

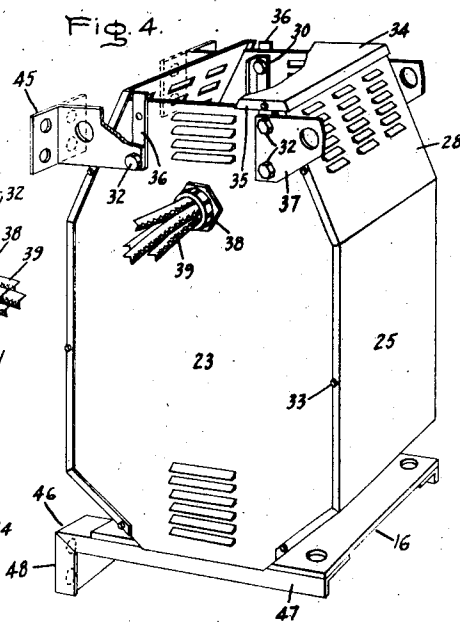
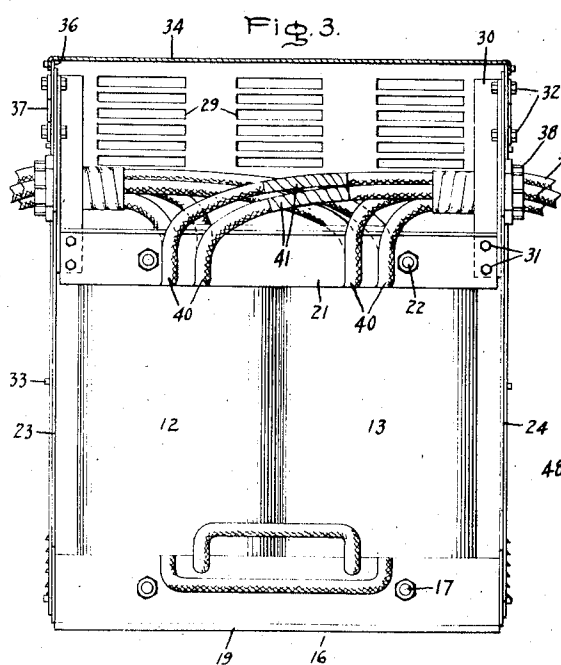
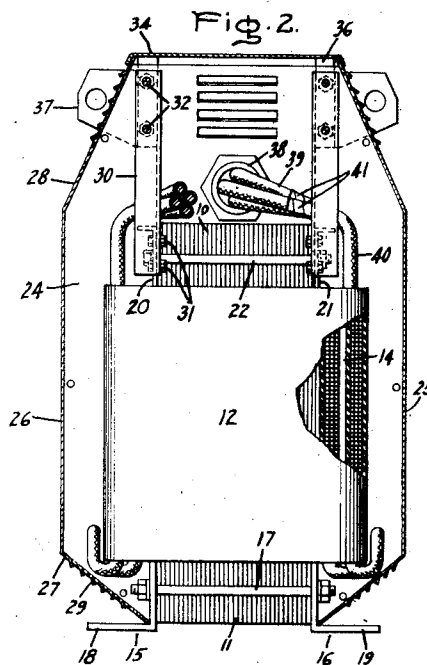
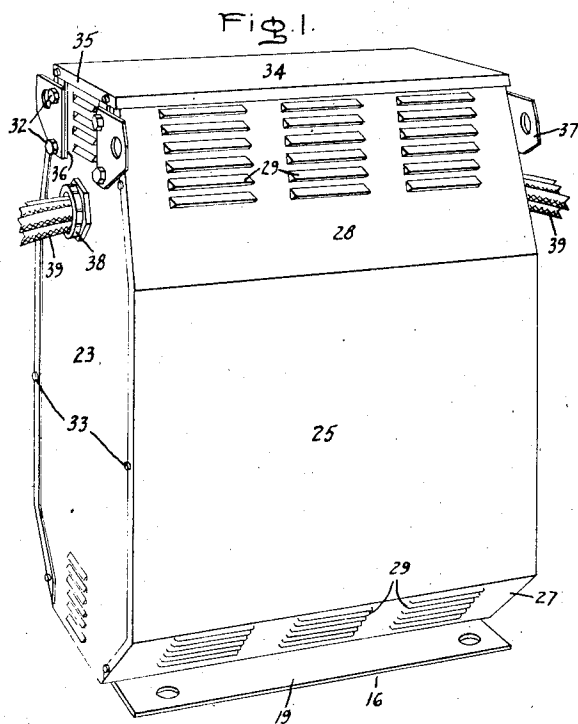
July 18, 1944.

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2,354,078

ELECTRIC APPARATUS

Filed April 21, 1942



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UNITED STATES PATENT OFFICE

2,354,078

ELECTRIC APPARATUS

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Application April 21, 1942, Serial No. 439,801

10 Claims. (Cl. 175—361)

My invention relates to electric apparatus, and to enclosing housings therefor, and although not limited thereto it has particular application to transformers of the air-cooled type.

An object of my invention is to provide an improved electric apparatus construction which will be efficient in operation and economical to manufacture.

A further object of my invention is to provide an electric apparatus with an improved enclosing housing construction.

A still further object of my invention is to provide an electric apparatus with an improved housing construction which will facilitate the passage of cooling air through the passageways in the housing, and through the apparatus within the housing.

Further objects and advantages of my invention will become apparent from the following description referring to the accompanying drawing, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In the drawing Fig. 1 is a perspective view of an electrical apparatus provided with an embodiment of my invention; Fig. 2 is an end view of the apparatus construction illustrated in Fig. 1, with an end housing member having been removed; Fig. 3 is a side view of the apparatus illustrated in Figs. 1 and 2 with one of the side members of the housing removed, and Fig. 4 is a perspective view of an electrical apparatus the cover being partly broken away, the apparatus being provided with a modification of the mounting arrangement illustrated in Figs. 1, 2 and 3.

In the arrangement illustrated in the drawing, my invention has been applied to a transformer of the air-cooled type, but it is to be understood that my invention may be employed with any other suitable type of electric apparatus. The illustrated transformer includes a conventional core and coils and a clamping arrangement which at one end of the core may provide a supporting or base construction, the core clamping arrangement at the opposite end providing a support for an enclosing housing construction. The enclosing casing or housing which includes a plurality of side members and a cover is provided with inwardly extending or tapered portions at both ends and louvers in the tapering portions to permit the free circulation of air over the core and coils inside the casing. Such a general construction is illustrated in a copending application, S. N. 424,935, filed December 30, 1941, Patent

No. 2,340,727, granted February 1, 1944, for Zelt, and which is assigned to the same assignee as this present invention.

In order to provide an improved and simplified construction a plurality of angle bars or members are supported by the upper core clamps through which bars the housing construction is supported by the upper core clamps. A pair of opposite casing sides or members is attached to the extending angle bars through removable means such as bolts, and the remaining pair of side members which has inwardly extending portions at both ends with louvers is supported by the first-mentioned pair of side members. A cover encloses the top ends of the side members, the cover being contiguous with adjacent ends of the side members with the inwardly extending portions and being spaced from the adjacent ends of the remaining pair of side members which is attached to the angle bars. Lifting ears may be provided on the outside of the casing which ears are attached to the upwardly extending angle bars. It will be understood that any other suitable lifting means may be provided through the core clamps. If it is desired to mount the apparatus construction on a vertical wall, suitable mounting brackets may be attached to the upper and lower core clamp construction.

Referring more particularly to the drawing, it will be seen that I have provided a transformer construction which includes a core provided with upper and lower yoke portions 10 and 11 and winding legs surrounded by coils 12 and 13 which may be of any suitable type. Since this transformer is of the air-cooled type the coils 12 and 13 may include a plurality of concentric layers providing ducts 14 between the layers through which the cooling air may pass, as will be seen in Fig. 2. The yoke construction 11 of the core is provided with a clamping arrangement which includes suitable angle bars 15 and 16 which extend across opposite sides of the yoke. The core clamps 15 and 16 are tightly secured to either side of the yoke in any suitable manner, such as by bolts 17. The core clamps 15 and 16 are in the form of an angle iron so as to provide outwardly extending portions 18 and 19 which provide a base or foot construction for supporting the electrical apparatus on a base. Thus, the apparatus may be vertically mounted on a horizontal base with feet members 18 and 19 resting on the base, but it is to be understood that my construction may be mounted in any other suitable position, such as being wall mounted, and an improved construction to accomplish this will be described below.

The opposite or yoke portion 10 is clamped by a pair of bars or angle irons 20 and 21 to opposite sides of the yoke construction through bolts 22.

As will be seen in the various figures of the drawing the enclosing housing or casing for the core and coils includes a pair of similar side members 23 and 24, and a pair of similar side members 25 and 26. It is to be understood that these side members may have any suitable size in relation to each other, depending upon the dimensions of the core and coil structure. The side members 25 and 26 are provided with inwardly extending portions 27 and 28 at their opposite ends. These inwardly extending portions are provided with suitable louvers or openings 29 so as to facilitate the circulation of the air through the passages of the core and coils inside the housing. Such a tapering construction is shown in the above-mentioned Zelt application.

In order to facilitate the mounting of the housing construction through the upper core clamps I provide at each end of the clamps 20 and 21, bars or L shaped members 30 which are supported through the core clamps 20 and 21 through bolts 31. By employing L shaped bars which cooperate with the ends of the L shaped members which provide the core clamps, a relatively rigid construction is thereby provided. The housing construction is mounted and supported through these L shaped members 30 by attaching the side members 23 and 24 to the upper ends of the L shaped members 30 by means of bolts 32. The side members 25 and 26 with the tapering portions at both ends may be attached to the other sides in any suitable manner and in the drawing they are in turn removably attached to the side members 23 by bolts 33. In order to enclose the upper end of the housing, a cover member 34 is provided having a depending flange 35 which extends over the adjacent ends of the side members 25 and 26. The cover 34 is also contiguous with these adjacent ends of the side members 25 and 26, as will be seen in Fig. 2. It will also be seen, particularly in Fig. 4, that the cover member 34 is spaced from the adjacent edges of the side members 23 and 24, so as to provide a passage or path through which air may circulate. The depending flange 35 extending over this passage prevents any foreign material such as water from splashing into the housing through this passage.

The cover member 34 may be spaced from the adjacent ends of the side members 23 and 24 in any suitable manner and in the arrangement illustrated in the drawing it will be seen that the adjacent ends of the side members 25 and 26 extend a short distance beyond the ends of the side members 23 and 24. Furthermore, plates 36 are provided with ends which extend beyond the edges of the members 23 and 24 so as to further insure the spacing of the cover member 34 from the adjacent ends of the side members 23 and 24. These plates 36 are positioned outside the casing and are in turn rigidly supported to the outer surface of the side members 23 and 24 through the bolt members 32 which attach the side members 23 and 24 to the upstanding angle members 30.

In order to provide a convenient arrangement for lifting the transformer construction lifting ears 37 may be provided at the four corners of the structure, and which are rigidly supported by the upstanding angle members 30. This is accomplished by bolting the lifting ears 37 to the outside surface of the strips 36 by the bolts 32 which also accomplish the function of rigidly supporting

the strips 36 and the side members 23 and 24 to the angle bars 30.

In order to make suitable electrical connections to the coils 12 and 13 inside the transformer structure suitable nipples 38 are provided around openings in the side members 23 and 24 to accommodate cables 39. As will be illustrated in Fig. 3 these cables 39 may be electrically connected to leads 40 which extend from the coils 12 and 13 by the splices indicated at 41 in Fig. 3. If desired, however, the leads 40 may be sufficiently long so that connection may be made to suitable cables or connectors outside the transformer structure.

If it is desired to mount the apparatus construction in some other suitable position such as through a vertical surface wall brackets 45 and 46 may be provided at the top and bottom of the apparatus construction, which brackets are rigidly attached to the upper and lower core clamps in any suitable manner. As will be seen in Fig. 4 the lifting ears 37 may be removed at one side and the wall brackets 45 rigidly attached through the bolt 32 to the angle bars 30. The wall mounting brackets 46 may be provided with a section 47 which bridges between the members 18 and 19 of the lower core clamps and is rigidly supported thereto. The bracket 46 may have a right angularly extending portion 48 with suitable holes through which it may be rigidly attached to a vertical wall.

Although I have shown and described particular embodiments of my invention, I do not desire to be limited to the particular embodiments described, and I intend in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an electric apparatus, a core having a plurality of laminations, means for clamping said laminations together, an enclosing casing for said core including a plurality of side members, means including means extending from said core clamping means for supporting said casing through said core clamping means, opposite of said side members having inwardly extending portions on at least one end thereof, said inwardly extending portions having openings to permit free circulation of air over said core inside said casing, and means including said means extending from said core clamp means for providing lifting means for said apparatus so that the casing need not support the weight of the apparatus during lifting.

2. In an electric apparatus, a core having a plurality of laminations, means for clamping said laminations together, bars extending from said core clamping means, an enclosing casing including a plurality of side members, means including said bars for supporting said casing through said core clamping means, and means including said bars and said core clamp means for providing a lifting means for the apparatus so that the weight of the apparatus need not be carried by the casing during lifting.

3. In an electric apparatus, a core having a plurality of laminations, means clamping said laminations together, bars extending from said core clamping means, an enclosing casing including a plurality of side members, means including said bars for supporting said casing through said clamping means, lifting ears outside said enclosing casing, and means for attaching said lifting ears to said bars.

4. In an electric apparatus, a core having a plurality of laminations, means clamping said laminations together, bars extending from said core clamping means, an enclosing casing including a plurality of side members, lifting ears outside said enclosing casing, and means for attaching said lifting ears and said side members to said bars.

5. In an electric apparatus, a core having a plurality of laminations, means clamping said laminations together, bars extending from said core clamping means, an enclosing casing including a plurality of side members and a cover, and means including said bars for supporting said casing through said clamping means, said cover being contiguous with adjacent ends of some of said side members and being spaced from the ends of other of said side member to provide a path for air circulation.

6. In an electric apparatus, a core having a plurality of laminations, means clamping said laminations together, an enclosing casing including two pairs of opposite side members and a cover, and means supporting said casing through said core clamping means, one pair of said side members having inwardly extending portions at both ends thereof, said inwardly extending portions having openings to permit free circulation of air over said core inside said casing, said cover being spaced from the ends of the other pair of said members to provide air passages.

7. A housing for an electric apparatus including two pairs of opposite side members and a cover, one of said pairs of side members having inwardly extending portions at both ends thereof, said inwardly extending portions having louvers to permit free circulation of air over the apparatus inside said housing, said cover having a depending flange extending over the adjacent ends of said one pair of side members and being spaced

from the ends of the other pair of side members to provide air passages, said flange extending over the passages so as to prevent foreign material from entering the housing through the passages.

8. In an electric apparatus, a core having a plurality of laminations, means clamping said laminations together at opposite ends, an enclosing casing, means supporting said casing through said core clamping means at one end, mounting brackets outside said casing, and means including said casing supporting means for attaching said brackets to said core clamping means.

9. In an electric apparatus, a core having a plurality of laminations, means for clamping said laminations together, bars extending from said core clamping means, an enclosing housing, means including said core clamping means for supporting said housing on said core, lifting means outside said enclosing housing, and means for attaching said lifting means to said bars, said housing having an inwardly extending portion at one end thereof, said inwardly extending portion having openings to permit free circulation of air over said core inside said housing.

10. In an electric apparatus, a core having a plurality of laminations, means clamping said laminations together, bar means integral with and extending from said core clamping means, an enclosing casing including side and cover members, means including said bar means for supporting said casing through said clamping means, said casing having openings at one end and said cover enclosing the opposite end of said casing and being spaced from adjacent ends of some of the sides to provide a path for air circulation, and means including said bar means and core clamping means for providing lifting means for the apparatus so that the weight of the apparatus need not be carried by the casing during lifting.

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