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Mikhailov et al.

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[54] **SPLIT-TYPE MAGNETIC FIELD CONCENTRATOR**

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[51] **Int. Cl.** **B23k 13/00**

[58] **Field of Search** 219/7.5, 8.5, 9.5, 10.79, 219/149, 152; 29/497.5

[56] **References Cited**

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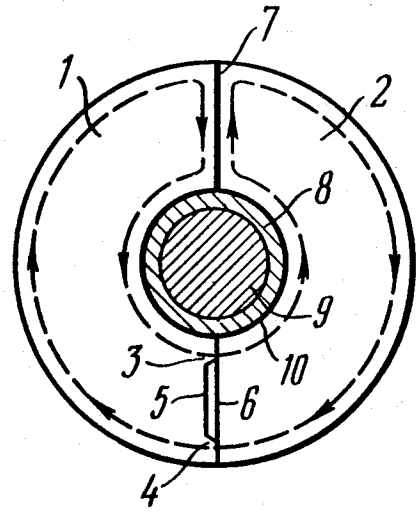
[57] **ABSTRACT**

A split-type magnetic field concentrator to be used in an inductor for magnetic pulse treatment of metals, consisting of two parts which, when joined together, form an aperture for placing therein an article being treated, said parts of the split-type concentrator are insulated from each other in one joint by means of an insulating gasket and contact each other in the other joint, the contacting end of one of the parts being provided with a recess to improve the electric contact between said parts.

2 Claims, 3 Drawing Figures



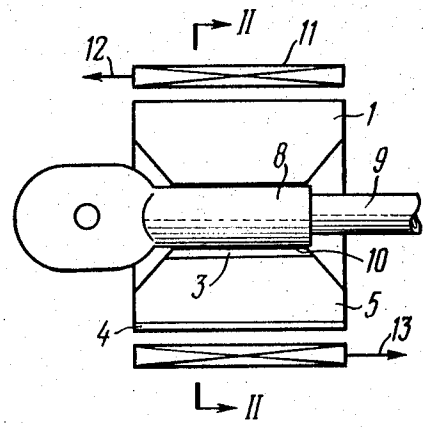


FIG. 1

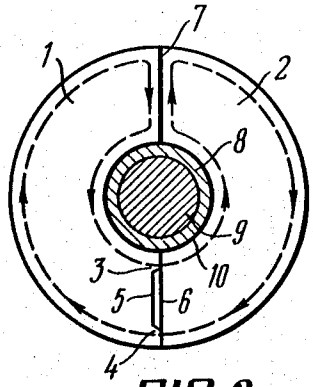


FIG. 2

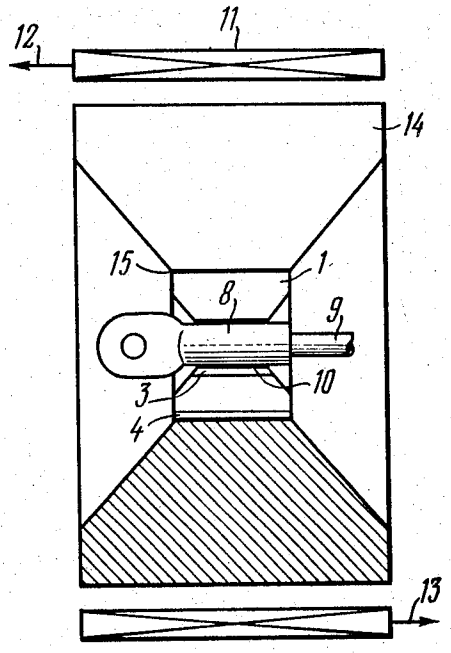


FIG. 3

SPLIT-TYPE MAGNETIC FIELD CONCENTRATOR

The present invention relates to magnetic pulse treatment of metals and, more particularly, to split-type magnetic field concentrators intended to be used in inductors for magnetic pulse treatment of metals.

Known in the art is a split-type magnetic field concentrator intended to be used in an inductor for magnetic pulse treatment of metals, comprising two parts joined together so as to form an aperture for placing therein an article to be treated, the joined concentrator parts being separated in one joint by an insulating gasket while having an electric contact in another joint.

However in the known art design, owing to the impossibility of providing a proper electric contact over the whole surface of the contacting faces current flows from one part of the split-type concentrator into the other part thereof through random contact points which can be located at a large distance from the aperture, thereby resulting in non-uniform working pressure acting upon the article being treated.

The object of the present invention is to eliminate the above disadvantage.

The present invention is directed to the provision of a split-type magnetic field concentrator wherein the parts thereof contact each other electrically in close proximity to the aperture for placing therein the article being treated.

In accordance with the invention this object is attained in a split-type magnetic field concentrator wherein a recess is provided in the central portion of the electrically contacting end of one part of the concentrator.

It is expedient to coat the electrically contacting joint surfaces of the split-type magnetic field concentrator with a layer of an electroconductive and corrosion-resistant material.

In the split-type concentrator of the present invention, owing to the recess in the electrically contacting end of one of the parts of the split-type concentrator, current flows from one part thereof into the other part through points located in close proximity to the working aperture, thereby permitting the uniformity of the working pressure acting upon the article being treated and thus the quality of the treatment to be improved.

The invention will now be explained in greater detail with reference to an examplary embodiment thereof taken in conjunction with the accompanying drawings, wherein:

FIG. 1 shows a split-type magnetic field concentrator to be used in an inductor for magnetic pulse treatment of metals, according to the present invention;

FIG. 2 is a section taken along the line II—II of FIG. 1; and

FIG. 3 shows an embodiment of an inductor with one-piece magnetic field concentrator and the split-type magnetic field concentrator for magnetic pulse treatment of metals, according to this invention.

Referring now to the Figures, a split-type magnetic field concentrator consists of two parts **1** and **2**. The parts **1** and **2** of the split-type concentrator are in electric contact with each other through the medium of projections **3** and **4** formed by a recess **5** on the part **1** of the split-type concentrator and an end surface **6** of the part **2** of the split-type concentrator. On the other hand, the parts **1** and **2** of the split-type concentrator

joined together have an insulating gasket **7** therebetween which is glued to the part **2** of the split-type concentrator.

A cable shoe **8** is placed into the split-type magnetic field concentrator together with a cable **9**, the cable shoe **8** to be pressed on the cable **9**. The cable shoe **8** is electrically insulated from the parts **1** and **2** of the split-type concentrator by means of an elastic sleeve **10** provided with a cut along its generatrix due to which the sleeve is easily put on and taken off the cable shoe. The split-type magnetic field concentrator together with the cable shoe **8** and the cable **9** is inserted inside a winding **11** having terminals **12** and **13**.

The split-type magnetic field concentrator of the present invention operates as follows.

A current pulse is supplied to the terminals **12** and **13** of the winding **11** whose magnetic field induces electric currents in the split-type magnetic field concentrator, whose direction is shown by the arrows in FIG. **2**. Owing to the recess **5** on the part **1** off the split-type concentrator, these currents flow through the projection **3** and the surface **6** in close proximity to the aperture with the cable shoe **8** and the cable **9** inserted therein. A pulse magnetic field generated in the aperture of the split-type concentrator presses the cable shoe **8** onto the cable **9**. Since the currents flow from the part **1** into the part **2** of the split-type concentrator close to the surface of the aperture, the pressure of the magnetic field acting upon the cable shoe **8** is uniformly distributed and the quality of the pressing is considerably higher as compared to that in the known split-type magnetic field concentrators.

Also possible is another embodiment of this invention, wherein the split-type magentic field concentrator is placed together with the cable shoe **8** and the cable **9** inside a one-piece magnetic field concentrator **14** (FIG. **3**). In this case, an insulating sleeve **15** is disposed between the concentrator **14** and the parts **1** and **2** of the split-type concentrator. In this embodiment, a current pulse is supplied to the terminals **12** and **13** of the winding **11** whose magnetic field initially induces currents in the concentrator **14**. These currents flow around the aperture of the concentrator **14** wherein the split-type magnetic field concentrator is disposed. The magnetic field of the concentrator **14** induces, in its turn, eddy currents in the split-type magnetic field concentrator. In other respects the principle of operation of the inductor is similar to that of the inductor with the split-type magnetic field concentrator, shown in FIGS. **1** and **2**.

The inductors with the split-type magnetic field concentrators of this invention are provided with a means for clamping together the parts **1** and **2** of the split-type concentrator to ensure a reliable electric contact.

In addition, a layer of material having high electroconductive and corrosion-resistant properties is applied to the contacting surfaces of the parts **1** and **2** of the split-type magnetic field concentrator.

What is claimed is:

1. A split-type magnetic field concentrator for use in an inductor for the magnetic pulse treatment of articles, comprising; a pair of complementary concentrator parts connectable to each other, said parts being shaped so as to, upon being joined, form a central aperture for receiving said articles being treated and to peripherally encompass the latter, said parts including oppositely located, radially extending connecting joints,

electrically insulating gasket means being interposed on the surface of one of said joints for electrically insulating said parts from each other at said joint, and radially extending recess means being formed in one of said parts in the contacting surface of the other of said joints so as to provide radially inwardly and outwardly spaced areas of electrical contact between said parts at said last-mentioned joint and cause a uniform flow of electrical current about said aperture in close proximity to the article being treated.

2. A concentrator as claimed in claim **1,** comprising a layer of a highly electroconductive and corrosion-resistant material being coated on at least the areas of electrical contact between said parts at said other joint.

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