

[54] **ELECTRET ELECTROSTATIC ELECTROACOUSTIC TRANSDUCER** 3,474,197 10/1969 Koukal..... 179/111 E
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[57] **ABSTRACT**

[52] U.S. Cl..... 179/111 E
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 [58] Field of Search 179/111 R, 111 E

An electrostatic electroacoustic push-pull type transducer wherein a vibrating film is not connected to any signal terminal. One terminal of a step-up transformer is connected to one fixed electrode, and the other terminal of the transformer is connected to another fixed electrode.

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4 Claims, 2 Drawing Figures

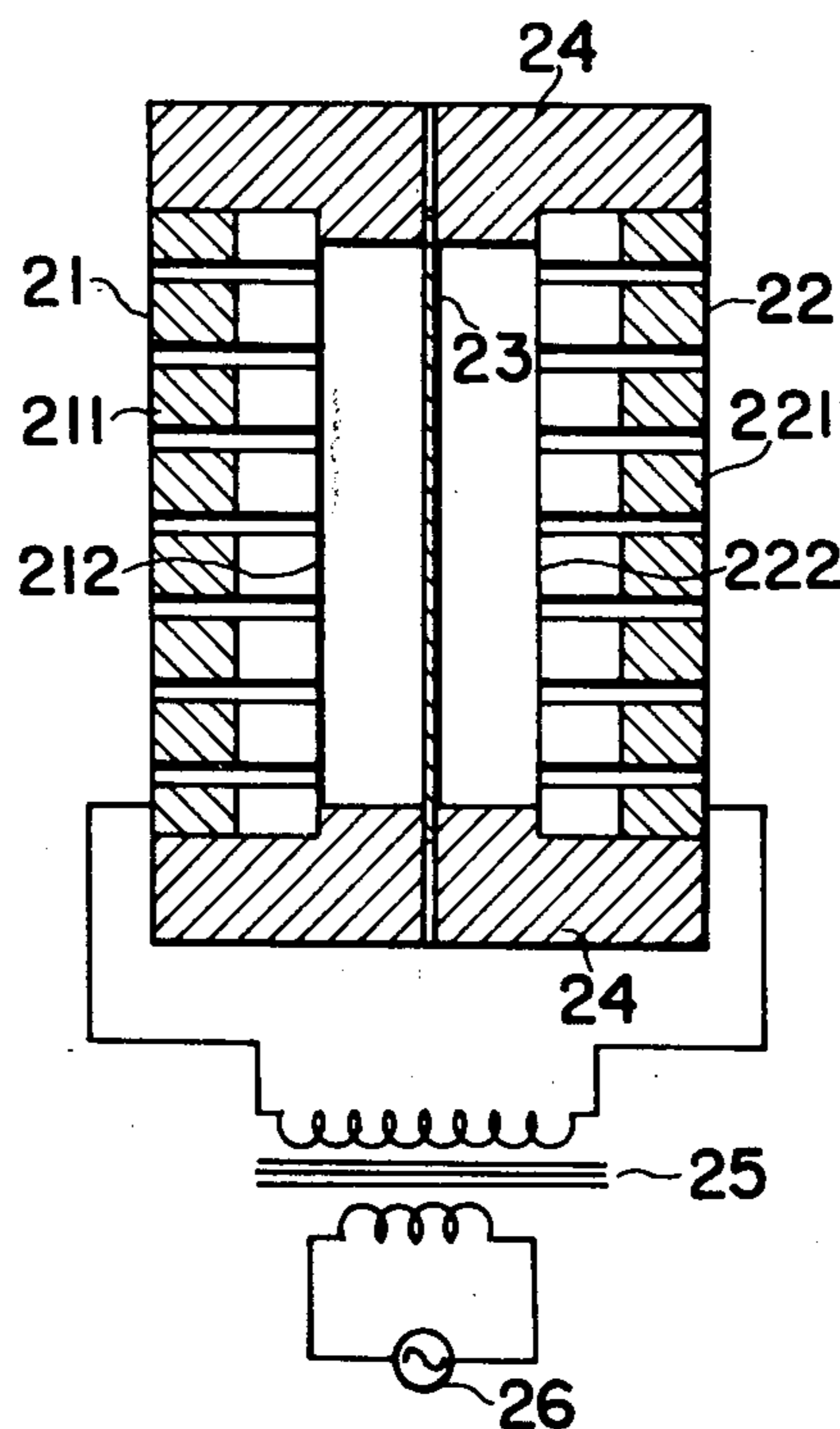


FIG. 1

PRIOR ART

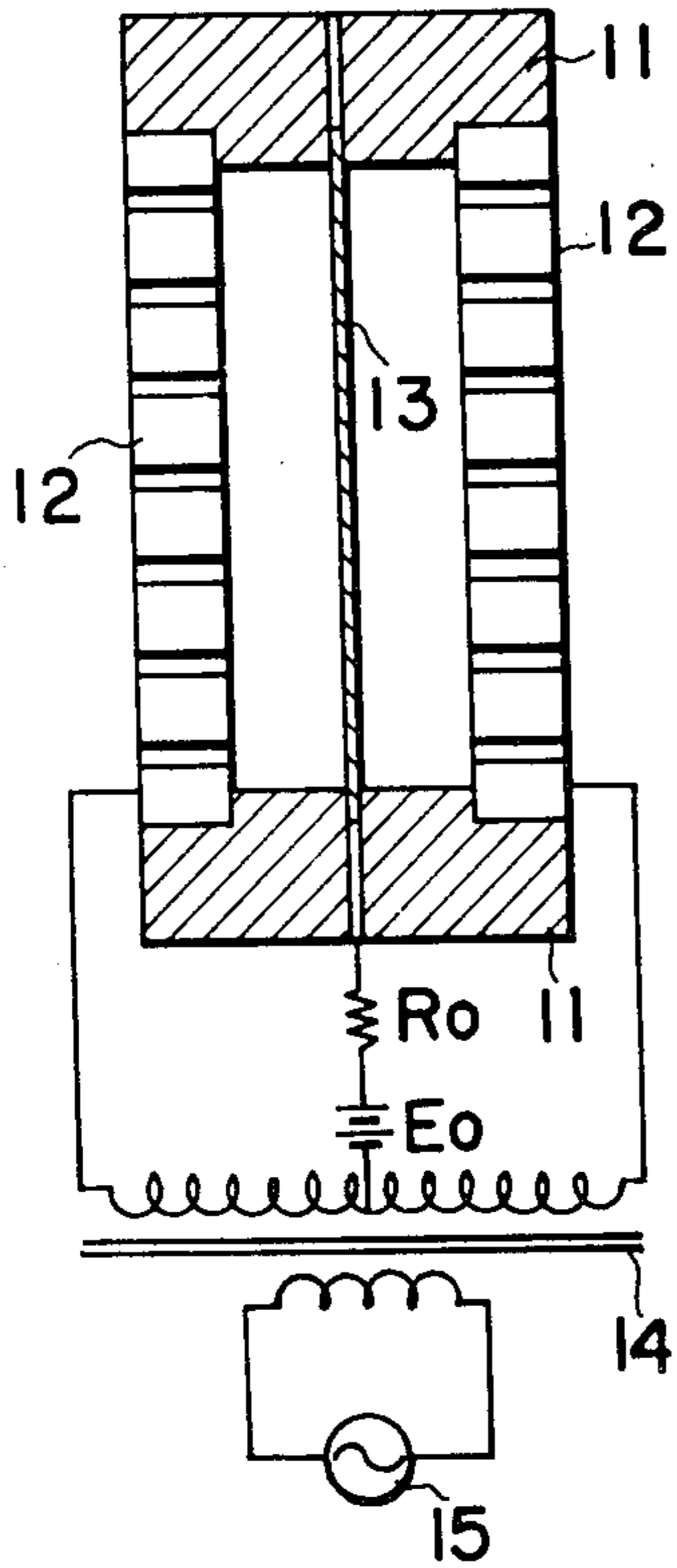
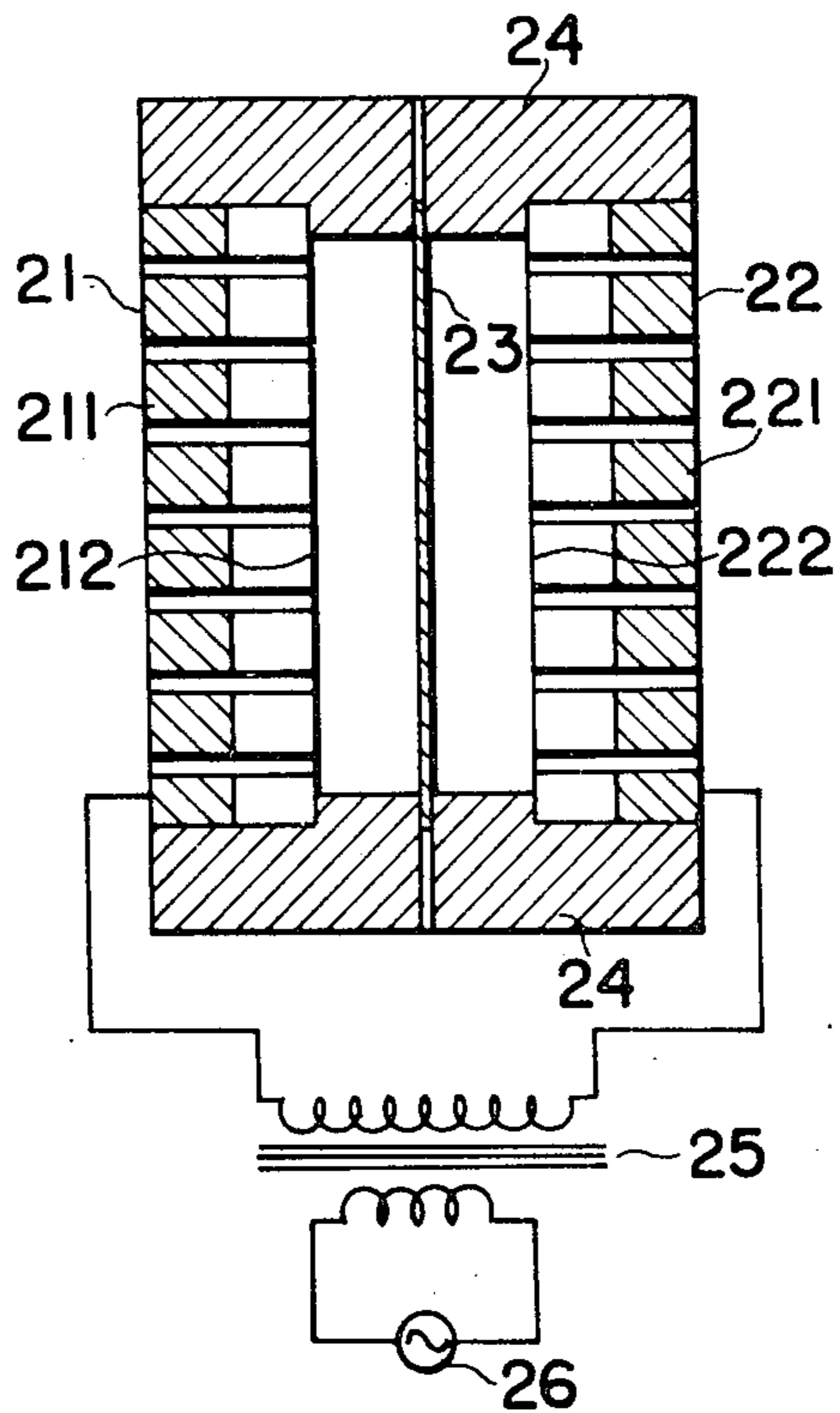


FIG. 2



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ELECTRET ELECTROSTATIC ELECTROACOUSTIC TRANSDUCER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to an electrostatic electroacoustic transducer, and more particularly to a novel and improved push-pull type transducer using an electret.

2. Description of the Prior Art

Prior art push-pull electrostatic electroacoustic transducers, such as a speaker, generally comprise a vibrating film, two electrodes and a holding member which holds the vibrating film between the two electrodes. A polarization voltage is applied to the film and a potential is applied across the electrodes through a step-up transformer.

The prior art devices have many disadvantages. First, the polarization voltage E_0 is large and therefore a larger conductor for the polarizing voltage is required. Second, the step-up transformer must be provided with a center tap to boost and divide an input signal and to place opposing potentials on the fixed electrodes. Third, a vibrating film must be connected to the center tap of the step-up transformer.

SUMMARY OF THE INVENTION

It is therefore the primary object of this invention to provide a novel and improved electrostatic electroacoustic transducer in which above mentioned defects are overcome.

It is a further object of this invention to provide an electrostatic electroacoustic transducer, using an electret, which is simple in construction and inexpensive to produce.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional plan view of a prior art push-pull electrostatic electroacoustic transducer showing its principle.

FIG. 2 is a sectional plan view of a push-pull electrostatic electroacoustic transducer of the preferred embodiment of the present invention.

Prior art push-pull type electrostatic electroacoustic transducers are constructed as shown in FIG. 1. A holding member 11, made of an insulating material, holds two fixed electrodes 12. A vibrating film 13 is positioned between the electrodes. Fixed electrodes 12 have many holes which pass the acoustic radiation. A polarization voltage E_0 is applied across the vibrating film 13 and each fixed electrode through a step-up transformer 14 and a resistor R_0 . The primary winding of the step-up transformer 14 is connected to a signal source 15. The potential of both fixed electrodes is supplied by an alternating signal of the signal source 15. The potential of the two fixed electrodes is opposing. That is, when one is positive, the other is negative.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 2, fixed electrodes 21 and 22 face each other. They comprise back electrodes 211 and 221, and electrets 212 and 222 which are affixed to the back electrodes. The fixed electrodes 21 and 22 have many holes which pass acoustic radiation. The potential of the facing surfaces of the two electrets is same. A vibrating film 23 is positioned between the fixed electrodes 21

and 22. The vibrating film 23 is electroconductive at least at its surface. Holding member 24 is made of an insulated material, and holds the fixed electrodes 21 and 22 and the vibrating film 23. One terminal of the secondary winding of step-up transformer 25 is connected to the fixed electrode 21, and the other terminal is connected to the fixed electrode 22. A signal source 26 is connected to the primary winding of step-up transformer 25.

In operation, when facing surfaces of electrets 212 and 222 are positive, both surfaces of the vibrating film 23 are negative. The vibrating film 23 assumes a negative charge because it has an electroconductive surface and is positioned between the two positively charged electrets. When an alternating signal from signal source 26 is stepped-up by transformer 25 and applied to the fixed electrodes 21 and 22, the positive potential of one electret, for example electret 212, is increased and that of the other electret is decreased during a half cycle of the signal. Thereby, the vibrating film 23 is biased toward the electret 212. Then during next half cycle of the signal, the vibrating film 23 is biased toward the other electret 222. This process is cyclicly repeated, vibrating film 23. As can be seen, the vibrating film 23 is not connected electrically to the electrets.

The present invention, as described hereinabove, gives many improvements over prior art devices. First, the vibrating film is not connected electrically, therefore the construction becomes simple and poor connections will not occur. Second, a polarization source and the center tap of the step-up transformer is unnecessary, therefore the transducer may be small in size, light in weight and inexpensive to produce.

While the invention has been particularly shown and described with reference to the preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

We claim:

1. An electrostatic electroacoustic transducer comprising first and second electrets positioned to face each other, said electrets having identical potentials on their facing surfaces, first and second back electrodes affixed to said first and second electrets, a vibrating film positioned between said electrets, said film being electroconductive on its surface, and a signal source wherein one terminal of said source is connected to said first back electrode and the other terminal is connected to said second back electrode.

2. An electrostatic electroacoustic transducer is set forth in claim 1, further comprising a holding means for holding said electrets, said back electrodes and said vibrating film.

3. An electrostatic electroacoustic transducer comprising first and second electrets positioned to face each other, said electrets being identically charged on facing surfaces, first and second back electrodes affixed to said first and second electrets, a vibrating film positioned between said electrets, said film being electroconductive on its surface, a step-up transformer having a primary and secondary winding wherein one terminal of the secondary winding is connected to said first back electrode and the other terminal of said secondary winding is connected to said second back electrode, and a signal source connected to said primary winding of said step-up transformer.

4. An electrostatic electroacoustic transducer as set forth in claim 3, further comprising a holding means for holding said electrets, said back electrodes and said vibrating film.

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