March 21, 1950 O. A. KENDALL 2,501,393

INDUCTION FLUID HEATER

Filed Feb. 13, 1946

FIG. 1

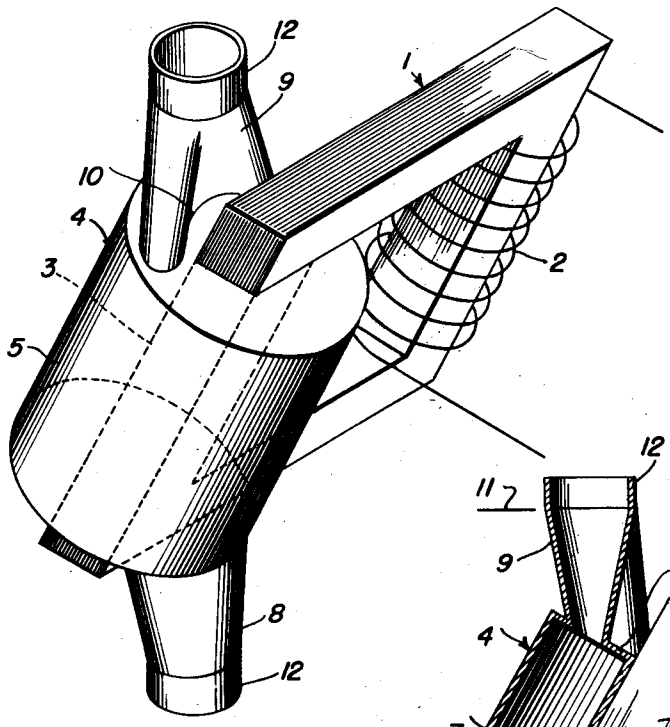


FIG. 2

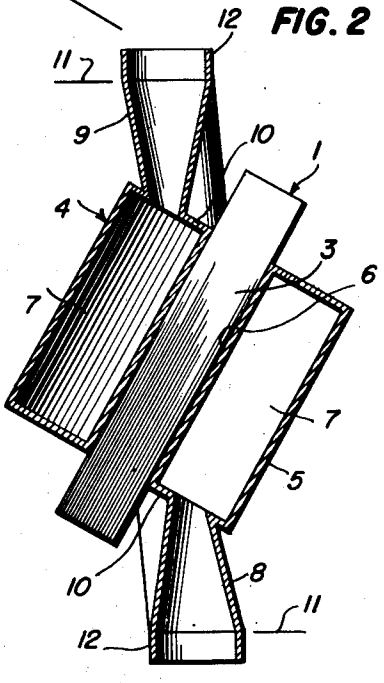
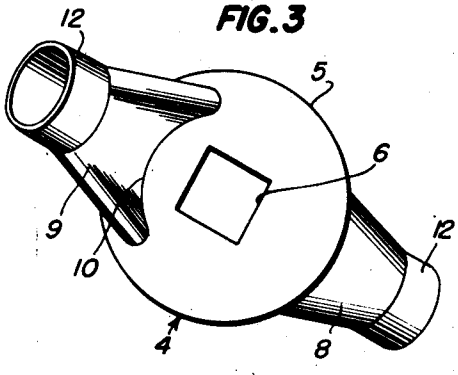


FIG. 3



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INDUCTION FLUID HEATER

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2 Claims. (Cl. 219—47)

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This invention relates to novel improvements and structural refinements in electric heaters for liquids, and applies particularly to those in which the secondary winding of a transformer is substituted by the liquid itself and by the heating unit through which the liquid passes, which in turn, becomes heated by the inductive action of the transformer primary winding. While several types of heaters embodying this principle of operation are conventionally known, their successful function is usually impaired by the coil-like manner in which the water tubes are passed around the transformer core. This condition introduces an added resistance to the free passage of water, which in many cases needs to be circulated by artificial means, in order to promote a more successful operation. Furthermore, the coil-like passages in conventional heaters have a tendency to become clogged by deposits of mineral matter existing in the water, and since their cleaning is difficult, the operating efficiency of the heater is thereby further minimized.

It is therefore, the principal object of this invention to eliminate the afore-mentioned difficulties by providing a heater in which the water will pass freely through the heating unit, circulated only by the convection current inherent therein.

A further object of the invention is to provide a heater which can be readily cleaned.

An additional object of the invention is to provide a heater which is of simple construction and operation.

With the above more important objects in view, and such other objects as may become apparent as this specification proceeds, the invention consists essentially of the arrangement and construction of parts as illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view showing the heater assembly.

Figure 2 is an elevational, cross-sectional view, taken in a vertical plane of the heater shown in Figure 1.

Figure 3 is a top plan view of the heating unit.

Like characters of reference are used to designate like parts in the specification and throughout the several views.

The invention comprises a four-sided transformer core 1, open at the center thereof and provided on one side with a primary winding 2. The sides of the core 1 are substantially square in cross-section, and positioned upon the side 3 of the core is a heating unit 4.

This heating unit is constructed of material

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such as cast iron, which offers high resistance to the passage of electric current, and consists of a cylindrical body 5 provided with an open-ended, axial bore 6. The latter is square in cross-section and is designed to accommodate the side 3 of the core 1, as will be clearly apparent from the accompanying drawings.

Surrounding the bore 6 in the body 5 is an annular chamber 7, and an inlet duct 8 and an outlet duct 9 communicate with the chamber at the opposite ends thereof.

In addition to being positioned at the opposite ends of the chamber 7, the ducts 8 and 9 are also disposed on the relatively opposite sides of the transformer core, so that when the latter and the associated body 5 is mounted in a vertically off-set plane as is illustrated in the accompanying Figure 2, the axes of the ducts 8 and 9 will be in vertical alignment.

The end of each of the ducts 8 and 9 which is connected to the body 5 is an arcuate, elongated cross-sectional configuration, as indicated by the reference numeral 10. Therefrom, each of the ducts is tapered to form a circular cross-sectional configuration on the plane of the line 11 and a short tube 12 is provided or formed integrally with the outer end of each duct, whereby it may be connected to the water system.

The cross-sectional area of the opening in each of the tubes 12 is equal to the area of the opening in the elongated end 10 of the ducts 8 and 9.

When the invention is placed in operation, the heater is mounted in the position best illustrated in the accompanying Figure 2, and the vertical alignment of the ducts 8 and 9 will facilitate free and unrestricted passage of the water through the chamber 7.

The ducts are connected as already explained, to the water system of a suitable storage tank, which however, constitutes no part of the present invention and therefore is not illustrated in the accompanying drawings.

While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What I claim as my invention is:

1. An electric heater for liquids comprising, in combination, a transformer having a four-sided laminated core open at the center thereof, a primary winding on one side of said core, and a metallic heating unit at the opposite side of said

core and in circuit therewith, said core and said unit lying in intersecting planes, said unit comprising a cylindrical body having an open-ended bore extending axially there-through, said opposite side of said core extending through said bore, an annular chamber formed in said body surrounding said bore and having a longitudinal axis parallel to the axis of said core, an inlet duct and an outlet duct on said body, said ducts being in vertical alignment and communicating with said chamber at the opposite ends thereof and on relatively opposite sides of said core, both of said ducts having a common longitudinal axis intersecting the said opposite side of said core.

2. The device as defined in claim 1, in which the opening in the end of each of said ducts communicating with said chamber is of an arcuate, elongated cross-sectional configuration, a tapered portion medially the length of each of said ducts, said portion terminating in an opening of

circular cross-sectional configuration adjacent the remaining end of said duct, and an extension tube at the circular end of each of said portions, each of said elongated openings being equal in cross-sectional area to the opening in each of said tubes.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,729,685	Rees	Oct. 1, 1929
1,829,119	Thery	Oct. 27, 1931
2,044,750	Bryant	June 16, 1936
2,060,039	Clapp	Nov. 10, 1936
2,265,470	Black	Dec. 9, 1941