Nov. 20, 1923. 1,474,777

L. JARKOVSKY

ELECTRIC WATER HEATER

Filed Oct. 25, 1921

Fig. 1

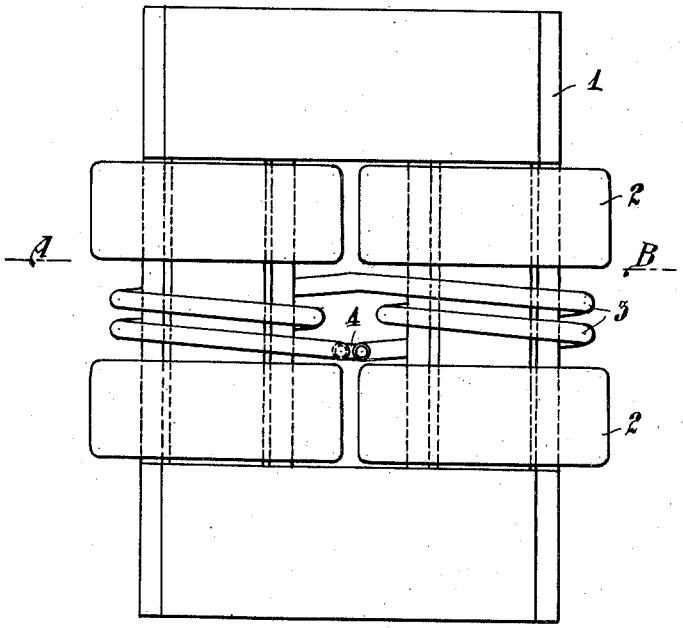
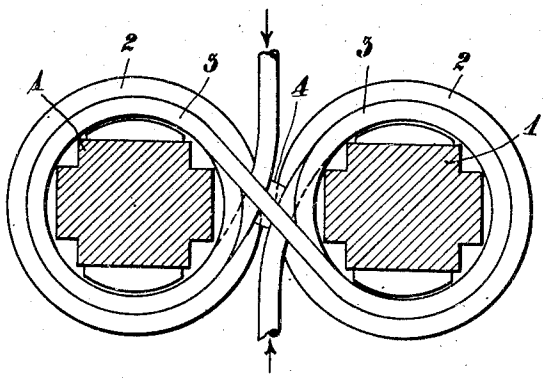


Fig. 2



Ladislaus Jarkovsky
Inventor

E. W. J. F. Braunsberg

Attorneys.

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UNITED STATES PATENT OFFICE.

LADISLAUS JARKOVSKY, OF VIENNA, AUSTRIA.

ELECTRIC WATER HEATER.

Application filed October 25, 1921. Serial No. 510,385.

To all whom it may concern:

Be it known that I, LADISLAUS JARKOVSKY, engineer, a citizen of the Republic of Austria, residing at V. Schönbrunnerstrasse 83, Vienna, Austria, have invented an Electric Water Heater, of which the following is a specification.

The object of this invention is an electric water heater in which the heating of the liquid is done in tubes which are part of the secondary circuit of a transformer for alternating or three-phase currents.

In the hitherto known arrangements of such heaters the secondary pipe-winding is either over or under the primary winding. Arrangements with the primary winding on one leg of the core, and the secondary pipe-winding on the other leg are practically unsuitable having great leakage-losses. But also the arrangements in which the pipe-winding is over or under the primary winding have many disadvantages; if the primary coil is wound over the pipe-coil, it becomes very large, therefore expensive and there are great ohmic losses; if, on the contrary, the pipe-coil is over the primary winding, then the indispensable heat radiation of the primary coil is impeded, and in case that moreover somewhat hotter water were required, and is drawn from the heater, the surface of the primary coil is heated instead of being cooled. Such apparatus, even with large dimensions of the primary copper, so as to have as little watt-losses as possible, are hardly suitable for continuous service, the primary winding soon becoming overheated. Moreover, both arrangements have the drawback of heavy stray-losses in common, so that their efficiency hardly amounts to 80 pct.

All these inconveniences are done away with the present invention which substantially consists in placing the water-carrying secondary pipe-coil between the primary coils of the transformer.

The drawing shows, by way of example, one construction of a water heater according to this invention. Fig. 1 is a view in elevation and Fig. 2 a section on line A B. 1 designates the closed laminated iron core, 2 denotes the primary coils, and 3 the secondary pipe-winding.

The water-carrying, secondary pipe-winding 3 is neither over nor under but between the primary winding of the divided primary coil. In this way the leakage is reduced to a minimum and the efficiency rises to more than 90 pct. Moreover it is obtained that the temperature of the pipe-coil does not interfere with the temperature of the primary winding. By this arrangement therefore, not only a considerably higher efficiency than hitherto recorded is obtained, but also the possibility of an unlimited continuous service with smallest expenditure of primary copper. The primary winding may also be divided into more than two parts, for instance into three or four parts with two, respectivelv three secondary pipe-coils between these parts.

In order to have secondary currents flowing through the secondary pipe-winding, it is of course necessary that the said winding forms in itself one complete circuit. This may be favorably accomplished, according to this invention, by first winding one single coil of as many and one more convolutions as ultimately shall be placed on both legs, then, by turning the upper or the lower half of this coil through an angle of 180°, thus completely inverting it, two coils are got, the forms of which are shown in Figs. 1 and 2. The uppermost and the lowest pair of convolutions have both the form of the figure 8, as shown in the drawing Fig. 2.

To the purpose of connecting the inlet and the outlet end of the winding to the pipe-conduit, conveniently the parts in the middle of said lowest pair of convolutions are straightened out and held in this position by the short-circuiting bridge 4.

In this manner, avoiding soldered joints in the topmost parts of the winding, the advantage of easiest manufacture combines with that of a nice appearance.

What I claim is:

1. An electric water heater with pipe coils for the liquid to be heated, said pipe coils forming the secondary winding of a

transformer for alternating on three-phase currents and primary windings of the transformer, the said pipe coils arranged as secondary windings of the transformer between the said primary windings.

2. An electric water heater with pipe coils for the liquid to be heated, said pipe coils forming the secondary winding of a transformer and composed of two halves of one single coil turned and bent down in such a way that both the axis of the halves of the coil stand transversely to the axis of the original complete coil.

ING. LADISLAUS JARKOVSKY.