

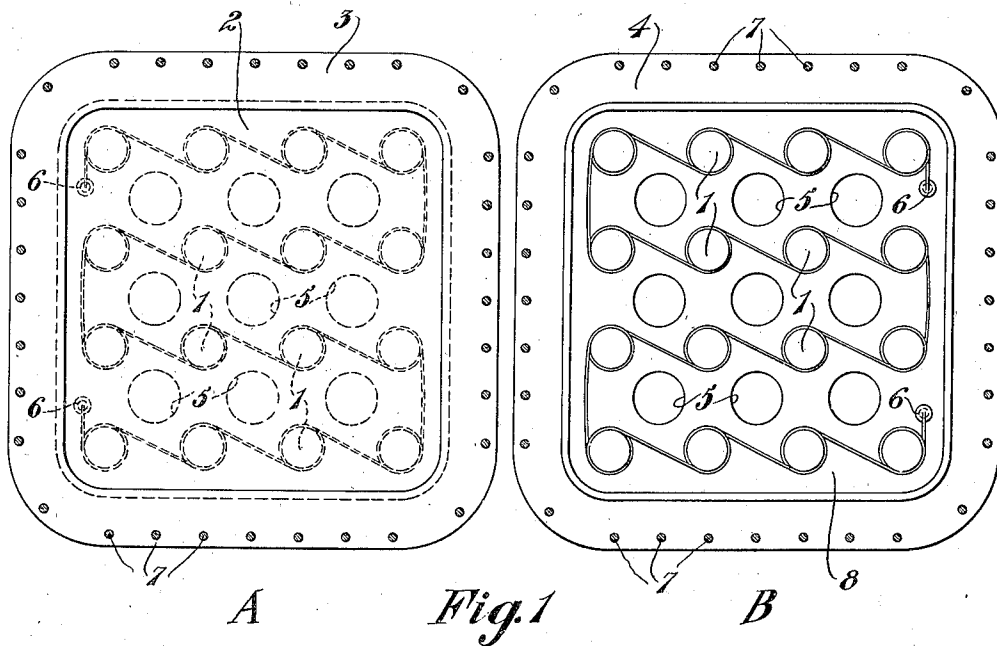
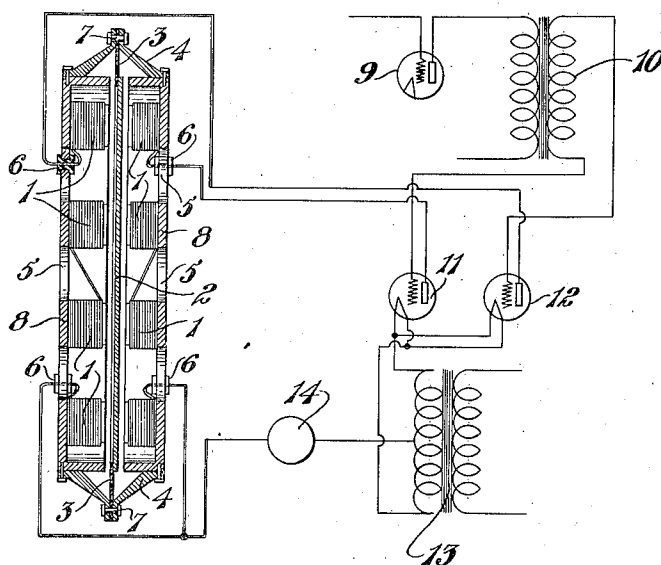
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ELECTROMAGNETIC SPEAKER

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ELECTROMAGNETIC SPEAKER

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6 Claims. (Cl. 179-115)

This invention provides for improvements in magnetic speakers in which the hitherto wasted field power is more fully utilized by vacuum tube control whereby the A. C. signal input into the grids of the control tubes varies the direct current supply of the speaker magnets whose action produces sound by movement of a diaphragm. The control circuit is different from the types similar to this, in that there is no external connection or coupling where the output of the circuit can be used. The power is directly used in the dissipation of heat and production of magnetic flux lines which move the diaphragm by variation of the field current.

This is made possible by a floating diaphragm being suspended between two vertical opposite groupings of electromagnets. The attraction of one group on the positive half of the input cycle being dominate while the other half groups attraction is nullified, and vice versa.

With reference to the drawing, Fig. 1 shows two views, A and B, representing the two halves of the assembly which bolted together form the speaker. Fig. 2 illustrates the control circuits utilizing a vertical cross section of the proposed speaker.

In Fig. 1 view A shows half of the speaker with the leather or composition suspension ring 3 cemented to the outer edge of the diaphragm 2 which covers the shaded cross-sectional circles representing the magnets 1. Holes 5 are drilled or punched in the outer housing wall 8 of the magnet assembly for the emission of sound waves. The housing and magnet cores are made of soft iron or metal having a high μ or susceptibility. Small holes in the outer edge of the suspension ring 3 view A and rim are provided to accommodate the studs 7 view B which fasten the speaker together. The outer rim 4 is made of non-magnetic material or metal to aid in the nullifying of leakage flux. External connections from the magnet assemblies is made through insulated studs 6 which pass through the outer housing wall 8.

The spacing of the electromagnets is such as to prevent bending of the diaphragm due to concentration of flux lines near their poles. This is in ratio to the thickness and composition of the diaphragm.

In Fig. 2 the A. C. input signal from the last audio amplifier tube 9 passes through the coupling transformer into the output windings 10 which conducts the signal into the grids of the heavy duty triode type vacuum tubes 11 and 12. As the one grid turns positive in tube 11, on the

positive half of the cycle, the grid of tube 12 turns negative. This allows current from the D. C. source 14, connected to the center tap in the secondary winding of the control tubes 11, 12, filament transformer 13, to flow from the filament to the plate of tube 11. This completes the circuit causing the diaphragm to move toward the magnet assembly connected to the plate of tube 11. This action takes place on the grid of tube 12 as it turns positive on the other half of the cycle. Since one grid is positive while the other is negative and vice versa, the current applied alternately to the opposite groupings of electromagnets results in no magnetic neutralizing effect upon each other. The production of sound waves by movement of the diaphragm corresponds to the power applied to each group of magnets.

It will be obvious from the above description and the attached drawing that as power is alternately applied to the opposite groupings of electromagnets 1 the diaphragm 2, which is suspended between the opposite groupings of magnets by means of the suspension ring 3 of leather or similar flexible material, will be caused to move back and forth between the opposite groupings of magnets.

I claim:

1. An electromagnetic speaker comprising two opposite groupings of electromagnets, a diaphragm located between said opposite groupings of electromagnets, said diaphragm comprising a magnetic plate, and pliable, non-resilient supporting means at the edges of the magnetic plate.

2. An electromagnetic speaker comprising two opposite groupings of electromagnets, a diaphragm located between said opposite groupings of electromagnets, said diaphragm comprising a magnetic plate, and a pliable, non-resilient suspension ring connected to the edges of the magnetic plate for supporting the magnetic plate.

3. An electromagnetic speaker comprising two opposite groupings of electromagnets, the electromagnets of each grouping being opposite the electromagnets of the other grouping, a diaphragm located between said opposite groupings of electromagnets, said diaphragm comprising a magnetic plate, and pliable, non-resilient supporting means at the edges of the magnetic plate.

4. An electromagnetic speaker comprising two opposite groupings of electromagnets, a diaphragm located between said opposite groupings of electromagnets, said diaphragm comprising a magnetic plate and pliable, non-resilient supporting means at the edges of the magnetic plate, and

means for alternately applying power to said opposite groupings of electromagnets to produce sound waves by movement of the diaphragm suspended therebetween.

5. An electromagnetic speaker comprising two spaced, substantially parallel walls each having a plurality of openings therein, opposite groupings of electromagnets mounted on said walls, an outer rim attached to the walls, a diaphragm comprising a pliable, non-resilient suspension ring attached at its outer edge to said outer rim, and a magnetic plate suspended between said opposite groupings of electromagnets and connected at its outer edge to the inner edge of said suspension ring.

6. An electromagnetic speaker comprising two spaced, substantially parallel walls each having a plurality of openings therein, opposite groupings of electromagnets mounted on said walls, an outer rim attached to the walls, a diaphragm comprising a pliable, non-resilient suspension ring attached at its outer edge to said outer rim, a magnetic plate suspended between said opposite groupings of electromagnets and connected at its outer edge to the inner edge of said suspension ring, and means for alternately applying power to said opposite groupings of electromagnets to produce sound waves by movement of the diaphragm suspended therebetween.

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