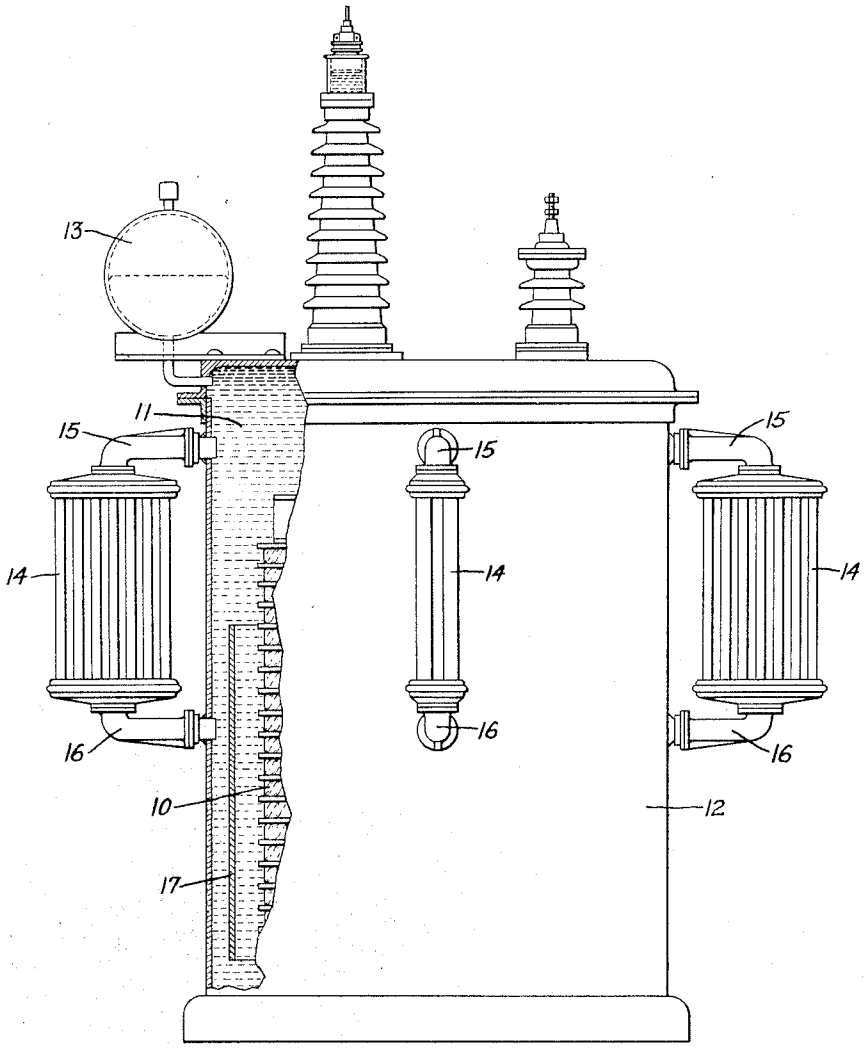
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CASING FOR ELECTRICAL INDUCTION APPARATUS

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CASING FOR ELECTRICAL INDUCTION APPARATUS

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3 Claims. (Cl. 175—361)

My invention relates to casings for electrical induction apparatus such as transformers and reactors and more particularly to such casings containing insulating liquid in which the apparatus is immersed and having external heat radiators for cooling the liquid. The usual practice has been to connect each radiator between the upper and lower parts of the casing with the assumption that this was the most effective and economical arrangement for circulating and cooling the insulating liquid in the casing. The general object of the invention is to provide an improved and more effective and economical arrangement of radiators for cooling the liquid.

The invention will be explained in the following description taken in connection with the accompanying drawing which shows a transformer with a casing provided with heat radiators in accordance with the invention, part of the casing being broken away to show structure inside the casing.

The transformer 10 shown in the drawing is immersed in an insulating liquid 11 in a casing 12, the insulating liquid filling the casing 12 and extending into an expansion tank 13 to permit expansion and contraction of the liquid caused by temperature changes. The losses in the transformer while it is in operation appear as heat which raises its temperature and the heat must be dissipated at a sufficient rate to prevent such an increase in the temperature of the transformer as might cause injury to it. The maximum load which the transformer can safely carry may be increased by increasing the rate at which the heat is dissipated. For this purpose, the casing 12 is provided with external heat radiators 14. The height of each radiator 14 is considerably less than that of the casing 12 and is located beside the upper part of the casing with which it communicates through top and bottom pipe connections 15 and 16. The liquid 11 in the casing 12 is heated by the transformer 10 and rises by convection to the upper part of the casing. The heated liquid then enters the pipe connections 15, descends through the radiators 14 where it is cooled and finally returns to the casing 12 through the pipe connections 16, ready to absorb more heat from the transformer. The rate of heat dissipation is greatest near the tops of the radiators where there is the greatest difference in temperature between the liquid and the air surrounding the radiators. As the liquid descends in the radiators it becomes cooler and cooler and the heat dissipation decreases. By using short radiators, as shown in the drawing, it is not necessary for the liquid to remain in the radiators after there is no longer any substantial dissipation of its heat and unnecessary resistance to the flow of the liquid is thus avoided.

The lower ends of the radiators 14 are a substantial distance above the bottom of the casing 12 and the bottom pipe connections 16 are as short as possible to reduce resistance to the flow of the liquid. Thus the cooled liquid is returned to the casing 12 at a considerable distance above the bottom of the casing. In order that the liquid in the bottom of the casing may circulate and keep the lower part of the transformer cool, a baffle 17 is arranged between the transformer and the wall of the casing. This baffle 17 deflects the liquid from the radiators 14 toward the bottom of the casing 12 so that it may reach and cool the lower part of the transformer. The baffle 17 may be of any desired material and form such as an insulating pressboard cylinder. It preferably extends somewhat above the bottom connections 16 and well down toward the bottom of the casing 12 and should be spaced sufficiently from the casing wall to provide an easy path for the flow of liquid.

The invention provides an effective arrangement for cooling the transformer and avoids an expensive use of heat radiating surfaces where such surfaces are inefficient.

The invention has been explained by describing and illustrating a particular arrangement and application thereof but it will be apparent that changes may be made without departing from the spirit of the invention and the scope of the appended claims.

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

1. The combination with electrical induction apparatus immersed in insulating liquid in a casing, of a heat radiator, a pipe connection between the top of the radiator and the upper part of the casing, a pipe connection between the bottom of the radiator and the casing, the bottom of the radiator and its pipe connection being substantially above the bottom of the casing, and a baffle for diverting liquid from the radiator toward the bottom of the casing.

2. The combination with electrical induction apparatus immersed in insulating liquid in a casing, of a heat radiator, the top of the radiator communicating with the upper part of the casing, the bottom of the radiator communicating with the casing substantially above the bottom there-

of, and a baffle for diverting liquid from the radiator toward the bottom of the casing.

3. The combination with electrical induction apparatus immersed in insulating liquid in a casing, of a plurality of heat radiators, the tops of the radiators communicating with the upper part of the casing, the bottoms of the radiators communicating with the casing substantially above the bottom thereof, and a cylindrical baffle between said apparatus and the wall of the casing to divert liquid from the radiators towards the bottom of the casing.

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