May 2, 1933. A. HELGASON 1,906,586

TRANSFORMER CONSTRUCTION

Filed Nov. 16, 1932

Fig. 1.

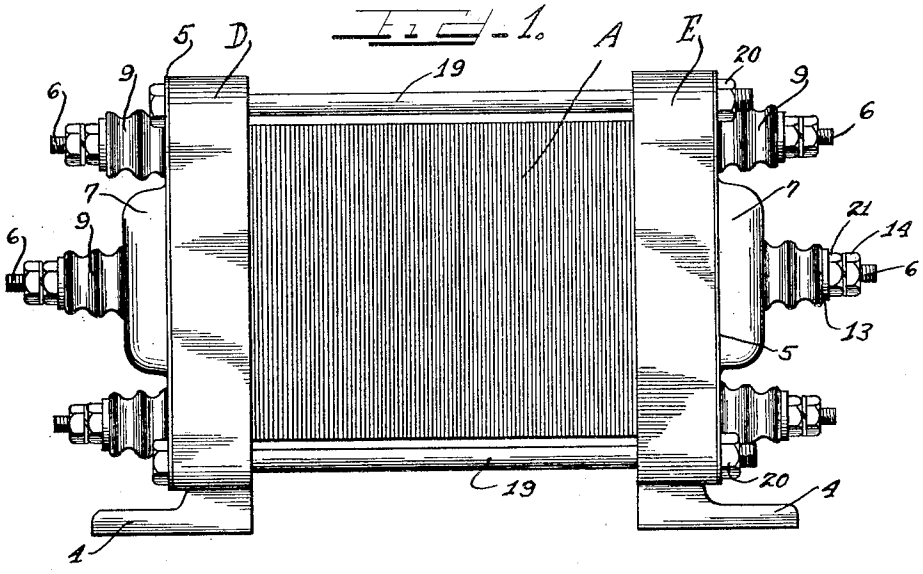


Fig. 2.

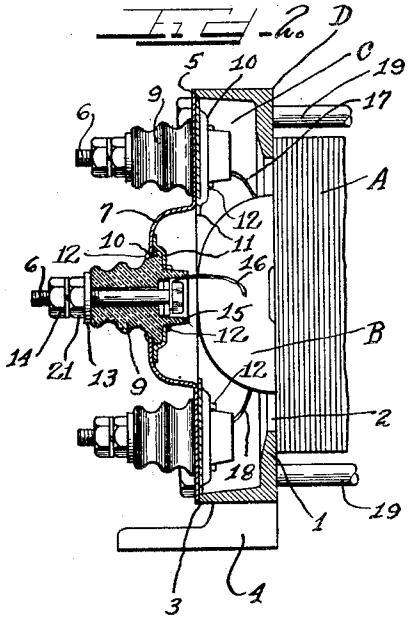
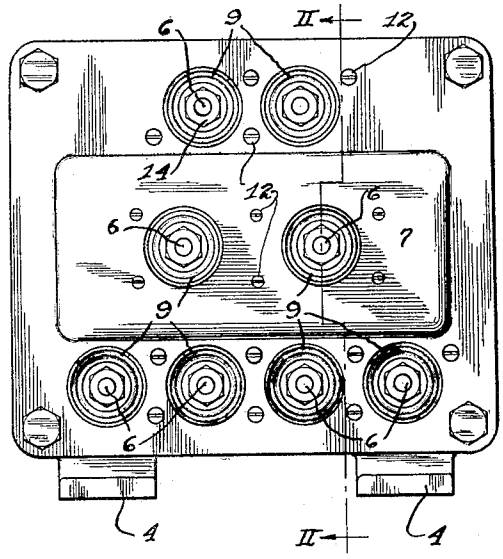


Fig. 3.



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By Charles Fiddes Attys.

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UNITED STATES PATENT OFFICE

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TRANSFORMER CONSTRUCTION

Application filed November 16, 1932. Serial No. 642,831.

The present invention relates to transformer construction and more particularly to the construction of end frames and cover plates to provide additional space for making internal connections to the transformer terminals whereby additional terminals may be mounted on the cover plates.

An object of the present invention is to improve transformer construction in such manner as to afford means for application of a plurality of terminal connections to the cover plates.

Another object of the invention is to provide end frames for transformers so constructed as to afford increased space at the transformer ends for making internal connections to terminals.

A still further object of the invention is to provide end frames for transformers having cover plate attaching flanges spaced from the coil ends to provide additional space for terminal connections.

The above, other and further objects of the invention will be apparent from the following description, accompanying drawing and appended claims.

The accompanying drawing illustrates embodiments of the present invention, and the views thereof as follows:

Fig. 1 is a side elevational view of a transformer constructed in accordance with the principles of the present invention.

Fig. 2 is a fragmental view, partially in elevation and partially in vertical section, showing details of construction.

Fig. 3 is an end view of the transformer illustrated in Figure 1.

The drawing will now be explained.

The drawing illustrates a transformer having a core designated generally at A and a coil B. The core is illustrated as comprising a plurality of laminations of suitable electrical characteristics, arrangement and design. The coil B is designated conventionally.

The end frames of the present invention are preferably formed as castings and each is rectangular in elevation and angular in cross-section. This construction provides a vertical flange portion 1 defining a central opening 2 of sufficient size to receive within it the ends of the coil B and to be spaced from the coil a sufficient distance. The horizontal portions 3 of the end plates are at right angular relationship with the flanges 1, and when arranged in assembled position extend away from the adjacent end of the core A and are spaced outwardly of the core body. The form of core illustrated is rectangular, accordingly the elevation of the end frame will be rectangular.

The end frames are provided with feet 4 for supporting the transformer on a suitable base. The end frames are assembled as illustrated in Figure 1 with the horizontal flange portions 3 extending in opposite directions from each other and each outwardly from the adjacent end of the core. Such an arrangement therefore provides a chamber C at each end of the transformer.

Cover plates 5 are provided to cooperate with the horizontal flanges 3 of the end plates to form one of the walls of a chamber C and also to carry the terminals 6. The central portion of each plate 5 is offset as indicated at 7 to provide space between the adjacent end of the coil B and the offset portion 7 for making internal connections between the ends of the coil and the cover plates.

The various terminals 6, of which eight are shown in the accompanying drawing, are supported on the cover plates in the following manner. The cover plates 5 are provided with a plurality of apertures for receiving insulating bushings 9 and all of which have enlargements or flanges 10 near the rear end thereof, which flanges bear against the inner faces of the plates 5 and are larger than the apertures in the plates.

The insulating bushings 9 are retained within the cover plate 5 by metallic straps 11 which are retained against the inner faces of the plates 5 by screws 12 applied from the exterior of the cover plate 5. The straps 11 are provided with suitable openings to receive the inner ends of the insulators 9 and bear against the flanges 10 of the same. In this manner the various insulating bushings 9 are suitably supported in the cover plates 5.

Every one of the bushings 9 is provided

with a terminal bolt 6 maintained in position in the bushing by means of a nut 21 threaded onto the outer end of the bolt and bearing against the washer 13 engaging the outer end of the bushing, or insulator 9. Another nut 14 is threaded onto the bolt for clamping between it and the nut 21, a conductor, as is common practice.

The heads of the bolts 6 are received within enlargements 15 formed in the insulators 9 and are connected to various leads from the primary and secondary windings of the transformer.

For instance, the primary lead may be connected to the two terminals 6 arranged in the offset portion 7 of the cover plate. Figure 2 illustrates the leads 16 from a portion of the coil B connected to the terminals 6 arranged on the offset portion 7 of the cover plates 5. Other leads 17 and 18 on the coil B are connected to others of the terminals 6 as occasion demands.

The end frames and the cover plates are retained in assembled relation by means of bolts 19 passing through suitably disposed apertures in the end plates 5 and the end frames, and when the nuts 20 are also tightened the end plates are secured against the ends of the core A and the cover plates 5 fastened against the end plates.

A construction such as that herein exemplified enables the application of as many terminals to the transformer as may be desired for connecting the transformer in circuit relation with a plurality of circuits requiring different voltages.

It will be observed that by making the horizontal flanges 3 of the end plate in the manner described so that these lie outwardly of the contour lines of the core A, additional space is provided between the ends of the coil B and the cover plate 5 so that as many internal connections may be made in the chambers C.

The end plates are designated at D and E for convenience.

The invention has been described herein more or less precisely as to details, yet it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement and proportion of parts and equivalents substituted, without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. A transformer including a core and a coil, end frames of angular cross-section secured against the ends of the core, said frames having central openings for the coil ends, said frames being secured to the core with certain flanges thereof lying outwardly of the core and extending in directions away from the adjacent ends of the core to provide terminal connection space between the coil ends and the frames, and cover plates secured against the margins of said flanges, said cover plates carrying terminal connections available for connection to outside wires outwardly of said plates, leads to and from the primary and secondary windings being connected to said terminal connections within the space between the cover plates and the adjacent ends of the coil within the outwardly extending flanges of the end frames.

2. A transformer having flanged end plates, certain flanges of said plates being disposed flatwise against the ends of the transformer core and others of the flanges extending in directions away from the adjacent ends of the core, and cover plates supported against the margins of said last mentioned flanges, said cover plates carrying terminal connections.

3. A transformer having flanged end plates, certain flanges of said plates being disposed flatwise against the ends of the transformer core and others of the flanges extending in directions away from the adjacent ends of the core and outwardly of the boundaries of the core, cover plates supported against the margins of the last named flanges, said cover plates carrying terminal connections, and connections between said terminals and the transformer leads connected within the last named flanges of the cover plates and the adjacent ends of the core.

4. A transformer having flanged end plates, certain flanges of said plates being disposed flatwise against the ends of the transformer core and others of the flanges extending in directions away from the adjacent ends of the core, and cover plates supported against the margins of said last mentioned flanges, said cover plates carrying terminal connections, the arrangement of the last named flanges providing space between the core ends and the adjacent end plates for terminal connections between the coil ends and said last named flanges.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

ARNI HELGASON.