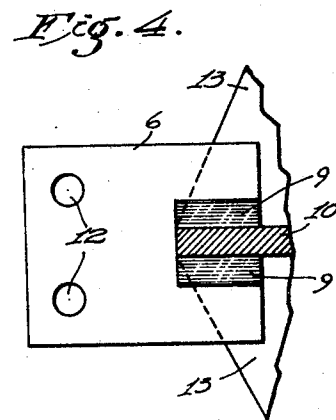
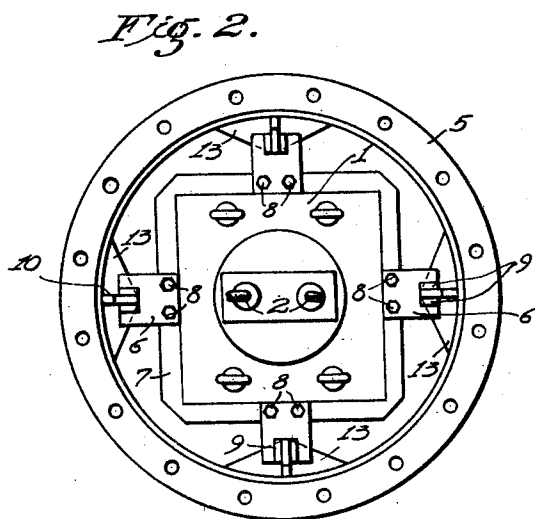
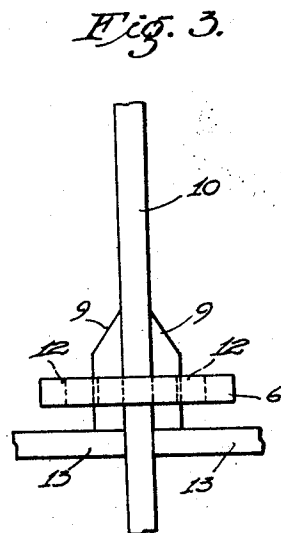
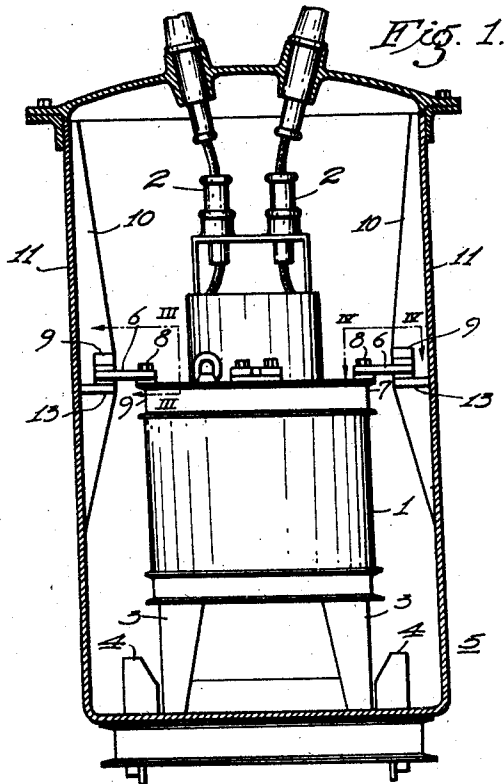


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TRANSFORMER BRACING STRUCTURE

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TRANSFORMER BRACING STRUCTURE

Application filed October 20, 1930. Serial No. 489,820.

Our invention relates to transformers and more particularly to a transformer centering and bracing structure.

With the steady increase in the size of the transformers the problem of bracing the transformer in its tank has become greater. During shipment of the tank, it is desirable to keep the core and windings of the transformer stable and free from lateral motion. The slightest collision of the transformer and tank walls may cause serious damage to the walls or to the windings, and, if the collision is great enough, to both the walls and windings. Upon reaching its destination, the transformer must be reassembled and straightened in its tank. This is an added expense as it involves extra work and a waste of time and material.

With the increase in size of the transformer, the quantity of insulating fluid necessary for good operation increases. With this increase in the insulating fluid the tank walls must be heavier to stand the strain exerted thereon by the fluid. As it is not desirable to increase the thickness of the walls because of the greater cost of material, some suitable means of strengthening the walls must be devised.

Previously, power transformers were assembled in the following manner: The transformer was lowered into its tank. Entrance was then made to the restricted space between the transformer and the tank wall. Working in this restricted space, permanent braces were lined up between the transformer and the angle shelves welded on the inside of the tank wall. After locating the braces by scribing them, they were removed and drilled so as to get properly located bolt holes. A second entrance into the tank was then necessary in order to bolt the braces in place. If it was desired to remove the transformer for repairs or other reasons, entrance to the restricted space was again made and the bolts holding the braces removed. Our invention eliminates this excess of work in positioning or removing the transformer, and has the added advantage in that our bracing automatically engages with the wall of the tank with such strength and accuracy so as to

withstand the shocks received during shipment.

The general object of our invention is to improve the bracing of transformers in their tank.

A further object of our invention is to provide a transformer bracing structure that is conveniently and economically constructed.

It is another object of our invention to strengthen the tank walls by means of the transformer bracing structure.

A more specific object of our invention is to provide a bracing structure that will strengthen the tank, eliminate horizontal movement of the transformer during shipment and thereby protect the windings of the transformer and the walls of the transformer tank from damage enroute.

In accordance with our invention we have provided a guiding and bracing structure comprising vertical members along the walls of the transformer tank and cooperating members attached to the transformer, engaging therewith.

The invention, together with additional objects and advantages thereof, will be better understood from the following description of a specific embodiment when read in conjunction with the accompanying drawings in which:

Figure 1 is a front elevational view partially in section showing an encased oil immersed transformer embodying the invention:

Fig. 2 is a plan view, of the transformer with the cover removed;

Fig. 3 is a detail elevational view of the brace and vertical member taken on the line III—III of Fig. 1;

Fig. 4 is a detail plan view of the brace and vertical member taken on the line IV—IV of Fig. 1.

Like reference characters indicate similar parts in the different figures of the drawings.

Referring specifically to the drawings, the apparatus shown in Fig. 1 comprises the transformer 1 and its leads 2 resting upon legs 3 which are guided into place by the beveled leg guards 4 suitably fastened to the tank 5. The transformer 1 is horizontally

braced by means of slotted braces 6 which are securely bolted to the upper portion of the transformer frame 7 by means of bolts 8. The braces 6 are so cut as to form a tight fit over wide tapered portions 9 of cooperating vertical members 10. The vertical members 10 are secured to the walls 11 of the tank 5 by any suitable means and are so formed as to provide edges that act as guide bars for the braces 6.

Detail views of the assembly of the slotted braces 6 and the vertical members 10 may be seen in Fig. 3 and Fig. 4. Holes 12, for receiving the bolts 8, are drilled in the slotted braces 6 to suit the assembly.

The vertical members 10 are cut on a slope extending from the top of the tank 5 down to the wide tapered portions 9, which portions are so located as to receive the slotted braces 6 at the point desired. Braces 13, extending at right angles to the vertical members 10 and fastened securely thereon in any suitable manner as by welding, are located directly below the wide tapered portions 9 of the said vertical members and project until engaged with the wall 11 of the tank 5. The braces 13 prevent horizontal distortion of the vertical members 10, due to stress induced therein by movement of the transformer 1. The braces 13 also strengthen the walls 11, to which they are attached in any suitable manner. From the braces 13, the vertical members 10 slope back to the walls 11 of the tank 5 completing the fin like guide brace of the tank.

In assembling the apparatus, the transformer 1 is lowered into the tank 5 by some suitable means so that the slots of the slotted braces 6 fit over the vertical members 10. As the transformer is lowered, the vertical members 10 guide it to its desired position at which position the slots of the slotted braces 6 form a tight fit over the tapered portions 9, thus automatically locking the transformer in its permanent position.

The vertical members 10 have a two-fold purpose in that they strengthen the walls 11 of the tank 5 and also act as guides in centering the transformer 1 for assembly and shipment. Any stress occurring, due to movement of the transformer 1 is transmitted through the bolts 8, the slotted braces 6, the wide tapered portion 9, and the vertical member 10 to the walls 11 of the tank 5, where it is distributed over the entire tank.

It will be seen, therefore, that we have provided such a transformer bracing structure, that horizontal movement of the transformer will be negligible and that this result is accomplished by convenient and economical means. It will also be seen that the auxiliary bracing structure increases the strength of the walls of the transformer tank.

Although we have shown and described certain specific embodiments of our inven-

tion, we are fully aware that many modifications thereof are possible. Our invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

We claim as our invention:

1. In a tank bracing structure for electrical apparatus, a framework with an electrical apparatus thereon, an enclosing casing, slotted braces extending from said framework of said electrical apparatus, means for securing said slotted braces to said framework, braces systematically located on and extending from the walls of said enclosing casing, said braces engaging with said slotted braces.

2. In a tank structure for electrical apparatus, a framework with an electrical apparatus thereon, an enclosing casing, slotted braces extending from said framework, means for securing said slotted braces to said framework, vertical braces systematically located on and extending from the walls of said enclosing casing, means for securing said vertical braces to said enclosing casing, said vertical braces engaging said slotted braces.

3. In a tank structure for electrical apparatus, a framework with an electrical apparatus thereon, an enclosing casing, slotted braces systematically located on and extending from said framework, means for securing said slotted braces to said framework, vertical braces located to engage with said slotted braces, said vertical braces extending from the walls of said enclosing casing, and means for securing said vertical braces to said enclosing casing.

4. In a tank structure for electrical apparatus, a framework with an electrical apparatus thereon, an enclosing casing, slotted braces systematically located on and extending from said framework, means for securing said slotted braces to said framework, vertical braces located to engage with said slotted braces, and extending from the walls of said enclosing casing, said vertical braces comprising a tapered portion which the said slotted braces are cut to fit, and means for securing said vertical braces to said enclosing casing.

5. In a bracing structure for electrical apparatus, a framework with an electrical apparatus thereon, an enclosing casing, slotted braces systematically located on and extending from said framework, means for securing said slotted braces to said framework, vertical braces extending along and secured to the walls of said enclosing casing, said vertical braces possessing a tapered portion which fits into the said slotted braces, horizontal braces at right angles to and directly below said tapered portion of said vertical braces, said horizontal braces extending to the walls of said enclosing casing, and means

for securing said horizontal braces between said vertical braces and said walls.

In testimony whereof, we have hereunto subscribed our names this 11th day of October, 1930.

ARTHUR WILLIAM THOMPSON.
WALTER M. DANN.

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