March 15, 1949. S. DI VITA ET AL 2,464,218

TRANSFORMER

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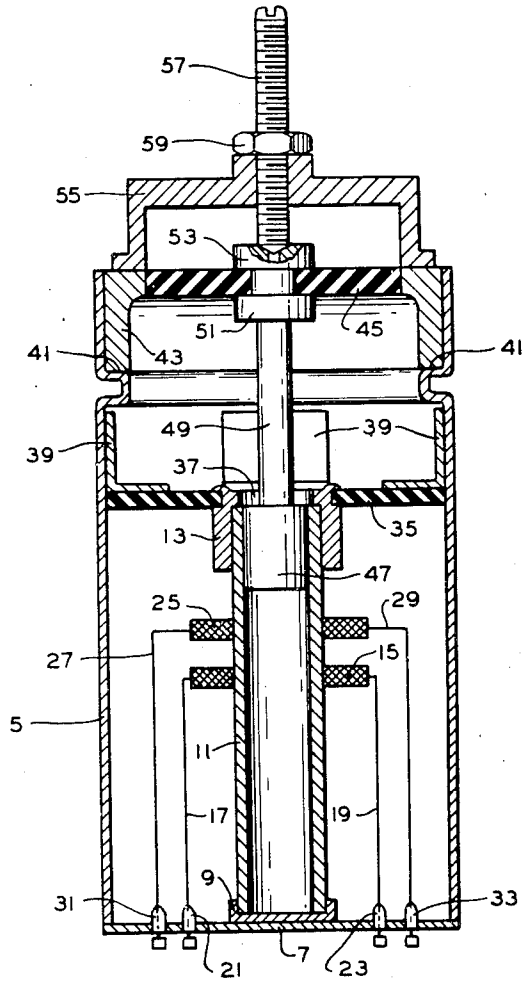


FIG. 1.

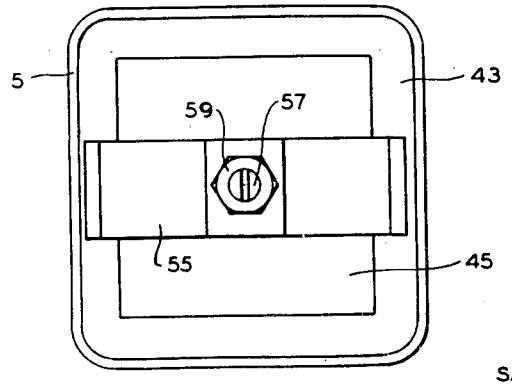


FIG. 2.

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TRANSFORMER

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2 Claims. (Cl. 171—777)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

This invention relates to transformers.

An object of the invention is to provide a completely sealed, air and moisture proof transformer, comprising a core which is adjustable from outside the transformer. Such transformers are desirable, particularly as intermediate frequency transformers adapted to align the frequency in superheterodyne circuits, especially when used in damp climates, where moisture causes such deterioration as to diminish the sensitivity, the selectivity and the gain per stage.

The invention comprises an airtight casing, transformer coils, and an adjustable core within the casing, means extending outside the casing for moving the core, and a resilient diaphragm forming part of the casing, and adapted to allow movement of the core in one direction and to retract it in the opposite direction.

The drawings illustrates one form of the invention, and in these:

Figure 1 shows a transformer, certain parts being in section and other parts in elevation; and

Figure 2 is a plan view of the transformer shown in section in Figure 1.

Referring to the drawing for a more detailed description thereof, the numeral 5 indicates the lateral walls of an airtight casing which has a square cross section with corners rounded, as shown in Figure 2. The lower end 7 of the casing centrally supports a collar 9 secured to its inner surface. Said collar retains the lower end of an insulating tube or coil form 11, the upper end of which is held in a collar 13.

The primary intermediate frequency coil 15, mounted on the tube 11, has leads 17 and 19 brought out through the lower end 7 of the casing by means of metal-to-glass seals 21 and 23 respectively. The secondary coil 25, also mounted on the form or tube 11, is shown as having leads 27 and 29 which are brought out through the lower end 7 of the casing by means of metal to glass seals 31 and 33 respectively.

The mentioned collar 13, which retains the upper end of the coil frame 11, is bonded to a transverse plate 35 which has a central aperture 37. The plate 35 is held in place by angle irons 39 welded thereto and to the walls 5 of the casing. The walls just mentioned are constricted, above the angle irons, to provide an interior ledge or seat 41, to support a frame 43 which

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is bonded airtight to the inner surfaces of the walls 5 of the casing.

A rubber diaphragm 45 is also bonded airtight, at its perimeter, to the frame 43, and supports the transformer powdered iron core 47, which is disposed, and adapted to be moved, in the coil form 11. Said core, which is preferably of compressed magnetic powder, is secured to the lower end of a rod 49. This rod is attached at its upper end to a pair of spaced collars 51 and 53 which are bonded to, and contact, the diaphragm 45 in airtight relation.

A bracket 55 is welded onto the upper surface of the frame 43 and functions to support a screw 57 which is in threaded engagement therewith. The screw is conically pointed at its lower end to fit into a countersink formed on the mentioned upper collar 53. Turning of the screw 57 in one direction moves the core 47 downwardly, the diaphragm yielding to such movement. Movement of the screw in the opposite direction allows the distorted diaphragm to exert a retracting force on the core. Movement of the core obviously changes the inductance of the transformer coils 15 and 25 whereby the desired tuning is effected. A locking nut 59 threadedly engages the screw 57 and is tightened down against the bracket 55 to prevent accidental movement of the screw and, therefore, of the core, after the latter has been adjusted.

What is claimed is:

1. In a transformer, an outer casing comprising side walls and an end wall, a partition within said casing connected to said side walls intermediate the length thereof and extending transversely thereof, said partition being formed with a central opening, an insulating tube extending inside said casing from the end wall to the partition and being formed with an opening aligned with the central partition opening so as to be accessible from the other side of the partition, primary and secondary coils mounted on said tube and having leads extending through the end wall of said casing, a narrow annular member secured to the inside of the side walls of the casing adjacent the open end thereof, a resilient non-metallic diaphragm attached to said annular member and extending transversely of said casing to form a seal for the open end of the casing, an adjustable core slidably mounted within the insulating tube, a shaft having one end attached to said core and the other end attached to the diaphragm, and means outside said casing adjacent said diaphragm for moving said shaft longitudinally of the insulating tube.

2. In a transformer, an outer casing comprising side walls and an end wall, the other end wall of said casing being defined substantially by a resilient non-metallic diaphragm, a transverse partition within said casing defining first and second chambers, said partition being formed with a central opening, transformer coils mounted within the first chamber about an insulating tube, a core slidable within said tube, a shaft connected to said core and extending through said partition opening into the second chamber, the other end of said shaft being connected to said diaphragm, and means positioned outside of said casing adjacent said diaphragm for moving said shaft lengthwise of said insulating tube.

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