June 4, 1963 HISAO MAEDA 3,092,796

INTERMEDIATE FREQUENCY TRANSFORMER

Filed May 4, 1960

Fig. 1.

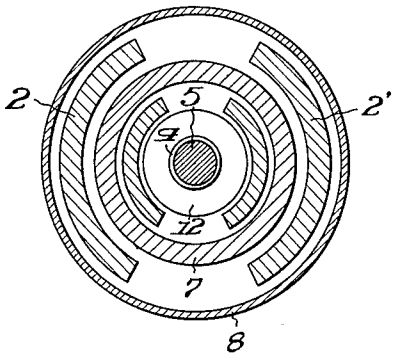


Fig. 2.

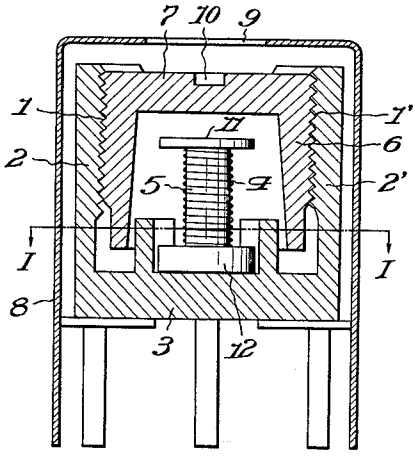


Fig. 3.

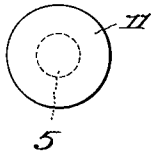
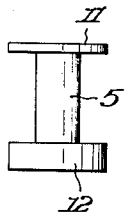


Fig. 4.



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INTERMEDIATE FREQUENCY TRANSFORMER

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1 Claim. (Cl. 336—135)

This invention relates to an intermediate frequency transformer of improved construction.

It is an object of this invention to provide a new and improved, intermediate frequency transformer whose inductance can be varied over a wide range and set in simple manner.

It is another object of this invention to provide an intermediate frequency transformer as stated above, of simple and compact, yet strong construction.

The manner in which the foregoing as well as other objects and advantages may best be achieved will be understood more fully from a consideration of the following description of one embodiment of the invention, taken in conjunction with the accompanying drawing in which:

FIG. 1 is a plan view, in section, taken along the line I—I in FIG. 2, showing the construction of the embodiment of this invention;

FIG. 2 is an elevational view, in section, showing the construction of the embodiment of FIG. 1;

FIGS. 3 and 4 are, respectively, a plan view and an elevational view of the high-frequency magnetic core used in the embodiment of FIG. 1.

Referring to the drawing, the principal structural member of the intermediate frequency transformer of this invention is a base 3 made from an electrical insulation substance, such as phenol resin, on which vertical support columns 2, 2′ are rigidly fixed. The inner surfaces of said columns 2, 2′ are arcuate in the plan view, lying on the same circle in diametrically opposed juxtaposition, and have female screw threads 1, 1′ on their inner surfaces. A spool-shaped, high-frequency magnetic core 5 about which is wound a coil 4 is disposed centrally on the said base 3 and is covered by a high-frequency magnetic cylinder 7, which has male screw threads 6 on the upper portion of its outer periphery, and which is screwed in and between the support columns 2, 2′ by engagement of the screw threads 6 into the screw threads 1, 1′. A shield can 8 is adapted to enclose the aforedescribed main structural members 3 and 2, 2′. Said shield can 8 has, on its top surface, a through opening 9, through which such a tool as a screwdriver can be introduced and inserted into a slot 10 provided on the top of the aforesaid magnetic cylinder 7 to turn the said magnetic cylinder 7, thereby raising or lowering it and varying the inductance of the coil 4.

It is a unique feature of the invention that the upper flange 11 of the spool-shaped, high-frequency magnetic core 5 is made thinner than the lower flange 12. By the use of this configuration, it is possible to provide a transformer of a greater range of variable inductance than that possible with the use of a core having flanges of equal thickness. The reason for this may be explained as follows:

In an intermediate-frequency transformer of the above construction, when the high-frequency magnetic cylinder 7 is separated to an extreme distance away from the high-frequency magnetic core 5, the inductance of the coil wound on the core 5, if the said core has upper and lower flanges of the same thickness, will be higher than it would be if the said core, although having the same number of turns as in the first cases, were to have an upper flange of less thickness than the lower flange. On the other hand, when the magnetic cylinder 7 is adjusted to be flush against the magnetic core 5, the inductances of the above two configurations are almost equal, and each is greater than its respective value for the case of a remotely-separated cylinder 7. It will be apparent, therefore, that the said core having an upper flange which is thinner than the lower flange has a wider range of variable inductance than the core having flanges of equal thickness.

Since it is obvious that many changes and modifications can be made in the above described details without departing from the nature and spirit of the invention, it is to be understood that the invention is not to be limited to the details described herein except as set forth in the appended claim.

I claim:

An intermediate high-frequency transformer comprising, in combination, a base made of an insulating material; two vertical support columns rigidly disposed on said base having arcuate inner surfaces lying in the same circle in diametrically opposed juxtaposition and having female screw threads on said inner surfaces; a spool-shaped magnetic core disposed concentrically inside said support columns; a lower flange at the bottom of said core fastened to said base; an upper flange on top of said core; said upper flange being substantially thinner than said lower flange; a coil wound about said core; a high-frequency magnetic cylinder having male outer screw threads and being screwed thereby to the female screw threads of said support columns, thereby adapted to be raised and lowered and enveloping in the manner of a canopy said core; means for raising and lowering said cylinder; and an outer shield enclosing the entire structure except for an opening on top and substantially in the center, to allow access to said means for raising and lowering said cylinder.

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