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METALLIC CORE FOR ELECTROMAGNETS

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In a copending application it is shown that metallic cores for electro-magnetic devices are advantageously prepared from metallic powders obtained by the thermal decomposition of the corresponding metal carbonyls. By these means a metallic powder of an extremely small particle-size of for example 0.00001 millimetre may be obtained. Cores prepared from such material are greatly superior in their properties to such made from any other form of pure iron. For example when employed in the form of rings, they show a very small loss by eddy currents, a very small alteration of the inductivity and a resistance causing losses depending only slightly and nearly proportionally on the frequency of the oscillations.

We have now found that such metallic powders are rendered particularly suitable for the production of metallic cores for electromagnetic devices by subjecting the said metallic powders to a thermal treatment in an atmosphere of reducing gas prior to making them up to the cores. An atmosphere of hydrogen is particularly advantageous for this purpose.

The product thus obtained, which sometimes sinters a little, is then ground to the desired size of grains. This grinding operation is preferably carried out in a ball mill, as in this way a particularly suitable product is obtained.

As a rule oxygen should be excluded during the grinding process, for example, by working in an atmosphere of nitrogen. In some cases, however, a slight superficial oxidation of the grains may be advantageous to which end the ground powder is exposed for a short time to an oxidizing treatment.

The metal powder obtained in this manner is particularly well suited, because of its great permeability, for the production of cores for the so-called Pupin coils. Its permeability may be more than twice that of the initial material.

The following example will further illustrate how this invention may be carried out in practice, but it is understood that the said invention is not limited thereto.

Example

Iron powder obtained by the decomposition of iron carbonyl is treated for 18 hours in a revolving furnace at 500° with a current of hydrogen. After cooling down in an atmosphere of hydrogen, the product is ground in a ball mill with exclusion of oxygen. The permeability of the iron powder thus obtained is more than twice that of the initial powder, which has not been subjected to thermal treatment.

What we claim is:

1. The process of producing metallic cores for electro-magnetic devices from metallic powders obtained by the decomposition of the corresponding metal carbonyl, which comprises the step of subjecting the said powder to a thermal treatment in an atmosphere of reducing gas, prior to preparing cores from the said powder.

2. A modification of the process of claim 1, which consists in employing hydrogen as a reducing gas.

3. The process of producing metallic cores for electro-magnetic devices from metallic powders obtained by the decomposition of the corresponding metal carbonyl, which comprises the step of subjecting the said powder to a thermal treatment in an atmosphere of reducing gas and grinding it to the desired size of grain prior to preparing cores from the said powder.

4. The process of producing metallic cores for electro-magnetic devices from metallic powders obtained by the decomposition of the corresponding metal carbonyl, which comprises the step of subjecting the said powder to a thermal treatment in an atmosphere of reducing gas, grinding it in a ball mill to the desired size of grain, and slightly

oxidizing the surface of the grains, prior to preparing cores from the said powder.

5. The process of producing iron cores for electro-magnetic devices from iron powder obtained by the decomposition of iron carbonyl, which comprises the step of subjecting the said powder to a thermal treatment in an atmosphere of reducing gas, prior to preparing cores from the said powder.

6. The process of producing iron cores for electro-magnetic devices from iron powder obtained by the decomposition of iron carbonyl, which comprises the step of subjecting the said powder to a thermal treatment in an atmosphere of hydrogen, prior to preparing cores from the said powder.

7. As new articles of manufacture metallic cores for electro-magnetic devices, which comprise metallic powder obtained by the decomposition of the corresponding metal carbonyl, the said powder having been subjected to thermal treatment in an atmosphere of reducing gas before being made up to cores.

8. As new articles of manufacture iron cores for electro-magnetic devices, which comprise iron powder obtained by the decomposition of iron carbonyl, the said iron powder having been subjected to a thermal treatment in an atmosphere of reducing gas before being made up to solid cores.

In testimony whereof we have hereunto set our hands.

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