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TRANSFORMER TANK CONSTRUCTION

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FIGURE 2

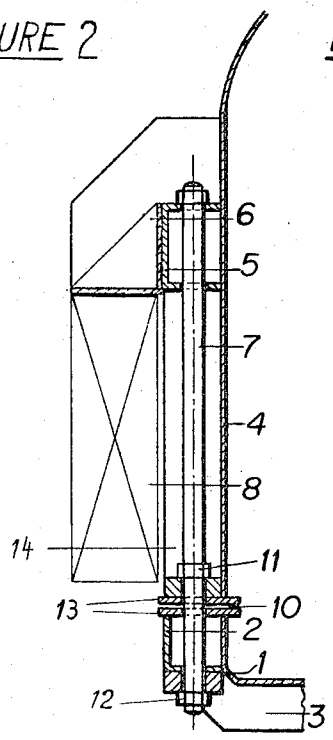


FIGURE 1

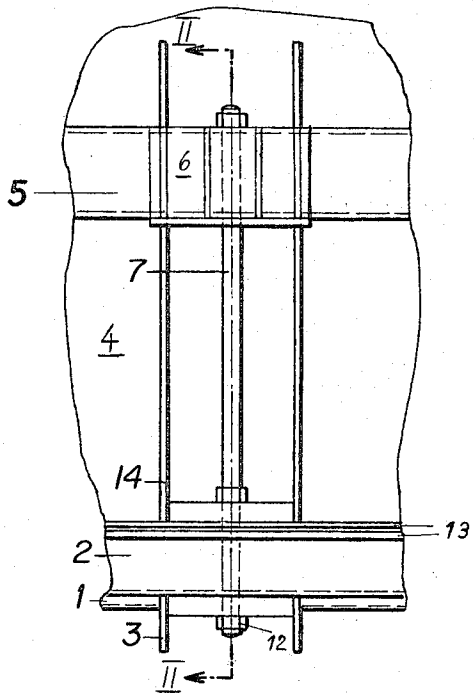
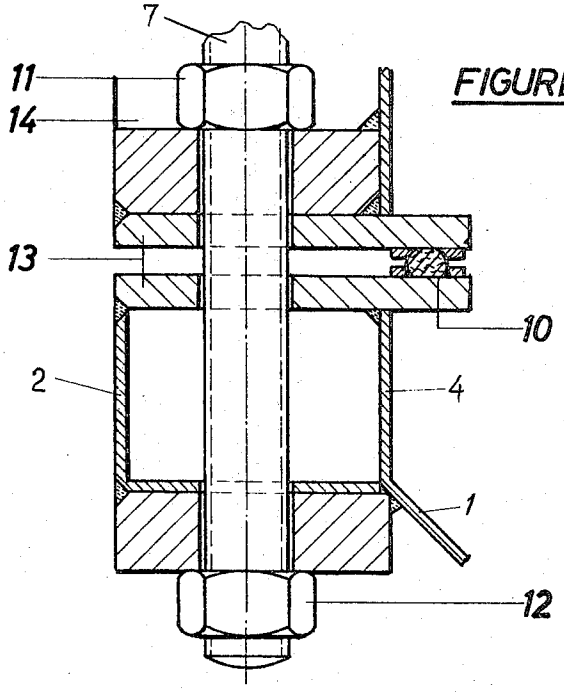


FIGURE 3



Inventors:
August Schmied
Wilhelm Jan
Alfred Lehmann

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TRANSFORMER TANK CONSTRUCTION

August Schmied, Weiz, Styria, Wilhelm Jan, Graz, Styria, and Alfred Lehmann, Weiz, Styria, Austria, assignors to Elin-Union Aktiengesellschaft fur Elektrische Industrie, Vienna, Austria

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8 Claims. (Cl. 220—5)

To an ever increasing extent, transformer tanks are built with a bell-shaped cover as in the case of inspection or repair works such a cover may be lifted by means of relatively simple lifting devices which are available also on the site. This operative advantage of a so-called bell tank is however coupled with certain difficulties in transporting the transformer especially if great transformer units are to be transported for which units only a so-called bridge-girder truck is suitable. Owing to the transformer profile (dimensions) or to the weight of the transformer the transport of such units by means of a platform truck would not be possible.

In transporting a transformer using a bridge-girder truck the transformer tank is suspended between the truck girders by means of bracket bearings screwed or welded on the tank walls. This is practicable without any considerable additional provisions with tanks having a plain cover, owing to the longitudinal and cross stiffenings of the tank, which transmit the weight of the active transformer parts to the transport brackets.

With transformers having a bell-shaped cover this manner of transportation can not be applied without further provisions as the cross stiffenings of the lower trough-like tank part, which take up the weight of the active transformer parts, can not be immediately extended beyond the sealing flanges between the lower tank part and the bell-shaped cover applied thereabove.

It is the aim of the present application to take remedial measures and to show that also transformers having a bell-shaped cover can be transported by means of a bridge-girder truck.

The object of this invention is a tank construction for transformers having a bell-shaped cover, which are to be transported by means of a bridge-girder truck.

In accordance with this invention stiffening frameworks, surrounding both the upper bell-shaped tank part and the lower tank part on their circumferences, are tied together by means of tie rods provided preferably on places where the bracket bearings are screwed or welded on the upper framework for supporting the transformer on the two bridge girders of the transporting truck.

In the accompanying drawing,

FIG. 1 shows a portion of a transformer tank made according to the present invention;

FIG. 2 is a partial sectional view, taken along line II—II of FIG. 1; and

FIG. 3 is an enlarged representation similar to FIG. 2, of the seal between the upper and lower tank portions.

In the drawing, numeral 1 indicates the lower tank part which has the shape of a flat trough on which the magnetic core of the transformer rests. Numeral 4 indicates the upper tank part which has the shape of a bell applied to or placed above the active parts of the transformer. Both tank parts 1, 4 are provided with rigid flanges 13 between which a packing 10 is interposed. With 2 and 5, respectively, stiffening frames are indicated which surround the lower and upper tank parts 1, 4, respectively, on its circumference. Cross-beams 3 are provided for strengthening the tank bottom which must take up the active weight of the transformer.

The side walls of the transformer tank are strengthened by means of vertical ribs 14 in order to enable the side walls to withstand without damage the strains resulting above all in evacuating the transformer and from pressure tests, respectively. Bracket bearings 6, provided in a known manner for transporting the transformer by means of a bridge-girder truck, are screwed on or welded on the upper stiffening framework 5.

In accordance with this invention the weight of the active transformer part resting on the tank trough 1 is transmitted to said transport bracket bearing 6 and therewith to a bridge girder 8 of the transporting truck by means of tie rods 7 passing through the lower and upper stiffening framework 2, 5. In order to prevent that possible elongations of the tie rods 7 impair the pressure on the packing 10 between the flanges 13, which pressure is applied in the main by means of fastening screws (not illustrated) distributed over the flanges 13, the tie rods 7 are provided with respective upper and lower fastening nuts 11, 12 for applying an additional pressure to the flanges 13.

As the length of the rods 7 between the nuts 11 and 12 is only a fraction of the total rod length the portion of the total rod elongation affecting this length is likewise only a fraction of the total elongation. Thus, the strain of the flange screw connections at 11, 12, resulting during transportation from the weight of the active transformer parts resting on the lower tank part, remains within acceptable limits, since this strain counteracts the pressure applied to the packing 10.

Using the transformer tank design in accordance with the invention, it is possible to transmit the main load (the weight of the active transformer parts) resting on the cross-beams 3, by means of the tie rods 7 directly to the transport bracket bearings 6 and thus to the bridge girders 8 of the truck. During transportation the other tank parts are consequently largely relieved from strains and, above all, leakage of the tank oil is prevented which would be due to a decrease of the packing pressure on the flanges 13, resulting from transport strains.

What we claim is:

1. A tank for large-size transformers adapted to be transported by way of bridge-girder trucks, the tank comprising, in combination: lower and upper, separate tank portions, the former for supporting the operative elements of the transformer, the latter being bell-shaped and serving to cover said operative elements; lower and upper, substantially rigid flange means on adjoining respective peripheral parts of said tank portions, for interconnecting the latter; packing means interposed between said lower and said upper flange means, for preventing leakage of the oil within the transformer; lower and upper stiffening frames rigid with and surrounding the respective lower and upper tank portions; bracket bearings attached to the sides of said upper frame, adapted to be engaged by bridge girders of a transporting truck; and tie rods passing through and interconnecting said lower and said upper frames, and also traversing said lower and said upper flange means, said tie rods serving for directly transmitting to said bracket bearings the vertical forces acting on said operative elements and on bottom of said lower tank portion during transportation of the transformer.

2. The tank as defined in claim 1, wherein said tie rods are disposed at locations where said bracket bearings are attached to said upper frame.

3. The tank as defined in claim 1, wherein said lower frame is disposed adjacent to and underneath said lower flange means, while said upper frame is vertically spaced apart from and above said upper flange means.

4. The tank as defined in claim 1, wherein said flange means extend inwardly beyond the vertical wall of said

upper tank portion, and said packing means is disposed on the inner ends of said flange means, horizontally and inwardly spaced apart from said tie rods.

5. The tank as defined in claim 1, wherein said tie rods have screw threads at least along portions thereof, and further comprising tightening nuts applied to said screw-thread portions in a flanking arrangement with said lower and said upper flange means and said lower frame, for tightening said packing means, while said upper frame is vertically spaced apart from said tightening nuts.

6. The tank as defined in claim 5, further comprising securing nuts applied to further screw-thread portions of said tie rods at their upper extreme ends, remote from said flanking arrangement, and beyond said upper frame.

7. The tank as defined in claim 1, further comprising cross-beams rigidly attached to and underneath said lower frame, for strengthening said bottom of the lower tank portion.

8. The tank as defined in claim 7, further comprising stiffening ribs on the side walls of said upper tank portion, disposed vertically between said bracket bearings and said upper flange means, on both sides of said tie rods, and forming a continuation of vertical terminal portions of said cross-beams.

References Cited

UNITED STATES PATENTS

1,309,667	7/1919	Vail	220—74
1,748,138	2/1930	McBride	200—71
1,811,665	6/1931	Edsall	220—85
2,611,506	9/1952	Scheer	220—46
2,952,922	9/1960	Wenzl	220—5
3,079,033	2/1963	Wooton	220—46

FOREIGN PATENTS

98,131	10/1963	Austria.

THERON E. CONDON, *Primary Examiner.*

JAMES R. GARRETT, *Examiner.*