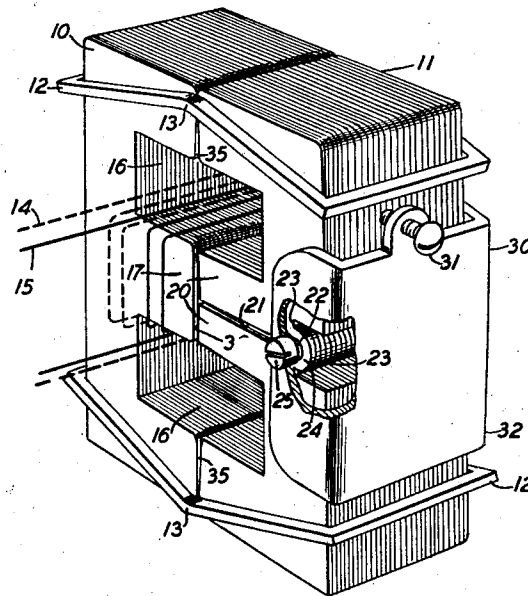


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INDUCTANCE DEVICE
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INDUCTANCE DEVICE

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This present invention relates to inductance devices such as transformers or the like and relates more particularly to means for readily or precisely adjusting the inductance or magnetic reluctance characteristics of such devices.

An object of the invention is to permit ready or precise adjustment of an inductance device.

A feature of the invention consists in a yoke member for flexing the core member of an inductance device to vary an air-gap and thereby vary magnetic reluctance of the core structure.

Other objects and features of this invention will be apparent from a consideration of the following specification in connection with the accompanying drawing in which the single figure is a perspective showing of a transformer made according to this present invention.

Heretofore in the art of inductance devices it has been the custom to test a fully assembled inductance device such as a transformer to find if the completed device has suitable magnetic characteristics. If the magnetic characteristics are out of the allowable range, it has been usual to employ cut and try methods to correct the inductance or magnetic reluctance characteristics of the device. For example, the finished transformer has been disassembled and shims inserted between parts of the core members followed by reassembly for test. This process is repeated until the value of the magnetic reluctance or inductance of the finished device is within the allowable range of values. According to this invention the core is fully assembled in completed form and during the first test can be readily adjusted to a proper magnetic value with precision. A yoke member is assembled in connection with the core to bend one of the components of the core to vary an air-gap, giving an adjustment. It is quite convenient by this method to produce a change in the magnetic characteristics of as great as fifty per cent.

Referring to the drawing, one-half of the transformer core consists of E-shaped laminations of magnetic material such as iron, iron alloy or the like assembled and riveted together as a block 10. Complementary to this block 10 of E-shaped laminations is a similar block 11 of laminations of magnetic material forming the E-section arranged opposite to block 10 for the completion of the transformer core. These two halves of the transformer core are forced together under tension by transversely deformed rectangular loops of non-magnetic or of magnetic material seen as open frames 12 which

are assembled in place by being first partially straightened where flexed at the point 13 near their centers to slide these frames over the assembled transformer core. These frames are then allowed to restore as much as possible to their formerly bent condition to draw the complementary halves of the transformer core together with force. Primary and secondary windings 14 and 15 are arranged in the spaces of window 16 formed between the legs of the blocks of E laminations, the coils having been slipped into place prior to the assembly of the complementary E-shaped blocks to form the core and the mounting of the tensioning deformed frame member 12. The center leg 17 of the block 10 has the normal construction shown in the prior art.

The center leg 20 of the complementary block E-shaped laminations is slotted as at 21 as with an ordinary saw cut ending in a bored hole 22 parallel to the back of core block 11. The core member 11 has its back slotted inwardly as at 23 in a manner to form between the bored hole 22 and the back slot 23 a relatively thin bridge 24 curved around the perforation 22, the bridge serving to hold in place a pin or bolt 25. A yoke member 30 shaped from a steel channel in suitable length and proportion is perforated in each of its leg members for the passage of the bolt or pin 25 and one of the leg members may be suitably threaded to retain the member 25 in position. An adjusting wedgelike or screw member 31 which may be an ordinary machine bolt or stud is controlled to exert varying pressure against the back of the block 11 as when turned by a screw-driver. This pressure exerted by the screw member 31 at one extremity of the channel member forces the inner edge of the opposite extremity of the channel 30 against a line across the back of the block 11 to flex the block 11 in its bridge section 24 by pulling outwardly on the bolt member 25 against the bridge 24 and closing the gap or saw cut 21, as is shown adjacent the center of the transformer structure. The outer legs of the E-shaped lamination forming the block 11 pull away at their inner edges as shown at 35, from the complementary laminations in the block 10 adjacent the windows 16. The outer edges of the complementary blocks forming the completed core are, however, held together under the tension of the frame members 12. This withdrawal of the center leg 20 in the block 11 in a variable degree from the juxtaposed center leg 17 of the block 20 forms a precisely variable air-gap

to fix or vary the reluctance in the parallel magnetic paths through the center legs of the blocks 10 and 11. Operation of the screw member 31 to deform the block of laminations 11 results, as noted, in slightly closing together the saw cut 21 with increasing changes. This movement of closing the saw cut 21 is not objectionable as interfering with the magnetic characteristic of the structure or with the precision of adjustment. The operation of the adjusting screw 31 having a relatively fine thread makes possible the precise adjustment of a desired value of magnetic inductance or reluctance in a finished core structure.

The operation of the yoke member 30 is that of a second class lever. The inner extremity of the screw member 31 is set with force against the back of the core block 11. This force brings the inner edge of the other extremity of the channel 30 against the back of the block 11. Further pressure due to forcing-in of the screw member 31 pulls outwardly on the bolt or pin 25 flexing the thin curved bridge 24 and pulling the center leg 20 increasingly from the juxtaposed leg 17 forming or increasing the air-gap 36.

What is claimed is:

1. A magnetic core comprised of two similar E-shaped structures with their legs in juxtaposition and providing two closed magnetic paths having a common path in the center leg of the E sections, one E section being slotted in its center leg to subdivide the path, and means for bending the slotted E-shaped member to form an air-gap between the center leg of the complementary E sections forming the completed core.

2. A magnetic core member comprised of two similar E-shaped magnetic structures with their legs in juxtaposition, one set of E sections being slotted to reduce the resistance to bending, and means to bend the slotted E-shaped member to form an air-gap of suitable thickness between the juxtaposed center legs of the complementary E sections, the bending means including a yoke fastening means secured to the center of the slotted E-shaped core and means adjacent an extremity of the yoke to exert variable force against the center fastening means to variably flex the slotted E-shaped member and thereby vary the magnetic reluctance of both magnetic paths simultaneously.

3. A magnetic core member for inductances, transformers or the like comprising complementary or E-shaped laminated core members with their legs in juxtaposition and providing two closed magnetic paths having a common path in the center leg of the E members, one set of E members being slotted in the center leg to subdivide the path and to lower the resistance of the member to bending around a line in the center transversely of the member, a yoke member secured to the center of the slotted E-shaped member, and means adjacent an extremity of the yoke member away from the back of the E-shaped member and to force the other extremity of the yoke-shaped member against the

back of the E-shaped member along an inner edge of the yoke to pull outwardly on the E-shaped core member at its center to bend the E-shaped member around a line through its center and to vary the distance between the juxtaposed center legs of the core members to vary the reluctance in the respective magnetic circuits.

4. A magnetic structure, according to claim 3, in which the yoke member is of channel form with outwardly extending legs perforated for the passage of a pin forming the means securing it to the E-shaped member, the center of the slotted E-shaped member being similarly perforated for the passage of the pin through the yoke and through the E-shaped magnetic member, a pin member passing through the yoke and the slotted member holding the yoke astride of the E-shaped member, the means for flexing the E-shaped member about a line parallel to the fastening means between the yoke and the E-shaped member consisting of a screw member for varying the bending force exerted between the screw member and the opposite extremity of the yoke member.

5. A magnetic core for inductances, transformers or the like formed of two complementary E-shaped laminated core members to form two closed magnetic paths through the extending legs arranged in juxtaposition, means for holding the outer legs in contact with one another, a slot formation transversely of the core member in the center leg of one of the E-shaped members to reduce resistance of the member to bending, a perforation through the member at the inner end of the slot, a slot across the back of the member parallel to the perforations, a channel-shaped yoke member astride the back of the slotted E-shaped member, a pin passing through the legs of the channel and through the perforation in the E-shaped member to hold the yoke rigidly on the E-shaped member, and means to force the opposite edges of the yoke member against the back of the slotted E-shaped member to flex the E-shaped member around the pin to vary the magnetic characteristics of the completed magnetic core.

6. A magnetic core member of two E-shaped magnetic structures held with their extending legs in opposition to one another, the center leg of each structure being integral with the remainder of the magnetic structure, means for holding the opposed outer legs firmly in contact with each other and means for varying the position of one center leg with respect to the opposed center leg to produce an adjustable gap between said center legs while still maintaining contact between said outer legs.

7. An inductance device with two complementary core members with complementary leg portions in juxtaposition, one of said leg portions being slotted lengthwise, and means for bending the slotted member to form a gap between the slotted leg and the opposed leg of the other member.

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