

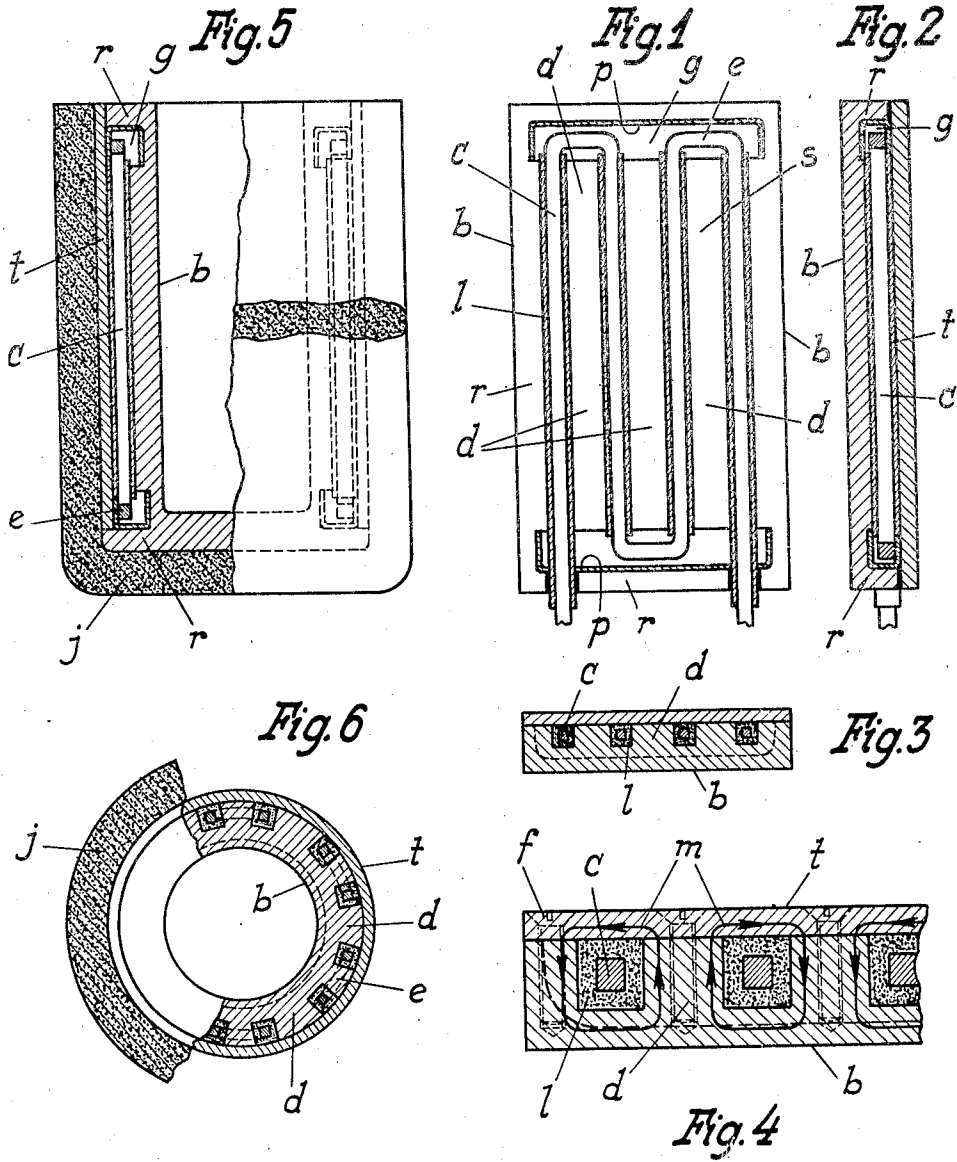
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ELECTRICAL HEATING DEVICE

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ELECTRICAL HEATING DEVICE

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3 Claims. (Cl. 219-47)

This invention relates to an electrical induction heating device of the kind in which an electric conductor is surrounded by a solid iron body to produce heat by the eddy currents induced in the iron by alternating currents flowing through said conductor.

The invention has for its object to provide a heating device which can be easily manufactured in a great variety of shapes, converts the current into heat with the highest efficiency and forms a self-contained unit enclosing totally the electric conductors so that such units are adapted for general use in any medium even submerged in electrically conducting liquids.

The device according to this invention consists of a completely closed box formed by two equidistant plane or curved solid iron plates and by peripheral iron ribs which box contains a serpentine conductor isolated from the iron and solid iron ribs overbridging the air gap enclosed by the equidistant iron plates between the several turns of said serpentine conductors.

The annexed drawing shows two embodiments of this invention as examples.

Figure 1 is a flat heating plate or unit shown in plan view with the cover plate removed and the insulators in section,

Figure 2 is a sectional side elevation of the same with the cover plate across line $x-x$ of Fig. 1,

Figure 3 is the cross-section of the heating plate across line $y-y$ of Fig. 1,

Figure 4 is a part of Fig. 3 on an enlarged scale,

Figure 5 is a side elevation of a cylindrical heater partly in section, and

Figure 6 is a cross-section thereof.

b is a solid iron bottom plate, and equidistant or parallel therewith is a solid iron top plate t joined by a peripherally solid iron rib r to a completely closed box. c is a serpentine conductor located within said box. Solid with the bottom plate b are ribs d of solid iron arranged between the several turns of the serpentine conductor c along the straight parts thereof. In the consecutive parallel conductors the currents flow in inverse directions so that the magnetic fluxes m are closed to magnetic circuits through the ribs d . l are electric insulators separating the conductor from the surrounding iron. The ribs d are formed preferably by grooves worked into the bottom plate b , while a channel g is milled across the ribs d to receive the heads e of the turns of the serpentine conductor. p is an insulating layer preferably of mica protect-

ing the heads e uncovered by the insulations l .

The top plate t is bolted or screwed on the bottom plate as shown in Fig. 4, where f are the screws set flush with the cover plate. In the manner described above, each heating plate is a self-contained unit which can be standardized and used in various ways. The conductors on each side surrounded by metal such as iron, ensure an excellent and safe way of even distribution of the heat generated on them by the Joule effect. This energy can be regulated according to circumstances.

The device shown in Figs. 5 and 6 is similar to that one shown in Figs. 1-4 with the difference that both plates b and t are cylindrical. The inner cylinder b corresponding to the bottom plate is provided with the ribs d . The outer cylinder t is slid over cylinder b and the serpentine conductor c is located in the grooves between the ribs d in the annular space between the two cylinders b and t . The peripheral ribs r, r are formed by annular flanges of the inner cylinder b . The device shown in Figs. 5 and 6 can be used as a melting pot for tin, lead, aluminum etc. The whole melting pot is insulated against loss of heat by suitable layers of some refractory material j .

What I claim is:

1. An electric heating device comprising a completely closed box of solid iron having a hollow therein and defined by two equidistant walls, a plurality of solid iron partitions in metallic contact with said equidistant walls, means defining channels at both ends of said partitions, which channels extend transversely across said partitions, a current conductor comprising straight sections substantially parallel with said partitions and disposed therebetween in such manner that the current flows in inverse direction through the adjacent parallel sections of said conductor, and insulating layers separating said conductor from the surrounding iron parts.

2. An electric heating device, comprising two equidistant cylindrical walls, peripheral ribs formed at the ends of said cylindrical walls, the walls and the said ribs forming a completely closed box, a plurality of solid iron partitions in metallic contact with said cylindrical walls and disposed in such manner as to provide annular channels at each end thereof, the said channels extending transversely across said partitions, a current conductor comprising straight sections substantially parallel with said partitions and disposed between said partitions in such manner that the current flows in inverse directions through the adjacent parallel sections of said conductor, and

insulating layers separating said conductor from the surrounding iron parts.

3. An electric heating device, comprising two substantially parallel plane walls, peripheral ribs disposed at the ends of said walls, the said walls and the said ribs providing a completely closed box, a plurality of substantially parallel, solid iron partitions, in metallic contact with said walls, the said partitions providing at their ends channels

extending transversely across said partitions, a current conductor comprising straight sections substantially parallel with said partitions and disposed therebetween in such manner that the current flows in inverse direction in the adjacent parallel section of said conductor, and insulating layers separating the said conductor from the surrounding iron parts.

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