Nov. 29, 1927. 1,651,308

L. WINKELMANN

AUDIO AMPLIFIER

Filed April 10, 1922

Fig. 2.

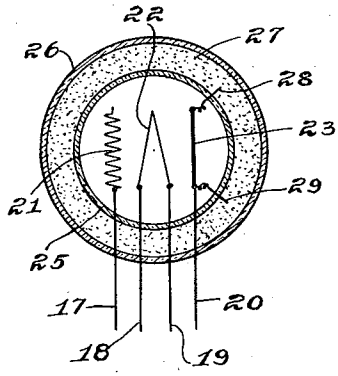
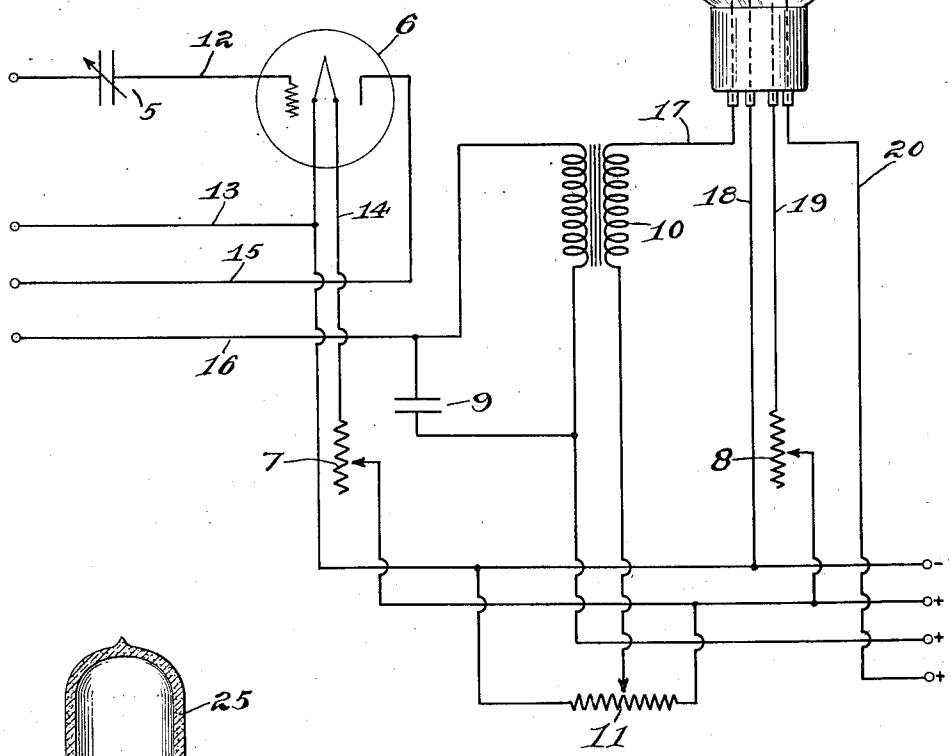


Fig. 1.



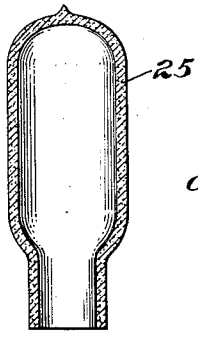


Fig. 3.

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UNITED STATES PATENT OFFICE.

LOUIS WINKELMANN, OF HOBOKEN, NEW JERSEY.

AUDIO AMPLIFIER.

Application filed April 10, 1922. Serial No. 551,287.

This invention relates to audio amplifiers, detecting or similar tubes such as are used in wireless receiving and transmitting apparatus and for other purposes, and the object of my invention is to provide means for intensifying or increasing the active properties of elements of this class whereby an audio amplifier or the like of a wireless receiving and transmitting apparatus made according to my invention will take the place of two or more of such elements, as now employed, or having power equal to two or more of such elements; and with this and other objects in view the invention consists in a device or element of the class and for the purpose specified which is simple in construction, efficient in use and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Fig. 1 is a diagrammatic view of a wireless receiving apparatus showing my improvement mounted in connection therewith and in section;

Fig. 2 a diagrammatic sectional view of my improvement as shown in Fig. 1 but showing a modification; and,

Fig. 3 a sectional detail view of a modified form of construction which I may employ.

For the purpose of illustrating one method of carrying my invention into effect, I have diagrammatically illustrated in Fig. 1 of the accompanying drawing, a wireless receiving outfit comprising, in the construction shown, a variable condenser 5, detector 6, rheostats 7 and 8 and condenser 9, transformer 10 and potentiometer 11. At 12 is shown a wire connected with the grid of the detector 6, at 13 and 14 are wires connected with the filament of the detector 6, at 15 is a wire connected with the plate of the detector 6, and at 16 is a tickler wire from the usual tickler which is connected with the condenser 9 and transformer 10, and four wires 17, 18, 19 and 20 are connected with the grid 21, filament 22 and plate 23 of the audio amplifier 24.

The above described construction is shown for the purpose of illustrating one method of carrying my invention into effect and forms no direct part of my invention and, in practice, and as shown in Figs. 1 and 2 of the drawing I enclose the vacuum tube 25 in a supplemental vacuum tube 26 which is larger than the tube 25 and forms a vacuum space 27 between said tubes, and this space is filled with a radio-active substance or substances, such as radium, thorium, uranium, phosphorus, pitchblende or the like, or a combination of two or more of such substances and including substances having combustible properties similar to phosphorus. The provision of the casing or jacket of radio active substance entirely around and encircling the elements of the tube, subjects said elements to the active properties of the said substance to the entirety of said elements and also results in increasing the efficiency of said elements.

By employing the radio-active substance or substances and including substances having combustible properties similar to phosphorus with an amplifier of the class described in the manner shown in Figs. 1 and 2, the active properties of a device or element of this class, as commonly employed, is greatly increased. In other words, by employing such substance or substances, in tubes of the class under consideration, a lesser number of these tubes may be employed in an apparatus, and by reason of the nominal expense of the substances employed, or many of them which may be employed, a material saving in wireless apparatus of this class, is effected as well as a simplification in the entire apparatus and the wiring thereof.

In Fig. 2 of the drawing, I have shown a slight modification in which two wires 28 and 29 are connected with the plate 23 within the tube 25 and extend outwardly through said tube into the vacuum space 27 between the tubes 25 and 26. With this construction the active properties of the amplifier may be materially increased but I am not necessarily limited to the use of the wires 28 and 29 and the same may or may not be employed.

In Fig. 3 of the drawing I have shown a modification, or a different method of carrying my invention into effect, and in said figure I have shown the tube 25, which as commonly employed, is made of or usually composed of glass and, in the practice of my invention I have combined with the material of said bulb 25 a radio-active substance or substances. In other words, the bulb 25 may be entirely or partially com-

posed of a radio-active substance or substances.

It will also be apparent that while I have shown and described my invention as applied to a wireless receiving apparatus, the same may be used in connection with wireless transmitting apparatus or in connection with devices or elements of any kind or class in the nature of amplifiers or the like regardless of the specific construction or use thereof, and various changes in and modifications of my invention, as herein shown and described may be made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages.

It is well known that X-ray, ultra violet ray, or a radio active element emanation will pass through glass if they are properly attracted by affinity, and it is for this reason that I place radio active phosphorated or phosphorescent radio active substance or substances or a mixture of radio active and substances having combustible properties similar to phosphorus or elements in the outside tube to assist the thermionic emission stream with these penetrating emanations while it is flowing to the negative and positive electric terminals and attracted by the gas free, evacuated inner tube, thereby producing a spontaneous, active radiation suitable for a strong, clear amplification of radio waves and signals.

The radio active substance will also repel the sun rays and prevent interference with the radio waves and signals while passing through the inner tube. It is a well known fact that radio reception is better at night than it is in the daytime on account of the sun ray radiation interference.

The purpose of inserting radio active and other substances such as phosphorus in detector, amplifying and oscillating vacuum tubes and especially in placing the same quantity and quality or proportions of such substances in vacuum tubes and exhausting them alike, they will have the same vacuum and the same ionized and oxidized gas condition within all the tubes alike, producing substantially balanced tubes. These tubes will also operate with a much lower voltage on the plate circuit and the filament will also use less current, depending upon the material used.

By employing the substances heretofore set out in vacuum tubes, interference caused by the gas still within the tube, is largely if not entirely eliminated. My tube will also be more sensitive and effective in its several uses and produce better electrical conductivity to the electrical emission stream.

The object in using a double tube is to enlarge the space and to maintain the substances in a separate chamber encircling the vacuum chamber containing the electrodes and further to form a protective shield or jacket for the electrodes and especially in protecting the filament, emission stream from outside interference, and to protect the inner tube and its electrodes from interferences in general. By employing the electrical connection between the plate and the substance in the outer tube, such substance is placed in direct electrical communication with the plate permitting the plate to operate efficiently and more sensitively on a lower voltage.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A device of the class described comprising a vacuum tube containing a filament, plate and grid, a supplemental tube enclosing said first named tube and spaced therefrom to form a vacuum chamber between said tubes, a radio-active substance mounted in said vacuum chamber, and means for placing said radio-active substance in electrical circuit with said plate.

2. A device of the class described comprising a tube, having a vacuum chamber therein, a plurality of electrodes in said vacuum chamber and substances surrounding said electrodes externally of said chamber, said substances including a radio-active element and phosphorus.

3. A device of the class described comprising a vacuum tube containing a filament, plate and grid, a radio active substance including a substance having combustible properties similar to phosphorus surrounding said filament, plate and grid, and externally of the vacuum chamber of the tube for intensifying the active properties of said device.

4. A vacuum tube containing a plurality of electric elements, and a radio active substance including a substance having combustible properties similar to phosphorus externally of the vacuum chamber of said tube and surrounding said elements.

5. The combination with a vacuum tube containing a filament, plate and grid, of a vacuum tube enclosing said first named tube, and a substance in said last named tube including a radio active element, and an element having combustible properties similar to phosphorus.

In testimony that I claim the foregoing as my invention I have signed my name this 8th day of April, 1922.

LOUIS WINKELMANN.