April 19, 1927. 1,625,445

J. ASTROM ET AL

STATIC ELIMINATOR

Filed March 16, 1925

Fig. 1

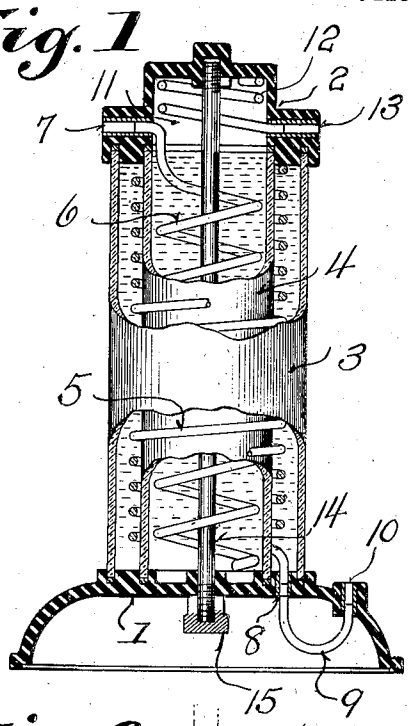


Fig. 2

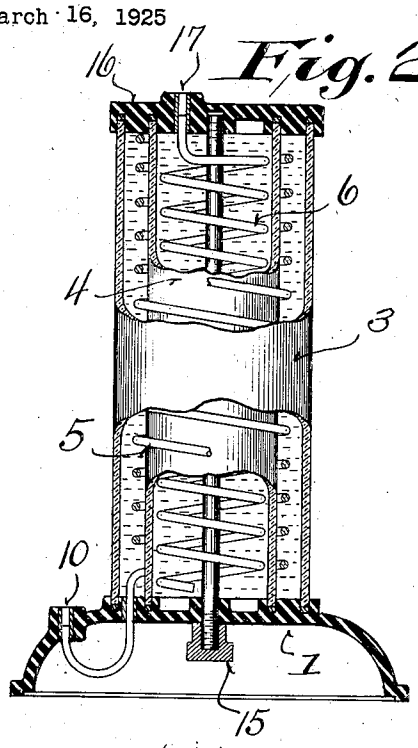


Fig. 3

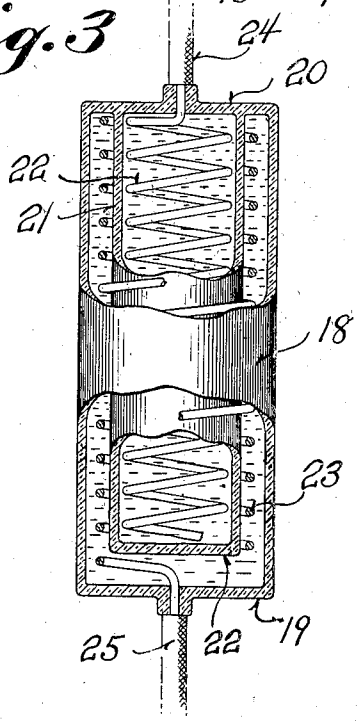
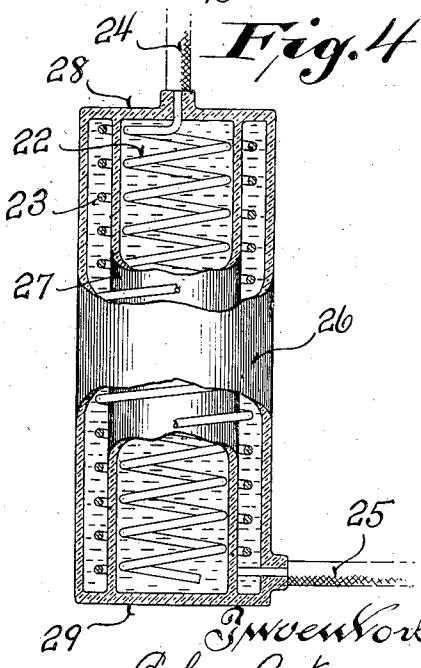


Fig. 4



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STATIC ELIMINATOR.

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This invention relates to static eliminators.

In radio reception it is well known that the static disturbances frequently preclude using the device. This type of disturbance is particularly noticeable with the sets employing material amplification.

Objects of this invention are to provide a very simple and practical static eliminator which may be connected between the antenna and the receiving set, and which will practically eliminate static disturbances and permit reception even under the worst conditions.

An embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a sectional view showing one form of the invention.

Figures 2, 3, and 4 are similar sectional views showing other forms of the invention.

Figure 1 shows a static eliminator in which a base member 1 is made of insulating material, such as hard rubber, for instance. A cover member or cap 2 of similar material is also provided. Between these members, a pair of cylinders 3 and 4 are positioned, such cylinders being of insulating material such, for example, as glass.

The ends of the outer and inner cylinders 3 and 4 are received in suitable grooves in the members 1 and 2 and gaskets, such as yielding rubber members, are employed for insuring an air tight and water tight joint.

Between the inner and outer cylinders, a coil or helix 5 of wire is formed which is preferably spaced from the glass inner cylinder 4, as shown in the drawings. A small helix 6 is positioned inside of the inner cylinder 4 and spaced therefrom, as shown, The end of the helix 6 passes into a small metal tube 7 carried by the head 2 and is soldered securely therein to afford a water tight joint accessible from the exterior and adapted to receive a suitable connecting plug. The end of the helix 5 is similarly soldered in a connecting tube of metal such as indicated at 8, and a second loop 9 of wire is also soldered in this tube. The end of the wire 9 is soldered in a metal tube 10 similar to the tube 7. The upper or cap member 2 is upwardly bulged to provide a recess 11, and a small helix 12 is positioned within this recess. Its end is soldered securely in the metal tube 13.

The space between these cylinders 3 and 4 is filled with a suitable conducting liquid such for instance as salt water and the inner cylinder 4 is filled to approximately its upper end with a similar solution, as shown in Figure 1, such liquid, however, stopping short of the upper coil 12. The cap 2 and base 1 are held tightly together by means of a tie bolt 14 which is threaded into a suitable recess in the cap, and which projects through the base 1. A clamping nut 15 is screwed upon the lower end of the tie rod 14 and its upper flat face forms a water tight joint with the base 1. Thus the parts are readily separable and are yet securely held together in a water tight and air tight relation.

Figure 2 shows a form of invention very similar to that previously described, with the exception, however, that the coil 12 is omitted. In this form the inner and outer cylinders 4 and 3 are similarly carried by the end members 1 and 16. These members are constructed in the same manner as that disclosed for the members 1 and 2. In fact the member 1 is a duplicate of the correspondingly numbered member of Figure 1.

The inner helix 6 is soldered in a water tight manner to the metal tube 17 projecting through the top 16. The other or outer helix 5 is connected to a metal tube 10 identically in the same manner as that previously described.

Figure 3 shows a form of invention in which the hard rubber end pieces are omitted. In this form the outer cylinder 18 is formed with an integral bottom 19 and an integral top 20. The inner cylinder 21 is integrally formed with the top 20 and is carried thereby. The lower end of the inner cylinder is completely closed by the integral base 22. These members are preferably formed, as a unit, from glass.

The inner helix 22 and the outer helix 23 have their ends sealed in the glass and connected with conductors 24 and 25, respectively.

In the form shown in Figure 4 substantially the same construction as described in Figure 3 is followed. For example, the outer cylinder 26 and the inner cylinder 27 extend to common top and bottom members 28 and 29, respectively, and are integrally joined thereto. The inner and outer helices 22 and 23 are connected to the conductors 24 and 25, as previously described. If desired, the conductor 25 may pass through the side wall of the cylinder 26.

In each of the forms of invention illustrated, a liquid conductor such as common salt water is employed in each of the cylinders. However, it has been found that the apparatus will operate without such liquid conductor although not so satisfactorily.

In using the device, one of the helices or coils, for instance, the inner coil is connected directly with the antenna. The other coil or outer coil is connected directly with the radio receiving set.

In the form shown in Figure 1, the coil 12 is connected directly to the ground lead of the receiving set or else directly to a separate ground. It has been found that the oscillatory energy is readily transmitted from one coil to the other coil and to the receiving set but that the static disturbances are substantially eliminated and will not pass through the apparatus from the inner coil to the outer coil.

Although the exact theory of the operation of the device is not wholly understood, it is confidently believed that the inner coil sets up the periodic, magnetic pulsations which are readily picked up by the outer coil and transmitted to the receiving set, while the static disturbances are not transmitted from one coil to the other coil.

On using the form illustrated in Figure 1, an improvement was effected by employing the auxiliary coil 12 which is connected to the ground. This coil carries away the static electricity brought in by the antenna and leads such electricity directly to the ground. In actual tests conducted with this apparatus connected and used as described, it was found that the reception was remarkably clear and strong and that a substantially entire absence of static disturbance was found even under extreme conditions.

From these practical tests and use of the different devices, it is certain that a very great improvement in radio reception is secured by the practice of this invention.

Although the invention has been described in considerable detail, it is to be understood that the invention may be variously embodied and is, therefore, to be limited only as claimed.

We claim:

1. A static eliminator comprising an inner vertical cylinder and an outer concentric vertical cylinder, end members closing the ends of said cylinders, an inner helix located within the inner cylinder, a liquid conductor partially filling said inner cylinder, a second helix located above said liquid conductor, a third helix surrounding said inner cylinder and enclosed by said outer cylinder, and a liquid conductor carried within said outer cylinder.

2. A static eleminator comprising an outer and an inner cylinder of insulating material, insulating gaskets closing the upper and lower ends of said cylinders and rendering the space within the inner cylinder and the space between the inner and outer cylinders completely inclosed spaces, a metal helix in the space between said cylinders and having means for connection at one end, a second metal helix within the inner cylinder and having means for connection at one end, said helices being free from connection with other and an electrolyte carried within each of said spaces.

3. A static eliminator comprising an inner vessel of insulating material, an outer vessel of insulating material, insulating members completely closing the inner vessel and the space between the inner and outer vessel, electrolyte in the inner vessel, electrolyte in the space between the inner and outer vessels, a separate and distinct conductor projecting into each electrolyte and having externally accessible connecting portions.

In testimony that we claim the foregoing we have hereunto set our hands at Fort Wayne, in the county of Allen and State of Indiana.

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