July 29, 1958 H. R. KORTE 2,845,602

TRANSFORMER CORE CONSTRUCTION

Filed Dec. 30, 1954

Fig. 1.

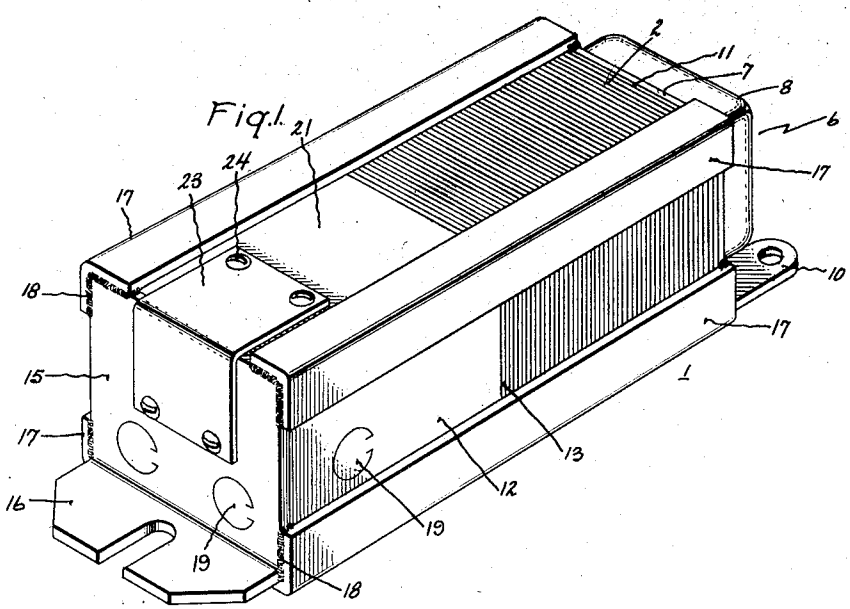
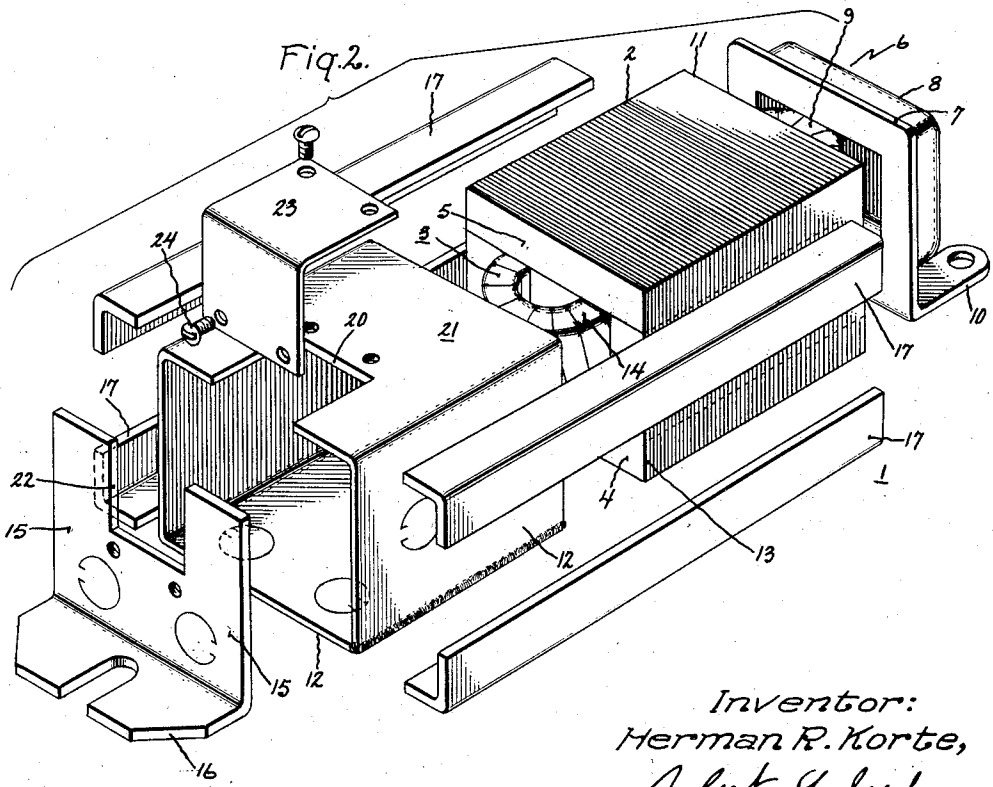


Fig. 2.



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United States Patent Office 2,845,602
Patented July 29, 1958

2,845,602

TRANSFORMER CORE CONSTRUCTION

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Application December 30, 1954, Serial No. 478,607

1 Claim. (Cl. 336—210)

This invention relates to transformers and more particularly to the mechanical assembly thereof.

Transformers of the air cooled type, particularly in the smaller ratings, are provided with a core formed of a plurality of laminations with the appropriate windings arranged thereon. These transformers are frequently arranged with the edges of the lamination exposed and with end caps respectively abutting the end laminations and enclosing the exposed ends of the coils. In other constructions, a sleeve member may be arranged abutting one end of the core, thus defining a junction box compartment and an end cap is arranged abutting the end of the sleeve member remote from the core. In either construction, the various elements are conventionally held in assembled relation and the laminations are clamped together by means of a plurality of through-bolts which respectively engage the end caps and extend through openings formed in the core. Such a construction adds appreciably to the overall cost of the transformer and furthermore, the provision of holes through the core to accommodate the through-bolts necessitates the use of additional iron and copper in the transformer design. It is therefore desirable to provide a transformer construction in which the various elements are held in assembled relation and the core laminations are clamped without the use of throughbolts. It is, of course, further desirable that this construction be inexpensive and readily assembled.

It is therefore an object of this invention to provide an improved transformer construction incorporating the desirable features set forth above.

Further objects and advantages of this invention will become apparent by reference to the following description and the accompanying drawing, and the features of novelty which characterize this invention and will be pointed out with particularity in the claim annexed to and forming a part of this specification.

This invention in its broadest aspects, provides a transformer having a core formed of a plurality of laminations. Members are provided respectively abutting the end laminations of the core and at least one strap member is provided extending between the abutting members on the exterior of the core and integrally joined thereto.

In the drawings,

Fig. 1 is a view in perspective of the improved transformer of this invention; and

Fig. 2 is an exploded view in perspective of the improved transformer of this invention.

Referring now to Figs. 1 and 2 of the drawing, the improved transformer 1 of this invention is provided with a core 2 formed of a stacked plurality of relatively thin laminations of magnetic material. The core 2 is of the shell type, i. e., having portions surrounding the coil, and has one or more coils assembled thereon. In the illustrated embodiment, the core 2 is formed of a plurality of E-shaped laminations 4 and I-shaped laminations 5 interleaved as shown. It is thus seen that the core 2 has a substantially rectangular configuration.

An end cap 6 is provided having a substantially rectangular flange portion 7 substantially conforming to the configuration of the core 2 and having a recessed portion 8 which accommodates the exposed end 9 of coil 3. End cap 6 may be provided with mounting feet 10 as shown. When assembled, the flange portion 7 of end cap 6 directly abuts the end lamination 11 at one end of the core 2.

A rectangular sleeve member 12 is provided abutting the end lamination 13 at the other end of the core 2 thus accommodating the exposed end 14 of coil 3 and defining a junction box compartment at the other end of the core 2. It will be seen that sleeve member 2 also substantially conforms to the configuration of core 2.

Another end cap member 15 is provided abutting the end of sleeve member 12 remote from the core 2 and substantially conforming to the configuration of sleeve member 12 and the core 2. End cap member 15 may be provided with a mounting foot 16 which cooperates with mounting foot 10 of end cap member 6 to mount the transformer 1.

In order to hold the end cap 6, core 2, sleeve member 12, and end cap 15 in assembled relation and further tightly to clamp the laminations of core 2 together, the arrangement now to be described is provided. A plurality of angle strap members 17 are provided extending between end cap members 6 and 15 and respectively embracing the corners of end cap members 6 and 15, core 2, and sleeve member 12. Angle strap members 17 are respectively integrally joined to the flange portion 7 of end cap member 6 and to end cap member 15 as at 18, as by helium arc welding. It will be readily understood that the core 2, sleeve member 12, and end caps 6 and 15 may be placed in a fixture which tightly clamps these elements together in assembled relation and that the angle strap 17 may then be positioned as shown and the welds 18 made. The elements are thus rigidly held in assembled relation and the laminations of core 2 are tightly clamped together without requiring the use of throughbolts.

Sleeve member 12 may be provided with convenient knock-outs 19 to which suitable conduit or cable may be connected in order to bring the necessary electrical leads into the interior of sleeve member 12. In addition, an opening 20 may be formed in the upper surface 21 of sleeve member 12 and a corresponding opening 22 formed in end cap 15 in order to provide an access opening to the interior of sleeve member 12 for making the necessary connections. This access opening may be closed by an angle-shaped closure member 23 which may be held in position by suitable screws 24.

It will be readily understood that the strap member 17 need not have the angle shape shown, but may have a rectangular or any other desired cross sectional configuration. In addition, it will be readily understood that four straps 17 may not be necessary and that a smaller number, for example, two straps on diametrically opposite sides of the core, or a single U-shaped strap may provide the necessary rigidity and clamping action.

It will now be readily understood that this invention provides an improved transformer construction in which the various elements are held in assembled relation and the laminations are tightly clamped without the necessity for using through-bolts. It will be seen that this construction not only eliminates the through-bolts, but also permits a reduction in the size of the core 2 and the amount of copper in coil 3. It will further be readily apparent that the construction is characterized by its simplicity, rigidity, and ease of assembly.

While I have shown and described a particular embodiment of this invention, further modifications and improvements will occur to those skilled in the art. I desire that it be understood therefore that this invention is not limited to the form shown and I intend in the appended claim to cover all modifications which do not depart from the spirit and scope of this invention.

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

A transformer comprising a core formed of a plurality of stacked laminations having a substantially rectangular configuration and having at least one coil thereon, said laminations having portions extending transversely outwardly of said coil, an end cap member abutting one end lamination of said core and peripherally coextensive therewith, said end cap member having a recessed portion for accommodating an exposed end of said coil, a sleeve member having a substantially rectangular cross section abutting the other end lamination of said core and peripherally coextensive therewith thereby accommodating the other exposed end of said core and defining a junction box compartment with said core, another end cap member abutting the end of said sleeve member remote from said core and peripherally coextensive therewith, and a plurality of angle strap members extending between said cap members in engagement with and respectively embracing the corners of said cap members, said sleeve member, and said core, and integrally joined to said cap members thereby tightly clamping said core laminations and holding said cap members and said sleeve member in assembled relation.

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