to, and suspended from, the under side of said block of insulating material, the space with- 35 in said receptacle surrounding said transformers being filled with a solid insulating material.

3. The method of assembling the elements of a radio apparatus which comprises sus- 40 pending said elements from a support, providing a bath of fused insulating material, inserting said elements, while in suspended position, into said bath of fused material and subsequently hardening said fused material 45 to bind said elements against individual vibration.

In testimony whereof, I have hereunto subscribed my name this 20th day of April, 1925.

50 LEWIS WARRINGTON CHUBB.

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