

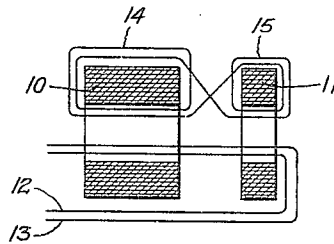
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ELECTRIC TRANSFORMER

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UNITED STATES PATENT OFFICE

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ELECTRIC TRANSFORMER

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My invention relates to electric transformers. In the construction of magnetic cores for transformers, particularly for instrument or current transformers, a core is often desired which has a permeability entirely different from that of any available magnetic material but which may be between that of some suitable material having a lower permeability than another suitable material having a higher permeability.

Magnetic cores having a desired permeability have sometimes been obtained by forming the core in sections having different permeabilities. If these sections are arranged to form parallel magnetic paths, the section having the higher permeability tends to carry nearly all the magnetic flux so that the core will have a very high permeability until this section is saturated, after which the material having the lower permeability carries the greater part of the additional flux. Thus the resultant permeability curve of the composite core will not be a smooth curve between the permeability curves of its separate sections. On the other hand, if the two materials are arranged so as to be magnetically in series, the magnetic flux will flow through the two materials in series and a fairly smooth permeability curve may result. The disadvantage of the latter arrangement, however, is that if a number of cores of different permeability are desired the sections of which the cores are formed would have different shapes so that they could not be produced as economically as if they were all alike.

The general object of the present invention is to produce an improved transformer having a core formed in sections of different permeabilities but having means for controlling the distribution of the magnetic flux so as to give a desired smooth permeability curve. An advantage of the invention is that similar sheet metal punchings may be used to form a core having any desired permeability curve between those of the two materials used in the punchings.

The invention will be better understood from the following description taken in connection with the accompanying drawing which shows a diagrammatic, cross sectional

view of a current transformer constructed in accordance with the invention.

As shown in the drawing, the current transformer includes a magnetic core formed in two sections 10 and 11. These core sections are preferably spaced a short distance apart and are arranged about a common axis. A primary winding 12 and a secondary winding 13 surround both sections of the core in the usual manner. An auxiliary winding has a section 14 on the core section 10 and a section 15 on the core section 11. The auxiliary winding sections 14 and 15 are connected in opposing series relation so that the voltages of these two sections induced by the primary winding 12 will be in opposition. The relative number of turns in the auxiliary winding sections 14 and 15 are such as to produce the desired distribution of magnetic flux between the two core sections 10 and 11. If the numbers of turns in the two sections of the auxiliary winding are equal, then the two core sections will carry substantially the same magnetic flux, since any difference in flux will produce a higher voltage in one of the auxiliary winding sections than in the other and this would produce a current in the auxiliary winding which would tend to reduce the greater flux and increase the smaller flux. Likewise, if the numbers of turns in the two auxiliary winding sections are not equal, then the magnetic flux carried by the two core sections will be substantially universally proportional to the number of turns in the respective sections of the auxiliary winding.

By properly relating the cross sections of the two core sections and the number of turns in the two auxiliary winding sections a magnetic core of any desired permeability may be very easily produced.

The invention has been explained by describing and illustrating a specific transformer construction but it will be obvious that changes may be made without departing from the spirit of the invention and the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. An electric transformer including a magnetic core formed in two sections of dif-

ferent magnetic permeabilities, primary and secondary windings on said core, and an auxiliary winding arranged in said core to produce a predetermined distribution of magnetic flux between said two core sections.

2. An electric transformer including a magnetic core formed in two sections of different magnetic permeabilities, primary and secondary windings on said core, and an auxiliary winding arranged with a section thereof on each core section, the voltages produced by the primary winding in said two auxiliary winding sections being in opposition.

3. An electric transformer including a magnetic core formed in two sections arranged about a common axis, said two core sections having different permeabilities, primary and secondary windings on said core, and an auxiliary winding arranged with a section thereof on each core section, the sections of the auxiliary winding being connected in series and with their voltages produced by the primary winding in opposition, and the numbers of turns in said auxiliary winding sections producing a predetermined distribution of magnetic flux between said two core sections.

In witness whereof, I have hereunto set my hand.

CHARLES GILBERT MAYO.