

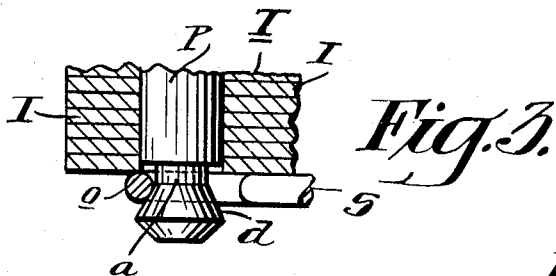
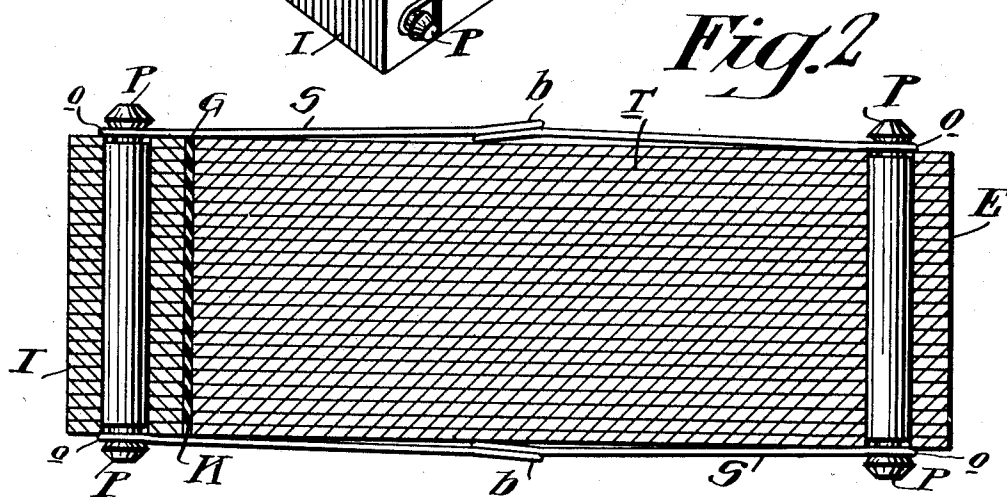
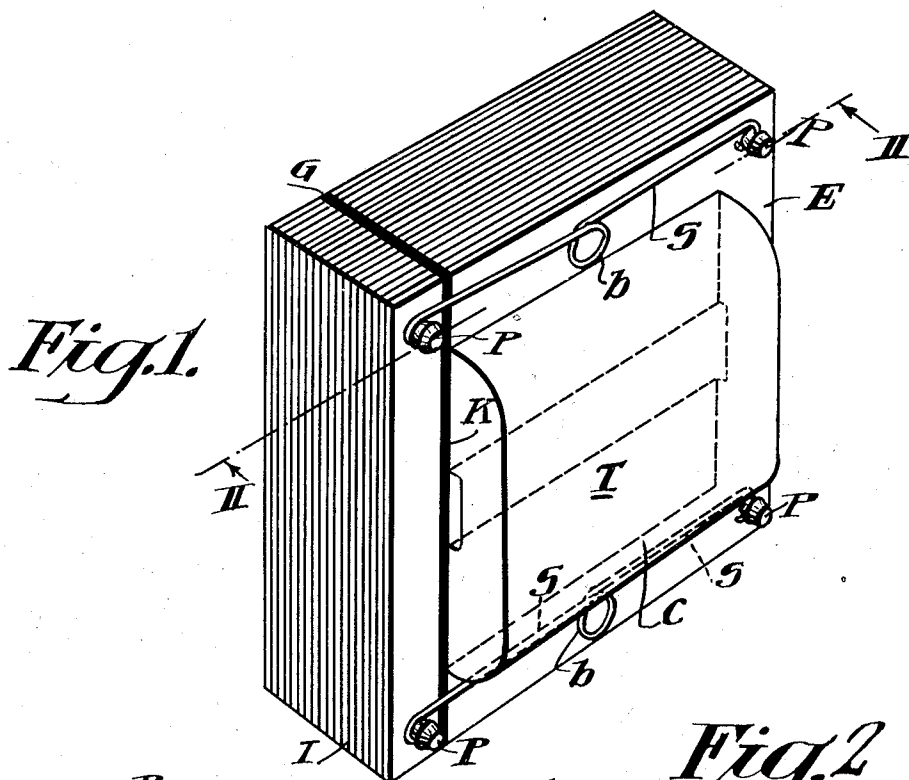
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SPLIT CORE TRANSFORMER

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SPLIT CORE TRANSFORMER

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3 Claims. (Cl. 175—356)

This invention relates to electromagnetic inductive devices and particularly to improvements in so-called "split core" transformers and reactors.

The dimensions of the air gap between the junction points of the lamellar core sections in split core transformers and analogous devices are usually chosen with a careful regard to the impedance characteristic desired and it is therefore desirable that these dimensions be accurately set up in mass production and thereafter maintained under normal operating conditions notwithstanding the wide variations in temperature encountered during repeated busy and idle periods. This has not been achieved in the split core transformers heretofore commercially available. This may be due to the conventional practice of employing friction-type clamps for holding the separate core sections together. Usually these clamps comprise one or more rigid brass or german silver strips which span the air gap and are anchored to the separate core sections, adjacent to the ends thereof, as by means of bolts or screws which extend through the metal laminations of which the said core sections are comprised. Such clamps have a tendency to creep due to the difference in temperature coefficients of expansion of the clamp and core materials. This apparently causes a slight displacement of the insulating spacer in the air gap and permits the tar or other embedment material to enter the gap and to thus increase the magnetic reluctance and reduce the electric impedance of the transformer by inhibiting the restoration of its normal gap dimensions.

Accordingly, the principal object of the present invention is to provide an improved split core inductive device which shall exhibit very stable operating characteristics over long periods of time and one which nevertheless lends itself readily to mass production methods.

A related object of the invention is to provide an improved split core inductive device which shall incorporate means for maintaining the "air-gap" between the discrete core sections constant at normal operating temperatures and not withstanding wide differences in temperature encountered during busy and idle periods.

Another object of the invention is to provide a reliable and trouble-free clamping means for holding together the separate laminated core sections of a split core inductive device, said clamping means being further characterized by the simplicity and economy of its parts and by its ease of assembly.

The foregoing and other objects are achieved

in accordance with the invention in a split core inductive device comprising a plurality of laminated magnetic core sections by substituting resilient clamping means of special design for the friction type clamps heretofore employed for holding the separate core sections together. The clamp of the invention preferably comprises a spring member which spans the air-gap between the adjacent terminals of the core sections and is so designed, positioned and arranged that it at all times exerts a biasing force calculated to urge the terminals at the opposite sides of the gap toward each other and yet permits that degree of expansion of the core metal which is incident to the operation of the transformer at its normal operating temperature.

Certain preferred details of construction together with other objects and advantages will be apparent and the invention itself will be best understood by reference to the following specification and to the accompanying drawing, wherein:

Figure 1 is a view in perspective of an improved split core inductive device embodying the invention and incorporating a resilient clamp for maintaining the separate magnetic core sections together.

Figure 2 is a sectional view taken on the line 2—2 of Fig. 1, and Figure 3 is a fragmentary sectional view of an anchor for the spring clamp of Figs. 1 and 2.

In the embodiment of the invention which has been selected for purposes of illustration the inductive device, indicated generally by the reference character T, is composed of separate core sections made up of E-shaped and I-shaped laminar and has a preformed coil C mounted on the middle arm of the E with the I-shaped section arranged adjacent to the open side of the E.

The "air-gap" between the junction points of the E and I sections is designated G and, as in standard practice, contains a spacer K, which may be constituted, by way of example, of calendered kraft paper, of a thickness of from, say, 1/1000 to 50/1000 of an inch as determined by the electrical and magnetic characteristics desired.

Four positioning pins P which are preferably located adjacent to the corners of the device extend through aligned apertures of similar diameter in the magnetic core sections EI. These pins P each extend beyond the plane of the surface lamination and are cut away preferably with an inward taper, as indicated at d (see Fig. 3) to provide the areas a of reduced diameter which serve as binding posts for the looped ends o of the wire-like springs S. There are four of these springs S,

two on each side of the transformer, one pair at the "top" and one pair at the "bottom." Each spring S spans the air-gap G and is bowed or otherwise tensioned intermediate its ends as indicated at b so that it exerts a biasing force upon the split-core sections E and I through the paired pins P in a direction calculated to urge the said sections toward each other so that the insulating layer K is at all times subjected to a positive clamping force which prevents its displacement.

The clamps S may be composed of phosphor bronze or, more economically of steel or of a nickel steel alloy. The use of these latter materials is permissible since the springs are mere wires and do not appreciably affect the impedance of the device as would the broad clamping bands of the prior art if they were constituted of magnetic materials. The absence of screws in the clamping mechanism of the invention facilitates the assembly of the device and it will be apparent from an inspection of the drawing that the springs S may be mounted in position simply by expanding their bows b and fixing their loops o over the ends of the pins P.

From the foregoing, it will be apparent that

the present invention provides an improved means for maintaining the air gap between the discrete core sections of an inductive device, and one characterized by its ease of assembly and by the simplicity and economy of its parts.

What is claimed is:

1. A device of the character described, comprising a plurality of discrete core sections constituted of magnetic laminae and each having a rod-like member extending therethrough for maintaining its laminae in alignment, an insulating spacer between said discrete core sections, and a wire-like spring anchored adjacent to its opposite ends to said rod-like members and biased to exert a permanent clamping force upon said spacer substantially irrespective of the temperature of the ambient.

2. The invention as set forth in claim 1, and wherein said resilient member is constituted of a non-magnetic material.

3. The invention as set forth in claim 1, and wherein said resilient member comprises a steel spring of a mass sufficiently small to present a negligible magnetic path across said gap.

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