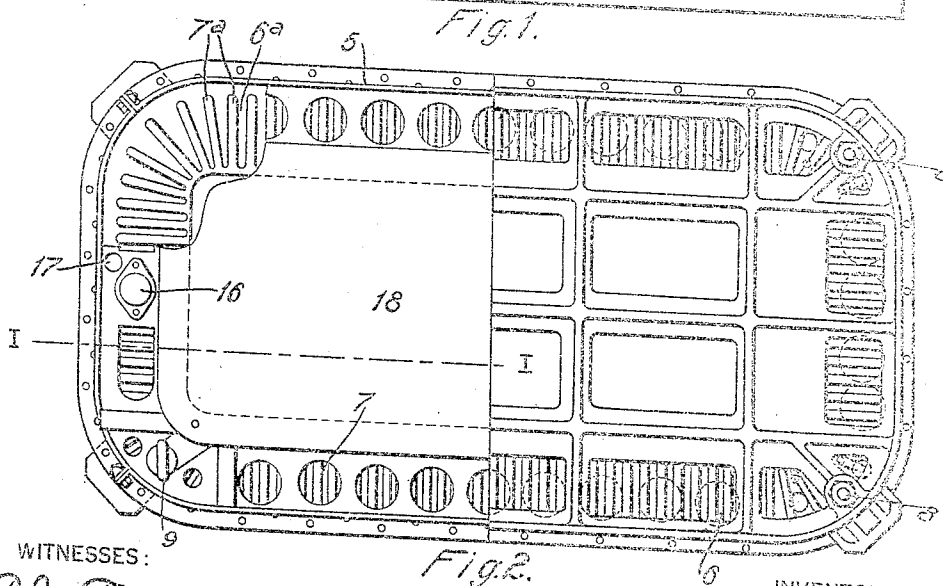
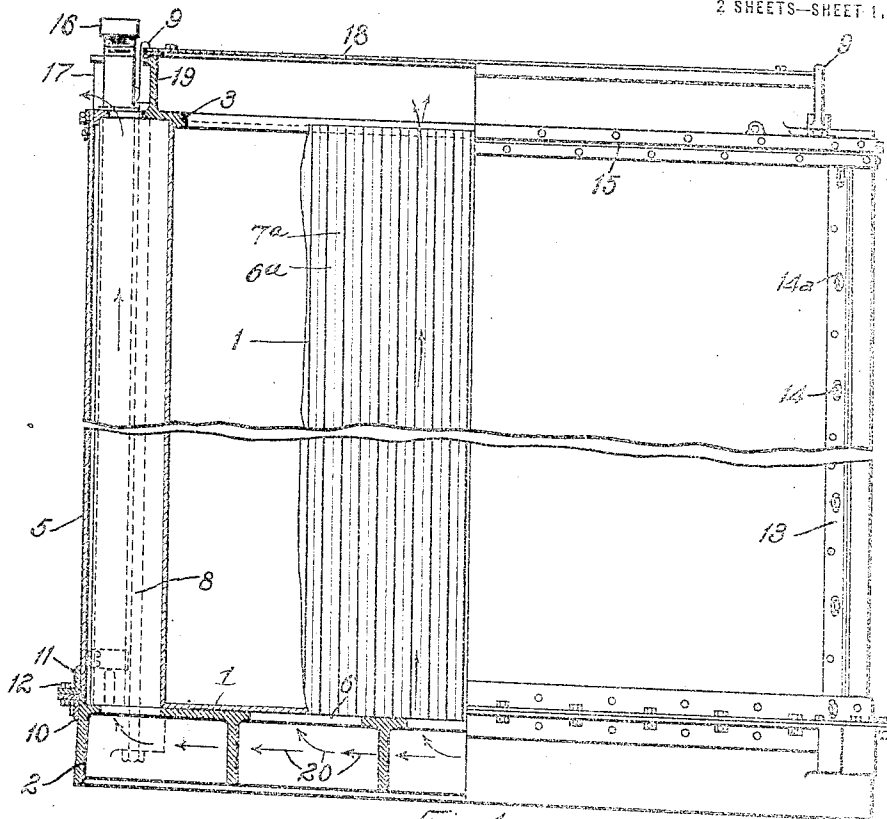


A. SCHAANNING & G. HARLOW.
ELECTRICAL TRANSFORMER.
APPLICATION FILED SEPT. 1, 1916.

1,206,260.

Patented Nov. 28, 1916.

2 SHEETS—SHEET 1.



WITNESSES:

R. J. Fitzgerald.
Geo. W. Hansen.

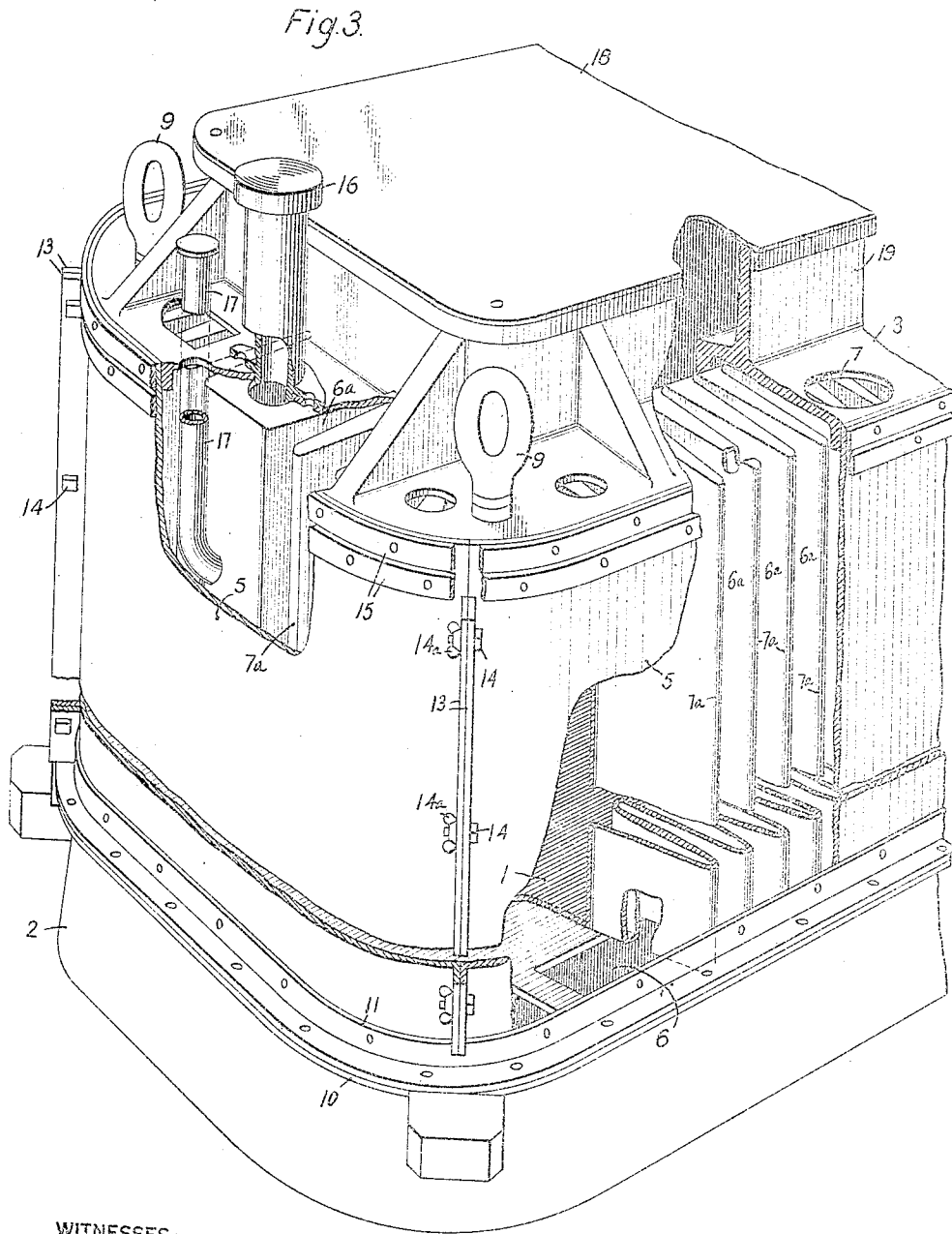
Fig. 2.

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UNITED STATES PATENT OFFICE

ALF SCHAANNING, OF MANCHESTER, AND GEORGE HARLOW, OF ALTRINCHAM, ENGLAND, ASSIGNORS TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRICAL TRANSFORMER.

1,206,260.

Specification of Letters Patent.

Patented Nov. 28, 1918.

Application filed September 1, 1916. Serial No. 118,042.

To all whom it may concern:

Be it known that we, ALF SCHAANNING, a subject of the King of England, and a resident of Manchester, in the county of Lancaster, England, and GEORGE HARLOW, a subject of the King of England, and a resident of Altrincham, in the county of Chester, England, have invented a new and useful Improvement in Electrical Transformers, of which the following is a specification.

Our invention relates to casings or tanks in which heat-generating apparatus, such as electrical transformers, may be contained and immersed in bodies of cooling and insulating liquid.

More particularly, our invention relates to the construction of a heat-radiating casing wherein adequate cooling of the electrical apparatus contained in the casing is insured under different operating conditions.

Structures commonly employed for electrical transformers comprise tanks having cooling surfaces of large exposed areas that are sufficient to radiate the heat generated in the transformers under normal operating conditions, without excessive rises in temperature. This form of construction constitutes what is known as an oil-insulated, self-cooling transformer. With transformers of large power capacity, it is difficult, if not impossible, to provide adequate cooling surfaces for the casings in which the transformers are contained, and, in such cases, currents of air are sometimes directed against the sides of the casings in order to enhance their heat-dissipating properties. This form of construction constitutes what is termed an oil-insulated, air-blast transformer.

The present invention has for its object to provide an improved construction of a casing for a transformer which may be readily and quickly adapted, under different operating conditions, to serve either as a self-cooled or as an air-blast transformer casing.

For a better understanding of the nature and scope of our invention, reference may be had to the following description and the accompanying drawing in which—

Figure 1 is a view, partially in elevation and partially in section, of a transformer tank embodying a form of our invention, the upper part of the sectional portion being

taken along the line I—I of Fig. 2 with the exterior plate being broken away to show a portion of the corrugated side of the casing, and the lower part being taken near the outer edge of the structure shown in Fig. 2; Fig. 2 is a plan view of the transformer of Fig. 1, the left and right hand portions being top and base plan views, respectively, a portion of the top plan view being broken away to illustrate the form of the exterior walls of the containing casing, and Fig. 3 is a sectional, detail, perspective view of one corner of the assembled tank with a portion of an exterior plate broken away to display some of the corrugations formed in a casing wall.

Referring to the drawing, a tank or casing 1, which is adapted to contain the transformer and a body of immersing insulating oil, is made of sheet metal having corrugated side walls and is provided with a lower end-frame 2 and a top end-frame 3, both of which are preferably made of cast iron. Detachable side plates 5 are provided for surrounding the exterior side walls of the corrugated tank or casing 1 and may be attached to the lower and top end-frames by any suitable means. The lower and top end-frames are furnished with a number of orifices 6 and 7, respectively, that are so located as to permit currents of air to be forced between the corrugated walls of the containing casing 1 and the detachable side plates 5. This structure is clearly illustrated in Fig. 3.

The tank 1 is seated upon the base 2 and is clamped between it and the top end-frame 3 by means of tie-bolts 8 terminating in lifting-lugs 9. The base 2 is provided with a plurality of orifices 6 and, similarly, the top end-frame 3 is provided with orifices 7 that may correspond somewhat in position and, if desired, in size to the orifices 6 formed in the base or lower end frame. It will be noted that the orifices 6 and 7 communicate with air spaces 6^a which extend between corrugations 7^a formed in the side walls of the tank, as shown in Figs. 2 and 3. The side plates 5, which are exteriorly detachable, are preferably made of sheet metal and, when in position, surround the corrugated sides of the tank or casing. The plates 5 are held in this position on the base 2 by means of angle irons 10 and

11 that are bolted together by means of bolts 12 and are attached, respectively, to the base 2 and to the lower portion of the side plates 5. For convenience in handling, it may be desirable to provide four side plates, as shown, when the containing casing 1 is of a rectangular form, although a greater or smaller number than four side plates may be used, as is most convenient. The side plates are held together, where they adjoin, by means of angle plates 13 through which extend bolts 14 having wing nuts 14^a. In this manner, the side plates 5 may be readily disengaged from one another, since the bolts 12 and 14 are exteriorly accessible. Instead of angle irons, bands 15 are riveted to the top of the side plates 5 in order to strengthen them. An oil-filling pipe 16 and an oil-gage 17, which are usually supplied as accessories to a transformer casing, are accessible. These accessories are supported by an expanded portion formed in the casing walls, as shown in Fig. 3. A lid or cover 18 is attached to an upstanding flange 19 formed on the upper end-frame 3.

When the side plates 5 are removed, the apparatus forms an oil-insulated, self-cooling transformer casing of the usual type. If, on the other hand, the side plates 5 are secured in position, as shown particularly in Fig. 3, and the whole apparatus is placed above an air well (not shown), currents of air represented by arrows 20 may be forced through the orifices 6 in the base 2 and between the corrugated walls of the tank 1 and the side plates 5, passing out to the atmosphere through the orifices 7 in the top end-frame 3. In this manner, the output of the transformer may be considerably increased, since the heat-radiating property of the containing casing or tank 1 has been greatly enhanced by means of effective forced cooling. While a specific structure has been illustrated and described in detail, it is to be understood that the invention is not limited to the details of construction herein described, as variations may be made therein without departing from the spirit and scope of the appended claims.

We claim as our invention:

1. A containing casing having corrugated sides, detachable side plates to surround the corrugated sides, a base member, and a top end-frame member, said members being

severally provided with openings so as to permit air currents to flow between the corrugated sides of the casing and said side plates.

2. A containing casing having sides in which are formed a plurality of outwardly extending adjacent heat-radiating fins that are normally exposed to the outer air, exteriorly detachable side plates co-extensive with the sides of the casing for inclosing said casing sides but being spaced therefrom in order to provide circulating passageways for air currents, and end frames that are provided with openings through which air currents may be directed to flow in said passageways.

3. A casing having sides provided with outwardly-extending and adjacent heat radiators, detachable side plates for inclosing the said sides having heat radiators, and top and bottom end plates therefor in which openings are formed that communicate with the air spaces between adjacent heat radiators.

4. A containing casing for an electrical apparatus having sides that are conducive to dissipating the heat generated by the apparatus under normal operating conditions, exteriorly detachable side plates for inclosing the containing casing, said side plates being spaced from the sides of the casing in order to provide passageways therebetween, and top and bottom end-frames engaging said side plates and being provided with openings through which air currents may be conducted to said passageways.

5. A containing casing for an electrical apparatus having adjacently disposed radiators normally in direct contact with the outer air, detachable side plates for inclosing said radiators of the casing, said side plates being spaced from the casing in order that cooling air currents may flow therebetween, and top and bottom end plates severally provided with openings that register with the air spaces between adjacent radiators.

In testimony whereof, we have hereunto subscribed our names this 3rd day of August, 1916.

ALF SCHANNING.
GEORGE HARLOW.

Witnesses:

WALTER HOWARD WADWORK,
HORACE BRADSHAW NEARN.