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TRANSFORMER CASE STRUCTURE

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Fig. 1.

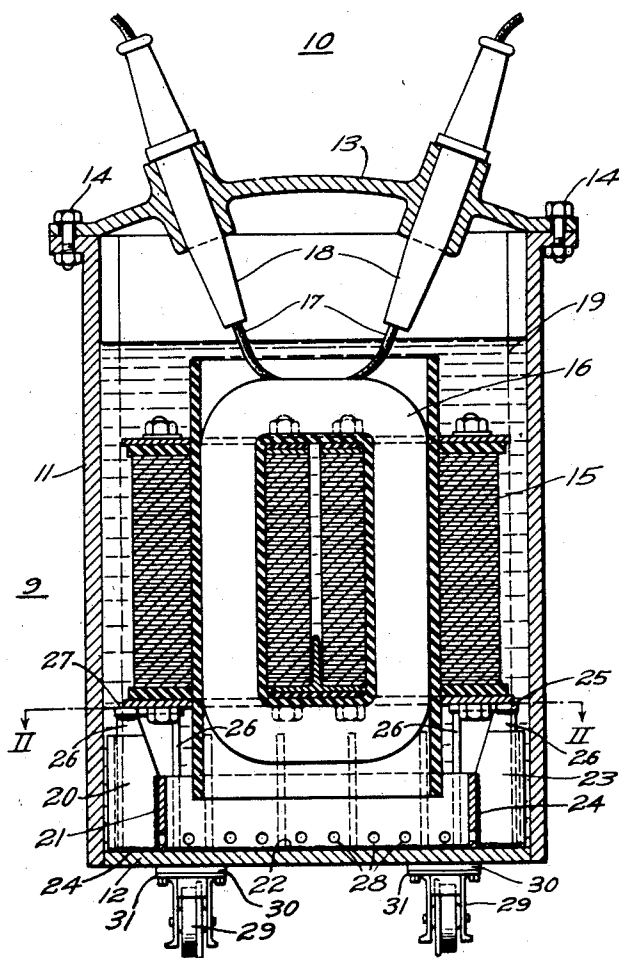
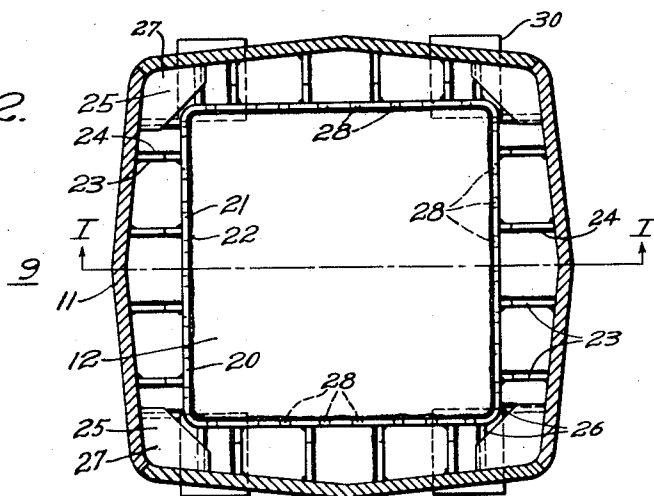


Fig. 2.



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TRANSFORMER CASE STRUCTURE

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5 Claims. (Cl. 220—85)

This invention relates to transformers, and particularly to case structures of transformers.

In the large power transformers it is necessary to provide the transformer case with a base that is sufficiently rigid and strong enough to support the weight of the core, coils, insulation and the cooling and insulating liquids. In order to support the weight of the assembled transformer, bulky and heavy base structures are provided for reinforcing and supporting the bottom of the transformer case. These base structures are usually provided as an integral part of the case structure outside of the case and below the bottom since the bottom of the case is not rigid or strong enough to permit a lifting of the transformer.

When such base structures are employed, the over-all height of the transformer is greatly increased adding to the difficulties encountered in shipping or transporting the transformer.

An object of this invention is to provide a transformer case with a reinforcing structure inside the case.

Another object of this invention is to provide a transformer case with a reinforcing base structure inside the case suitable for supporting the core and coil assembly of the transformer.

Other and additional objects of this invention will be better understood from the following description when taken in conjunction with the accompanying drawing, in which—

Figure 1 is a sectional view of a transformer with a core and coil assembly shown taken along the line I—I of Fig. 2, and

Fig. 2 is a sectional view of the bottom of the transformer case taken along the line II—II of Fig. 1, embodying the features of this invention.

Like reference characters in each of the figures denote similar parts.

In the building of large power transformers, it is desirable to construct them in as compact form as possible with the bottom of the case strong enough to permit the lifting of the assembled transformer.

Referring to the drawing and Fig. 1 thereof particularly, this invention is illustrated as embodied in a transformer 10. The transformer 10 is of the usual construction comprising a case 9 having an enclosing wall 11 of sheet iron or other suitable material fabricated in any desired shape, a bottom 12 suitably welded to the enclosing wall and a cover 13 mounted on the enclosing wall by any suitable means as by the bolts 14. The case 9 is of sufficient size to contain the core assembly 15, the coil assembly 16, leads 17 and

bushings 18. An insulating liquid 19 suitable for insulating and cooling the core and coils is contained in the case.

As illustrated, the bottom 12 of the case comprises sheet iron material of substantially the same thickness or gage as that of the side walls 11. In order to strengthen the side walls 11 and the bottom 12 of the case, it is desirable to provide a structure inside the case suitable for bracing the side walls and the bottom. The structure employed is a continuous box girder structure 20 disposed between the side walls 11 and the bottom 12.

The box girder structure 20 comprises a continuous metallic band 21 disposed about the bottom 12 of the case and welded thereto by a weld 22. As shown in the drawing, the metallic band 21 is disposed in a vertical position on the bottom 12 of the case and substantially parallels the shape of the side walls 11.

As shown in the drawing, gusset plates 23 are provided in spaced relation between the metallic band 21 and the side walls 11. The gusset plates are welded in a vertical position to the continuous band 21 and to the bottom 12 and side walls 11 as by welds 24. This provides a continuous box girder structure inside the case between the side walls 11 and the bottom 12, so that any stresses encountered in moving the assembled transformer will be distributed throughout the side walls and bottom of the case structure.

In order to provide for supporting the core and coil assembly 15 and 16 in their proper position in the transformer case, benches 25 suitable for receiving the end frames of the core 15 are provided in the girder structure 20. The benches 25 are constructed by providing gusset plates 26 between the side walls 11 and the band 21. The gusset plates 26 extend in a vertical direction to a plane above the plane of the upper edges of the gusset plates 23. A sheet iron plate 27 is provided in a horizontal position on the top edge of the gusset plates 26 and is welded thereto to provide the seat of the bench 25. These benches are usually provided in the corners of the transformer case in order to support the four corners of the core assembly but as will be understood by those skilled in the art, the benches may be provided elsewhere in the case as desired.

Since the core and coil assembly is cooled and insulated by the liquid 19, it is desirable to so provide a box girder structure for strengthening the case and supporting the core and coil assembly that the circulation of the insulating liquid 19 will not be impeded. This result may be accom-

plished by providing openings 28 in spaced relation near the bottom of the metallic band 21. With the girder structure in position in the case 9, as shown in the drawing, the inside wall of the metallic band 21 defines an opening in the girder structure for receiving the lower end of the coil assembly 16 that projects below the core assembly 15. The girder structure will thus not interfere with the conventional core and coil assemblies now used by the trade.

As illustrated in the drawing, the assembled transformer may be provided with removable wheel assemblies 29 mounted in any suitable manner to the base 12 of the case for assisting in transporting the transformer to its destination. In providing the removable wheel assemblies 29, plates 30 may be provided on the base of the case and may be attached thereto by any suitable means as by welding. Jack lugs 31 are permanently attached to the plates 30, so that when it is desired to mount the removable wheel assembly on the case, the case may be easily lifted and the wheel assembly may be bolted to the plates 30.

By providing the box girder structure inside the case, it is evident that the case is so reinforced that the stresses encountered in moving the transformer are distributed throughout the sides and bottom of the case. With this construction the overall height of the transformer may be greatly reduced since an external reinforcing base structure is not necessary. Further, it is seen that since the core and coil assembly is supported directly by the girder structure, the weight of the core and coil assembly will not induce stresses at localized points of the base but instead the stresses will be distributed throughout the side walls and bottom of the case.

Although this invention has been described with reference to a particular embodiment thereof, it will be understood by those skilled in the art that other and various modifications thereof are possible. This invention is, therefore, not to be restricted except insofar as is necessitated by the prior art and the scope of the appended claims.

I claim as my invention:

1. In a transformer case adapted for enclosing a core and coil assembly, in combination, a fabricated sheet iron wall, a bottom applied to the wall, a continuous metal band disposed on the bottom inside the case in spaced relation to and substantially paralleling the wall, and a plurality of gusset plates disposed in a substantially vertical direction between the wall and metal band, certain of the gusset plates extending to a height above the upper edge of the other gusset plates and being adapted to provide a bench for supporting the core and coil assembly of the transformer, the gusset plates being welded to the wall, bottom and metal band for providing a reenforced case.

2. In a transformer case adapted for containing a liquid suitable for insulating the core and coil assemblies, in combination, a fabricated sheet iron wall, a bottom applied to the wall, a continu-

ous metal band disposed inside the case on the bottom in spaced relation to and substantially paralleling the wall, and a plurality of gusset plates disposed between the wall and metal band, a plate disposed to bridge certain of the gusset plates for providing a bench for supporting the core and coil assembly of the transformer, the gusset plates being welded to the wall, bottom and metal band for providing a reenforced case, the metal band having openings therein for facilitating circulation of the insulating liquid.

3. In a transformer case adapted for containing a liquid suitable for insulating the core and coil assemblies, in combination, a fabricated wall, a bottom applied to the wall, a continuous metal band disposed inside the case on the bottom in spaced relation to and substantially paralleling the wall, a plurality of gusset plates disposed in a substantially vertical direction in spaced relation to each other and extending between the wall and metal band, a plate disposed to bridge certain of the gusset plates for providing a bench for seating the core and coil assemblies of the transformer, the metal band being welded to the gusset plates extending therefrom and to the bottom, and the gusset plates being welded to the wall and bottom, to provide a reenforced case, the continuous metal band having openings therein between at least some of the adjacent gusset plates extending therefrom for facilitating circulation of the insulating liquid.

4. In a transformer provided with a case and a core and coil assembly in combination, a continuous metal band disposed on the bottom of the case, gusset plates disposed between the case wall and the continuous metal band, the metal band, gusset plates, wall and bottom all being welded together at their meeting edges to provide a box girder structure on the bottom around the inside of the case into which the lower end of the coil assembly may extend, the box girder structure carrying the weight of the core and coil assembly and serving to distribute the load whereby the case is not distorted.

5. In a transformer provided with a core and coil assembly and a case for containing an insulating liquid in combination, a continuous metal band disposed on the bottom of the case, gusset plates disposed between the case wall and the continuous metal band, the metal band, gusset plates, wall and bottom all being welded together at their meeting edges to provide a box girder structure on the bottom around the inside of the case, means disposed on the box girder structure for seating the core and coil assembly with the lower end of the coil assembly extending into the box girder structure, the continuous metal band of the box girder structure having openings therein for facilitating circulation of the insulating liquid, the box girder structure carrying the weight of the core and coil assembly and serving to distribute the load whereby the case is not distorted.

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