

UNITED STATES PATENT OFFICE

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METHOD OF PRODUCING NICKEL IRON
POWDER

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The present invention relates to the production of nickel-iron powder such as finds use for the manufacture of so-called "dust cores" for loading coils, filter inductances, high frequency transformers and the like and it has for its object the provision of a simple and efficient process for conveniently manufacturing such powder of any desired composition and particle size.

Nickel powder is readily obtainable commercially in various grades of particle size prepared for instance by the carbonyl process and it has been found that if such nickel powder is employed as the starting material, the size of the particles has an important bearing on the size of the particles of the alloy which are most readily obtained.

According to the invention in order to produce nickel iron powder of predetermined particle size, nickel powder having particles of approximately the predetermined size is mixed with an appropriate proportion of an iron compound readily capable of reduction which is in the form of particles considerably smaller than the particles of nickel, the mixture being heated in a reducing atmosphere and the sintered mass subsequently crushed to powder.

According to another feature of the invention, in order to produce powder of predetermined particle size nickel powder having particles of approximately the predetermined size is mixed with an appropriate proportion of iron oxalate or iron oxide, heated to a temperature of 600-1200° C. in a reducing atmosphere and subsequently crushed to powder.

In a preferred form of carrying the invention into effect, nickel powder of the appropriate particle size is mixed with iron oxide or iron oxalate in proportions depending on the amount of iron required in the final alloy, the iron oxide or iron oxalate preferably having a particle size much smaller than that of the nickel powder. During the mixing the particles of nickel powder become coated with the finer particles of the iron oxalate or iron oxide. The mixture is then heated to a temperature of 600-1200° C., preferably in an

electric furnace, in the presence of a reducing gas such as hydrogen so as to reduce the iron oxalate or oxide as the case may be to iron, and at the same time to alloy it with the nickel. The resultant sintered mass of nickel-iron may then be re-crushed to powder, when particles approximating to the desired size will be obtained. If more accurately dimensioned particles are required, the powder may be subjected to grinding in a ball mill in known manner.

The invention therefore provides a simple and convenient method of obtaining nickel-iron powder of any required composition and particle size from materials which are readily available.

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

1. A method of producing nickel-iron powder of predetermined particle size in which nickel powder having particles of approximately the predetermined size is mixed with an appropriate proportion of an iron compound readily capable of reduction which is in the form of particles considerably smaller than the particles of nickel, the mixture being heated in a reducing atmosphere and the sintered mass subsequently crushed to powder.

2. A method of producing nickel-iron powder of predetermined particle size in which nickel powder having particles of approximately the predetermined size is mixed with an appropriate proportion of iron oxide in the form of particles considerably smaller than the particles of nickel, the mixture being then heated to a temperature of 600-1200° C., in a reducing atmosphere and subsequently crushed to powder.

3. A method of producing nickel-iron powder of predetermined particle size in which nickel powder having particles of approximately the predetermined size is mixed with an appropriate proportion of iron oxalate in the form of particles considerably smaller than the particles of nickel, the mixture being then heated to a temperature of 600-1200° C. in a reducing atmosphere and subsequently crushed to powder.

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