Patented Jan. 13, 1925. 1,523,109

UNITED STATES PATENT OFFICE.

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MAGNETIC MATERIAL.

No Drawing. Application filed December 21, 1920. Serial No. 432,358.

To all whom it may concern:

Be it known that I, GUSTAF W. ELMEN, a citizen of the United States, residing at Leonia, in the county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Magnetic Material, of which the following is a full, clear, concise, and exact description.

This invention relates to magnetic material and magnet cores and particularly to telephone loading coil cores of the so-called "dust" type, such as are described in the U. S. patent of G. W. Elmen No 1,297,127, dated March 11, 1919, and the other patents therein referred to.

The general object of the present invention is to obtain magnetic material which is cheap to manufacture and possesses to a high degree those characteristics which are desirable for inductive loading and other electrical apparatus.

In accordance with the present invention, magnetic alloys are produced in finely divided form by heating a mixture in finely divided form of the metals which are to compose the alloy, to a temperature high enough to cause alloying, the resulting product being then ground up, coated with insulating material, and formed into a solid in the usual manner.

The herein disclosed method is applicable to various magnetic alloys. It will, however, be described as applied to an alloy of nickel and iron for the purpose of illustrating the invention since it has been found that an alloy of these metals has a higher permeability for certain current strength than iron alone.

In carrying out the invention, it is first necessary to obtain a mixture in finely divided form and in the proportions desired in the alloy, of iron and nickel. Suitable proportions are more than 25 per cent nickel and the rest iron; and preferably approximately 78 per cent nickel and 22 per cent iron. A cheap and satisfactory manner of obtaining an intimate mixture of iron and nickel in finely divided form is to deposit these metals in the desired proportions in an electrolytic bath from a solution of their salts. The deposited mixture thus obtained is then ground up into particles of the desired size. A mass of these particles is then heated to a temperature at which alloying takes place, care being taken not to raise the material to a temperature at which the constituents fuse. The alloy thus obtained is in the form of a sintered mass which is easily ground up into alloy particles.

The alloy particles so obtained, may be sorted by sifting, coated with insulating material, and formed into a solid mass in the usual manner, preferably by pressure, as described in the patents hereinbefore mentioned.

What is claimed is

1. The method of making magnetic structures composed of alloys which consists in making a mixture in finely divided form of the metals which are to compose the alloy, heating said mixture to a temperature high enough to cause alloying, grinding up the resulting product, coating with insulating material the alloy particles so obtained, and forming a mass of such particles into a solid.

2. The method of making magnetic structures composed of alloys which consists in depositing in an electrolytic bath from a solution of the salts of the metals which are to compose the alloy, a mixture of said metals in the desired proportions, reducing to a finely divided state the mixture so obtained, heating the finely divided mixture to a temperature high enough to cause alloying, grinding up the resulting product, coating with insulating material the alloy particles so obtained, and forming a mass of such particles into a solid.

3. The method of making magnetic structures composed of an alloy of nickel and iron which consists in depositing in an electrolytic bath from a solution of salts of nickel and iron a mixture of said metals in the desired proportions, reducing to a finely divided state the mixture so obtained, heating the finely divided mixture to a temperature high enough to cause alloying, grinding up the resulting product, coating with insulating material the alloy particles so obtained, and forming a mass of such particles into a solid.

4. A magnet core composed of finely divided particles of an alloy of nickel and iron, and insulating material separating said particles.

5. A magnet core composed of finely divided particles of an alloy of more than 25 per cent nickel and the rest iron, and insulating material separating said particles.

6. A magnet core composed of finely divided particles of an alloy of approximately 78 per cent nickel and 22 per cent iron, and insulating material separating said particles.

7. A magnetic structure composed of finely divided particles of an alloy of a plurality of metals and comprising iron in a substantial amount and at least 25% of nickel, and insulating material separating said particles.

8. The method of making magnetic material comprising an alloy of iron and nickel, which comprises granulating iron and nickel, mixing the granulated metals in the proportions desired in the alloy, and heating said mixture at a temperature high enough to cause alloying.

9. A magnetic material composed of finely divided particles of an alloy of nickel and iron, and an insulating material separating said particles.

10. A magnetic material composed of finely divided particles of an alloy of approximately 22% nickel and 78% iron, and an insulating material separating said particles.

In witness whereof, I hereunto subscribe my name this 20th day of December A. D., 1920.

GUSTAF W. ELMEN.