June 5, 1923.

1,457,619

S. COHEN

AUDIOFREQUENCY COUPLING TRANSFORMER

Filed May 12, 1921

FIG. 3

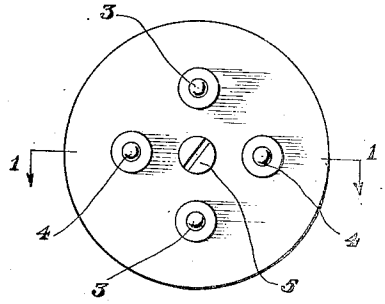


FIG. 2

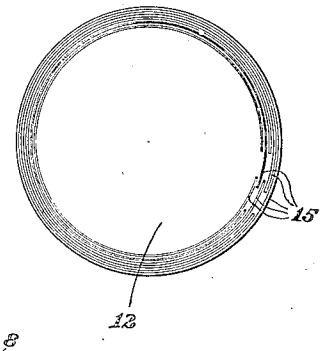
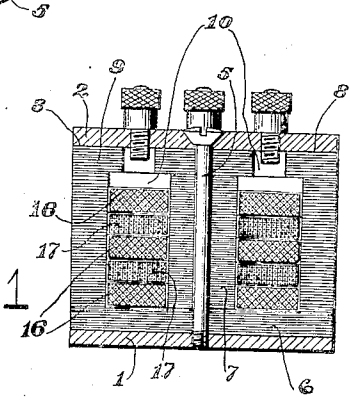
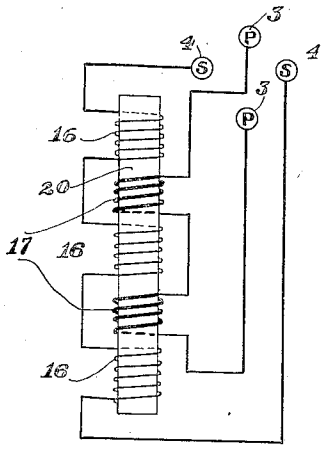


FIG. 1





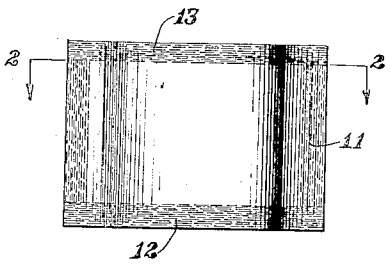


FIG. 5

FIG. 4

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UNITED STATES PATENT OFFICE.

SAMUEL COHEN, OF BROOKLYN, NEW YORK.

AUDIOFREQUENCY COUPLING TRANSFORMER.

Application filed May 12, 1921. Serial No. 468,993.

To all whom it may concern:

Be it known that I, SAMUEL COHEN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Audiofrequency Coupling Transformers, of which the following is a specification.

The main object of this invention is to provide an efficient audio-frequency transformer of superior utility and applicability to transformers similarly used in radio electrical arts.

The essential points in obtaining an efficient audio-frequency coupling transformer are, briefly, the following: the ratio of the reactance to the resistance should be a maximum; the ratio of number of turns in the primary winding to the number of turns in the secondary winding, should be a maximum; the degree of coupling between the primary and secondary windings should be a maximum; the leakage reactance of the core and windings should be a minimum; no external magnetic field should exist when the transformer is in operation in order to prevent stray fields from producing coupling between transformers and neighboring electrical apparatus and thereby preventing the generation of electromotive forces of audio-frequency; the coupling transformer in toto should have minimum physical dimensions.

It is the aim of this invention to accomplish the above-mentioned design and arrangement in a practical manner and yet approaching theoretical perfection as near as possible.

Referring briefly to the accompanying drawings, Fig. 1 is a central longitudinal cross-sectional view in elevation of my transformer, taken on the line 1—1 of Fig. 3.

Fig. 2 is a view taken on the line 2—2 of Fig. 5, illustrating a modified form of core, enlarged.

Fig. 3 is a plan view of my transformer.

Fig. 4 is an electrical wiring diagram of my transformer.

Fig. 5 is an elevational view of the aforementioned modified form of core, enlarged.

Referring now in detail to the drawings, the numeral 1 represents the base of my transformer, being composed of suitable insulating material. The top member 2, composed of similar material, is provided with central passage adapted to receive the crew 5, and with four equidistant additional passages adapted to receive the primary and secondary binding posts 3 and 4, respectively.

Upon the base 1 lies the lower core member 6 composed of a number of disks of soft sheet iron, and concentric with said member 6, and resting thereon, is the central core member 7, also composed of sheet iron disks. An outer core member 8, composed of a number of flat ring-like parts or laminations, rests upon the lower member 6, leaving an annular space concentric with the member 7 between said member 7 and the outer member 8. In this space are placed the windings, after the fashion shown, there being two primary coils 17 and three secondary coils 16, alternately mounted upon the lower core member 6. The upper core member 9 is similarly composed of a number of sheet iron disks, resting upon the outer member 8 and the central member 7, and being provided with four passages for the binding posts 3 and 4, as well as an additional passage for the screw 5. This screw 5 passes also thru the central member 7 and the base member 6, binding the entire device into a compact, rigid unit.

It is apparent that the arrangement of the coils as shown will assure good coupling; the core enclosing the entire device will practically nullify the effect of stray fields; the laminations as arranged will minimize eddy currents.

The wiring diagram of Fig. 4 indicates the manner of connecting the coils, the entire core being represented by the numeral 20.

In Figs. 2 and 5 I have illustrated a modified form of core per se, so constructed as to further reduce eddy current core losses. This consists of upper and lower core members 13 and 12, respectively, composed of disks of sheet iron, surrounded by cylindrical shell-like laminations 11. The individual laminations 11 are open, and the ends 15 thereof are arranged in staggered overlap relation, to prevent the circulation of eddy currents.

I claim:

1. A device of the class described comprising a substantially cylindrical hollow core composed of a plurality of laminations, a laminated base member rigid with and closing one end of said core, a central laminated member rigid with said base member and providing an annular recess between said core

and said central member, said recess being adapted to receive electrical coils, a laminated upper member rigid with the other end of said core, and passages in said upper member into said recess.

2. A device of the class described comprising a substantially cylindrical hollow core composed of a plurality of laminations, a laminated base member rigid with and closing one end of said core, a central laminated member rigid with said base member and providing an annular recess between said core and said central member, electrical coils mounted within said recess, a laminated upper member rigid with said core at the other end thereof, passages thru said upper member communicating with said recess, and means for binding said device in a single unit.

In witness whereof I affix my signature.

SAMUEL COHEN.