Jan. 3, 1939. M. F. MITSCHRICH 2,142,366

OIL COOLED TRANSFORMER

Filed June 24, 1936

FIG. 1.

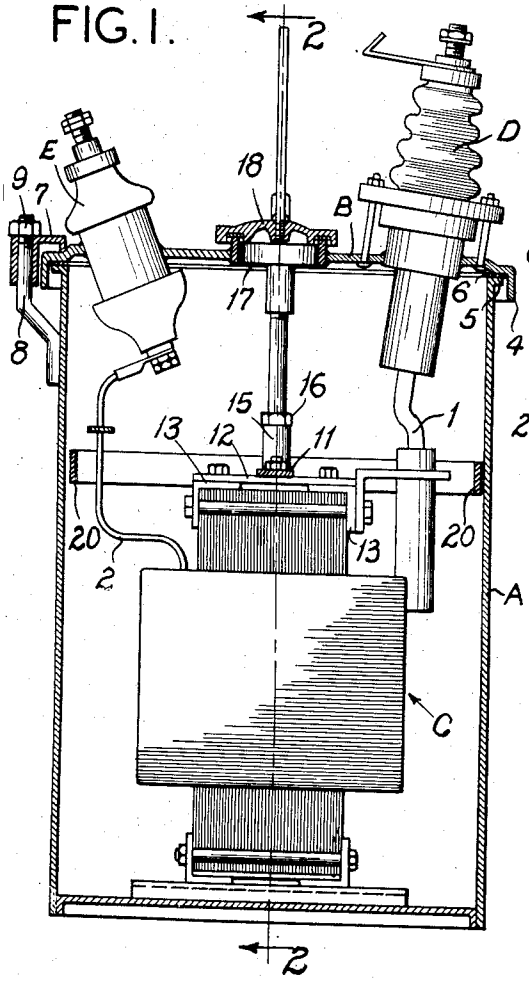


FIG. 2.

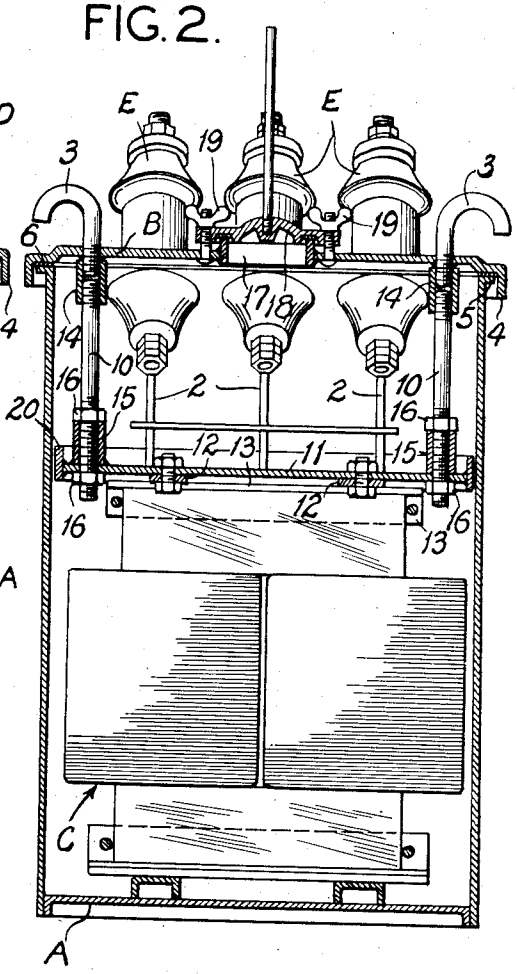


FIG. 3.

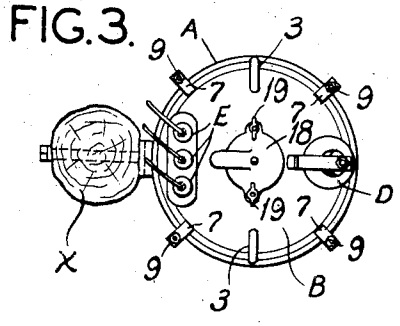
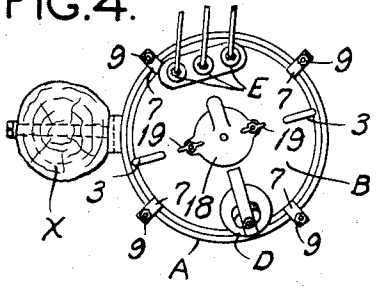


FIG. 4.



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OIL COOLED TRANSFORMER

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Application June 24, 1936, Serial No. 86,995

1 Claim. (Cl. 175—361)

This invention relates to transformers and has for its main object to provide a transformer which is so constructed or mounted that the high and low voltage terminal assemblies can be quickly and easily adjusted or positioned to best meet any special mounting arrangement.

Another object is to provide a transformer, capable of being easily mounted in either single or three-phase banks, and equipped with high and low voltage bushings that can easily be arranged in various positions so as to permit the leads to be brought out in the most convenient location.

Another object is to provide an oil cooled transformer which is of such design or construction that a single workman can easily remove the core and coil structure from the tank for inspection or replacement of parts.

And still another object of my invention is to provide an efficient oil cooled transformer of rugged design which, in addition to having the desirable features previously mentioned, is inexpensive to manufacture.

Figure 1 of the drawing is a vertical transverse sectional view of a transformer constructed in accordance with my invention.

Figure 2 is a vertical transverse sectional view taken at approximately right-angles to Figure 1, on the line 2—2 of Figure 1, and

Figures 3 and 4 are top plan views illustrating how the cover of the transformer tank is intended to be turned or rotated so as to arrange the high and low voltage terminal assemblies in various positions with relation to the parts to which the transformer leads are connected.

In the accompanying drawing which illustrates the preferred form of my invention, A designates the tank of an oil cooled transformer, B designates the removable cover or lid for said tank, C designates as an entirety the core and coil structure immersed in the oil in the tank, D designates an insulating bushing for a high voltage lead 1 from the coil, and E designates insulating bushings for low voltage leads 2.

One feature of my invention, which I believe to be broadly new, consists of a transformer so constructed or mounted that the high and low voltage terminal assemblies comprising the bushings D and E are intended to be turned, rotated or oscillated about a vertical axis so as to produce any desired relationship between the transformer leads and parts on the exterior of the transformer tank with which said leads co-act or to which they are attached. This feature of my invention will be clearly understood by comparing Figure 3 of the drawing with Figure 4. In Figure 3 the low voltage terminal assembly comprising the bushings E is arranged in close proximity to the pole x on which the transformer is mounted, and the high voltage terminal assembly comprising the bushing D is arranged at the greatest possible distance away from the pole x, whereas, in Figure 4, the low voltage terminal assembly is spaced farther away from the pole on one side of a vertical plane extending laterally from the pole, and the high voltage terminal assembly is arranged closer to the pole on the opposite side of said vertical plane. Obviously, any special mounting arrangement or any desired relationship between the transformer leads and parts with which they co-act may be obtained by the rotary adjustment above referred to.

It is immaterial, so far as my broad idea is concerned, what particular means is used to accomplish or attain the result above described, but I prefer to mount the coil and core structure C in the tank A in such a way and combine it with the high and low voltage terminal assemblies in such a manner, that when said assemblies are turned, rotated, or oscillated about a vertical axis to produce a desired relationship between the transformer leads and coacting parts on the exterior of the transformer tank, the same degree of rotary or oscillating movement is imparted to the core and coil structure C. In the preferred form of my invention herein illustrated, the cover B of the tank A is mounted in such a way that it can be turned or rotated relatively to said tank, and the core and coil structure C and the bushings D and E are mounted on or attached to said cover. Accordingly, any desired arrangement or position of the bushings D and E can be obtained simply by turning the cover B relatively to the tank, more or less, so as to in effect cause said bushings to swing about a vertical pivot coincident with the vertical axis of the tank A. Another advantage or desirable feature of a transformer of the construction above described is that a single workman can remove the core and coil structure from the tank for inspection or replacement of parts, simply by grasping the hook-shaped handles or grabbing devices 3 on the cover and moving said cover upwardly.

The co-acting parts of the transformer may be constructed in various ways without departing from the spirit of my invention. Preferably, the cover B is provided at its peripheral edge with a downwardly projecting flange or rim 4 that surrounds a laterally projecting flange 5 at the upper end of the side wall of the tank A, said flange 4 serving as a support for a gasket 6 that

maintains a tight joint between the cover and the tank. The cover is retained in adjusted position by means of a plurality of clamping devices 7 carried by brackets 8 attached to the side wall of the tank and provided with threaded portions that receive nuts or similar devices 9 which hold the clamps 7 in overlapping relationship with the peripheral edge portion of the cover B.

The means that I prefer to use to attach the core and coil structure C to the cover B is illustrated in Figure 2 and comprises rods 10 depending from the under-side of the cover B and attached at their lower ends to a horizontally disposed bar 11 on the core and coil structure, said bar 11 being provided with a plurality of cross-pieces 12 which, in turn, are attached to angle irons 13 at the upper end of the core and coil structure as illustrated in Figure 1. In order that the weight, or major portion of the weight, of the core and coil structure will be carried by the bottom of the transformer tank A, the means that is used to attach the horizontally disposed bar 11 to the cover B is of such construction that it can be adjusted so as to, in effect, vary the length of the rods 10 or vary the distance between the cover B and bar 11. In the transformer herein illustrated the grab hooks or handles 3 are welded to the cover B and provided with externally screw-threaded portions that project downwardly through the cover into internally screw-threaded sleeves 14 that receive externally screw-threaded portions on the upper ends of the rods 10. The rods 10 are provided at their lower ends with externally screw-threaded portions which pass through rigid sleeves or lugs 15 on the bar 11, nuts 16 being mounted on the rods 10 at points below the bar 11 and above the upper ends of the sleeves 15, so as to form a rigid connection between the rods 10 and bar 11 that can be manipulated in the operation of adjusting the rods 10, or in the event that it becomes necessary to substitute rods 10 of different length, in the operation of installing the core and coil structure in the tank.

In the operation of adjusting the means that is used to connect the core and coil structure to the cover of the tank, care is taken to have the rods 10 of such length that bearing devices, at the lower end of the core and coil structure C, will bear squarely on the bottom of the tank A when the cover B of the tank is clamped in operating position. Usually this adjustment can be attained by manipulating the nuts 16 and screwing the rods 10 more or less into or out of the depending sleeves 14 on the underside of the cover B. Such adjustment of the rods 10 can easily be effected through a hand-hole 17 in the cover B that is normally closed by a removable cap 18 that is retained in position by wing nuts 19 mounted on bolts that project upwardly through the cover B and through the cap 18 as shown in Figure 2. Any suitable means may be used to hold the core and coil structure C centered with relation to the side wall of the tank A, the means herein illustrated for this purpose consisting of a ring 20 of slightly less external diameter than the internal diameter of the tank, arranged in horizontal relationship with the core and coil structure C and rigidly attached to the horizontally disposed bar 11 previously described.

A transformer of the construction above described greatly simplifies the operation of combining the transformer leads with parts on the exterior of the transformer tank to which said leads are adapted to be attached, due to the fact that the cover B of the transformer tank is intended to be turned, rotated or oscillated so as to bring the high and low voltage terminal assemblies into any desired position as previously explained.

Still another advantage or desirable feature of such a transformer is that a single workman can quickly and easily install or remove the core and coil structure and the insulators for the high and low voltage leads simply by grasping the hooks or handles 3 and raising or lifting the cover B of the transformer tank. The weight, or major portion of the weight, of the core and coil structure is borne by the bottom of the tank and, consequently, the core and coil structure is firmly supported at all times and is held in properly spaced relationship with the side wall of the tank by means of the centering ring 20, but it will be noted that the core and coil structure moves with the cover when said cover is being turned about a vertical axis to adjust the high and low voltage terminal assemblies as previously explained. When the cap 18 is removed a workman can easily manipulate or adjust the means to attach the core and coil structure to the cover so as to provide a tight joint between the cover and the side wall of the tank and, at the same time, have the major portion of the weight of the core and coil structure sustained by the bottom of the tank. Due to the simplicity in the design of the co-acting parts of the transformer above described, the transformer can be manufactured at a low cost and easily adjusted so as to arrange the transformer leads in the most convenient location or to best meet any special mounting arrangement of the high and low voltage insulating bushings.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

In a transformer, the combination of a circular tank, a removable cover resting on the top edge of said tank and provided with high and low voltage terminal assemblies arranged eccentrically with relation to the vertical axis of the tank, said cover being adapted to be turned or rotated relatively to the tank during the operation of installing the transformer so as to produce a desired relationship between said terminal assemblies and objects on the exterior of the tank, a core and coil structure arranged inside of the tank and spaced far enough away from the side wall of same to permit said structure to be turned or rotated relatively to said side wall, means for causing the core and coil structure to move with the cover when the cover is lifted or turned, and a retaining means for said cover constructed so as to permit the cover to have any desired degree of rotary or oscillatory movement.

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