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MAGNET CORE

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3 Claims. (Cl. 175—21)

The present invention relates to the construction of magnet cores and is particularly concerned with the manufacture of cores of the type made from finely divided magnetic material by the application of high pressure which find considerable application in the manufacture of loading coils as applied to a telephone transmission line. The object of the invention is to produce an improved core of this type by the use of a special alloy which is found to have more satisfactory properties than those employed hitherto.

According to the invention the finely divided magnetic particles from which the core is pressed consist of an alloy comprising 60–80% nickel and 20–40% cobalt.

It has already been proposed in my specification Serial No. 625,208, filed 27th July 1932 to make use of an alloy of iron, nickel and cobalt in approximately the proportions of 3:1:1 for loading coil construction as this alloy when treated in the manner described is found to possess a number of desirable properties for this class of work. The improved alloy according to the invention may be dealt with in similar manner and it is found that cores so constructed have a higher permeability at the magnetizing forces concerned while the hysteresis loss is substantially the same. The manner in which the improved alloy is treated and formed into a loading coil as described in the said prior application is as follows: The alloy of nickel and cobalt in the proportions mentioned is drawn into a wire of about four mils diameter which is then chopped into lengths of approximately $\frac{1}{32}$ of an inch. The chopped wire is then heated to approximately 900° C. and is then annealed in air moderately quickly, for instance, by distributing it on a copper plate. The particles are then mixed with hydrofluoric acid solution to wet the particles and placed in a rotating drum. The temperature is then raised to approximately 300° C., whereupon the chemical reaction which takes place is substantially complete and the particles are coated with a film consisting mainly of metallic fluoride. The particles are now mixed with a suitable quantity of binder, for instance, powdered magnesia, and are subjected to a magnetic alignment process such as described in my prior application, S. N. 498,694, filed November 28, 1930, and are pressed in a ring mold. After the pressing operation the cores are heated to a temperature of about 450° C. to 500° C., which operation serves to considerably increase the permeability of the cores and to reduce the hysteresis loss.

The actual method of construction of loading coils with the improved alloy may be carried out in substantially the same manner as described in the prior specification using fluorides for insulation and magnesia as a binder. Moreover the magnetic particles may be used in the form of chopped wire, or alternatively the alloy may be reduced to powder. It is also found preferable that the heating operation after the pressing should be carried out under vacuum in order to overcome any tendency of the insulation to break down.

What I claim as new and desire to secure by Letters Patent is:

1. A magnet core for loading coils or the like in which the finely divided magnetic particles from which the core is pressed consist of an alloy comprising 60–80% nickel and 20–40% cobalt.

2. A process for making magnet cores for loading coils or the like in which finely divided particles of an alloy comprising 70% nickel and 30% cobalt are heated to approximately 900° C. and after cooling treated with hydrofluoric acid after which the particles are mixed with a binder, subjected to a magnetic aligning process, pressed to cause them to agglomerate and subsequently heated to a temperature of approximately 500° C. to improve the magnetic properties of the resulting core.

3. A process as claimed in claim 2 in which the final heating is carried out under vacuum.

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