

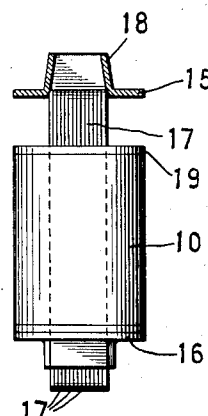
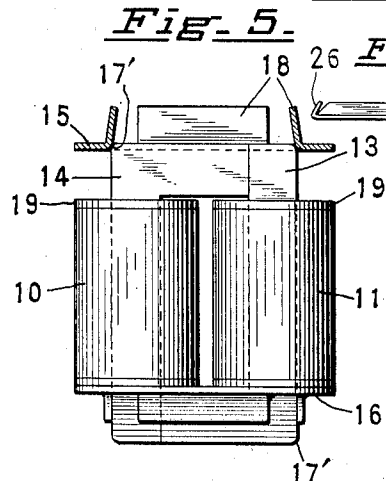
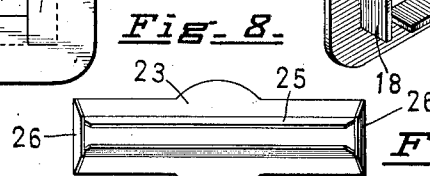
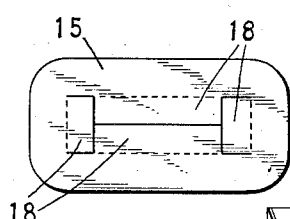
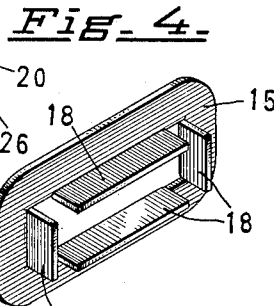
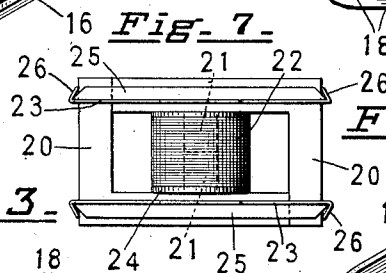
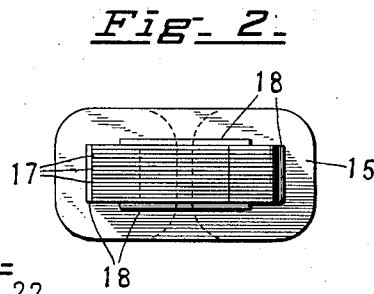
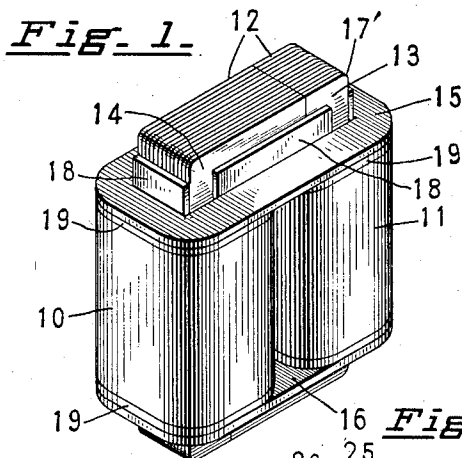
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M. ALDEN

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TRANSFORMER

Filed Dec. 14, 1926



INVENTOR
Milton Alden
BY
[Signature]
ATTORNEY

UNITED STATES PATENT OFFICE.

MILTON ALDEN, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO ALDEN MANUFACTURING COMPANY, OF SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

TRANSFORMER.

Application filed December 14, 1926. Serial No. 154,688.

My invention relates to electro-magnetic devices, such as iron-core transformers, choke coils and the like, hereinafter, for convenience, termed "transformers".

One of the chief objects of my invention is to provide a rapid and economical method of constructing transformers.

Another object is to provide a practical method of constructing iron or steel cores for electro-magnetic devices in such a manner as to reduce the magnetic reluctance of the cores.

Another object of my invention is to provide a transformer having an iron or a steel core of low reluctance.

Another object is to provide an audio frequency transformer which has a lower capacity between its primary and secondary coils and consequently gives a more uniform amplification, particularly at the higher frequencies.

The preferred form of my invention employs a primary coil and a secondary coil which are positioned on opposite sides or legs of a transformer core. This core may consist of two L-shaped laminated sections rigidly held and bound together by novel means.

Other features and details of construction will appear as the specification proceeds.

In the drawings I have illustrated my invention as embodied in one of its practical forms, with the understanding, however, that the invention is susceptible of various modifications without departure from the true spirit and scope thereof.

Fig. 1 is a perspective view of a preferred form of a transformer embodying my invention.

Fig. 2 is an end view of the same device.

Fig. 3 is a plan view of a punched, but unformed, plate or band which may be used to bind together laminated sections of the core of my transformer.

Fig. 4 is a perspective view showing the same plate or band in its final form.

Fig. 5 is a side view of my transformer with the upper band shown sectionally and in position to be forced around one end of the laminated core.

Fig. 6 is an edge view of the same.

Fig. 7 is a side view of a shell type transformer embodying my invention.

Fig. 8 is a plan view of a retaining band

or plate for the type of transformer shown in Fig. 7.

Fig. 9 is a side view of the band or plate shown in Fig. 8.

The preferred form of my invention consists of a transformer having two electrical coils 10, 11, which are placed around opposite legs of the core. These coils are preferably square or approximately so as this permits greater compactness and increased mutual inductance. The core consists of two L-shaped laminated iron or steel sections 13, 14 which are held together by metallic bands 15, 16 of iron or steel which are of a novel form and construction and will be described later in more detail.

The laminations 17, should be freshly punched, have clean cut edges and be assembled automatically as they come from the punch press. The surface of the edges should be smooth and untarnished particularly where two L-shaped sections are joined together.

The bands 15, 16 are preferably cut or punched from iron or steel sheets in a manner clearly indicated in Fig. 3. These forms are then pressed or bent into the shape shown in Fig. 4. Each band may have four outwardly inclined flanges or tongues 18 to facilitate assembly and provide resilient gripping jaws. The corners of the core may be bevelled or rounded as at 17' to make it easier to force the bands 15, 16 in place over the ends of the core.

Before placing the bands 15, 16 on the transformer core, they may be heated so as to expand the bands and enable them to be applied more readily over the ends of the transformer core. I may provide an insulating disc 19 (made of any suitable material) at each end of the electric coils substantially as shown. The band may be heated just sufficiently to cause enough expansion to get it over the end or corners of the transformer core. It may then be allowed to cool before it is pressed into the final position it is shown occupying in Fig. 1.

Where it is desirable to rely solely upon the resiliency of the metal the bands need not be heated. The forcing of the bands on to the ends of the core not only holds the ends of the two parts 13 and 14 tightly together but also presses the various laminations together tightly.

My transformer has a high efficiency as its core has a lower reluctance than it otherwise would have on account of the fresh and smooth surfaces of the L-shaped core sections 13, 14 being bound together in the vice-like grip of the end pieces.

Fig. 7 shows a transformer, or choke coil, having a shell type core consisting of two sets or stacks of laminations resembling the letter F in shape as 20. The winding 22 is carried by the two short arms of the F shape pieces as 21. The retaining plates 23 are forced on to the laminations in the manner already described and are shaped to protect the windings. An insulating washer 24 may be inserted between the plate and the winding. In this case the retaining plate 23 is of somewhat different construction than that shown in Fig. 4. The tongues 25 are punched out and formed in a similar manner to the tongues 18 of Fig. 4, but the tongues 26 are formed by bending the ends of the plate through an angle somewhat greater than 90°.

This construction has an advantage over types of transformers which are "jumbled packed". It also has an advantage over the types in which the laminated sections have become tarnished or rusted before being brought together. By either one of these former methods a core of much higher reluctance is obtained than by my method.

This method of assembly avoids the punching of rivet holes and the consequent removal of the material of the core commonly done in such devices.

Another advantage is that my transformer has its primary and secondary coils sufficiently separated from each other to give a low capacity, between the coils. Because of this low capacity, a much more uniform amplification is obtained, particularly at the higher frequencies. Moreover, the improved qualities of my transformer are made possible by a method of construction which considerably lowers the expense of manufacturing a transformer.

While in my drawings I have shown but two forms of transformers, my method of construction applies to other forms of magnetic devices, transformers, choke coils and the like, and I wish it understood that I do not intend to limit the scope of my invention except by the claims.

I claim:

1. An electro-magnetic device having no moving parts and consisting of a laminated core and an electrical coil positioned around a portion of said core, said core consisting of two right-angular sections and two continuous metallic bands, said bands positioned around said core at either end of said electrical coil and rigidly binding said right angular sections together.

2. A transformer having a core, a primary coil and a secondary coil positioned around opposite portions of said core, said core consisting of two L-shaped sections fitted together so as to form a rectangular ring, said sections held firmly united by two continuous metallic bands.

3. A coil having a core formed of two L-shaped laminated sections and a one-piece rectangular band having resilient flanges frictionally binding said sections together.

4. As an article of manufacture, an electro-magnetic device consisting of a laminated core and an electrical coil positioned around said core, said core being of the shape of a rectangular band and consisting of two right angular sections and two separate end bands, said end bands being frictionally fitted upon opposite ends of said core and holding said right angular sections together to form said core.

5. As an article of manufacture, an electro-magnetic device consisting of a laminated core and of an electrical coil positioned around said core, said core being of the shape of a rectangular band and consisting of two right angular sections and two iron or steel end bands, said end bands shrunk upon opposite ends of said core and holding said right angular sections together to form said core.

6. A transformer comprising a laminated core with coils on opposite legs and one-piece sheet metal bands having resilient flanges embracing the ends of the core to hold the ends tightly together and hold the laminations tightly together without the necessity of rivets or screws.

7. A transformer comprising a two-part magnetic laminated core with coils mounted thereon and a binder connecting the two parts of the core comprising an integral plate of metal having resilient flanges embracing the parts of the core.

MILTON ALDEN.