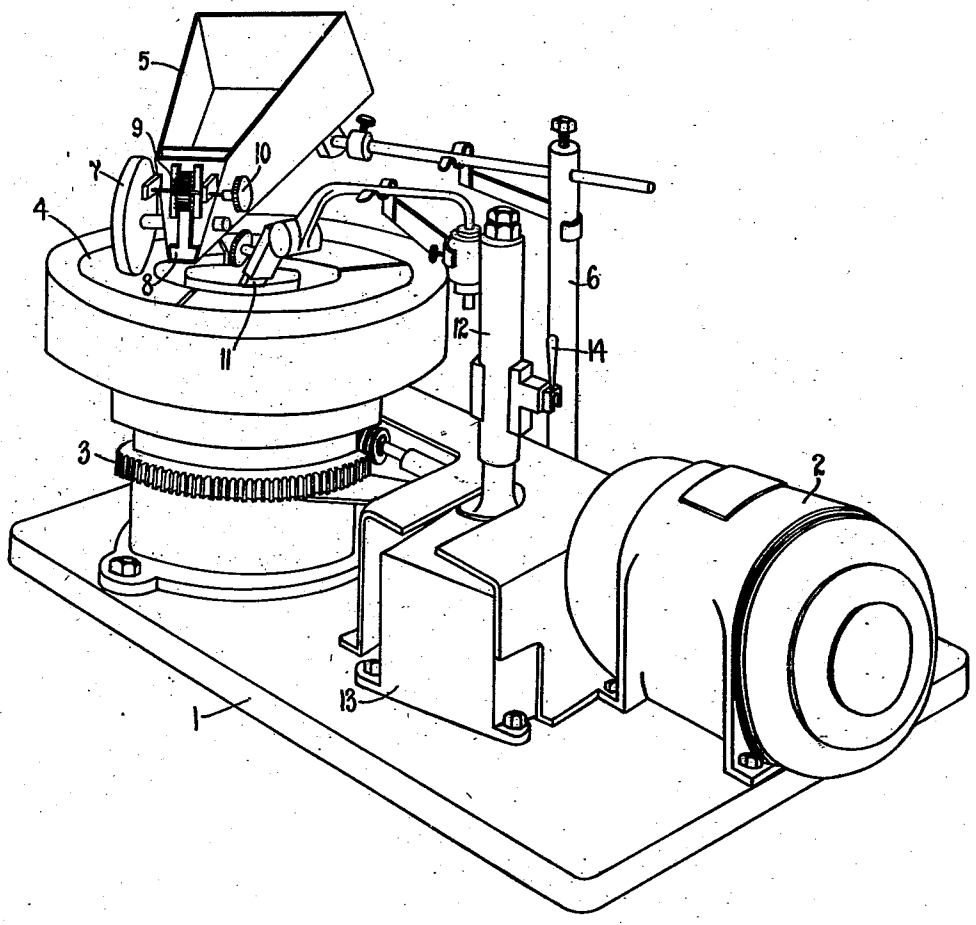
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MAGNET CORE

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Inventor
Philip Norton Roseby
Wm Watts Dorsey.
Atty

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MAGNET CORE

Philip Norton Roseby, Liverpool, England, assignor to Automatic Electric Company Limited, Liverpool, England, a British company

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8 Claims. (Cl. 175—21)

The present invention relates to the construction of magnet cores and is particularly concerned with cores which are made from finely-divided material by the application of high pressure. Such cores find considerable application in loading coils of the type used on telephone lines where their special magnetic properties are particularly advantageous. Where a nickel-iron alloy is used as the basic magnetic material as has been general practice, difficulties are experienced in securing a core with both mechanical and magnetic properties satisfactory. Thus after pressing has taken place annealing is desirable in order to give the core the most satisfactory magnetic properties, but this annealing process is liable to ruin the insulating properties of the core.

According to the invention this difficulty is largely overcome by the addition to the finely divided alloy of a suitable proportion, for instance about 6% of calcined magnesia which may conveniently be made in powder form. This addition of calcined magnesia which may replace the proportion of iron powder sometimes employed permits annealing to be effected after pressing since it does not lose its insulating properties at high temperatures and thus it is possible by annealing after pressing to restore the magnetic and mechanical properties which may have been somewhat prejudiced by this operation.

According to another feature of the invention finely-divided particles of magnetic material having one dimension substantially longer than the others are arranged substantially parallel with their longer dimension in the same direction as the magnetic field generated during the subsequent use of the core.

According to a further feature of the invention short lengths of finely drawn magnetic material each covered with a film of insulating material are arranged to be substantially parallel to one another and are then subject to high pressure to cause them to agglomerate.

The invention will be better understood from the following description of one method of preparing loading coils in accordance with the improved process, reference being had to the accompanying drawing. Nickel-iron wire of suitable composition is chopped into short lengths as described in my application Serial No. 424,738 filed 30th January 1930, and is then annealed at approximately 650° C. for three hours. It is then cleaned with dilute hydrochloric acid and after washing, the particles are provided with an insulating coating by treatment with phosphoric acid. The insulated particles are then mixed with approximately 3% calcined magnesia and are then treated with varnish formed of a synthetic resin preferably that known under the registered trade name "Bakelite." The powder thus prepared is then mixed with a further 3% of magnesia and is then in a form for transfer to the mould.

Referring now to the drawing the apparatus used for filling the mould in the required manner will be described. The various elements are conveniently mounted on a base plate 1 which serves to accommodate a small electric motor 2 which by means of worm gearing 3 drives the mould 4 which is mounted so as to be capable of rotation. The required quantity of prepared powder for forming a complete core unit is placed in the hopper 5 which is supported by an upright bracket 6 and carries a small rubber wheel 7 which runs on the mould 4 and is therefore rotated thereby. The wheel 7 is arranged to drive a small rake in the interior of the hopper for the purpose of agitating the powder and distributing it evenly into the mould. The amount of powder which flows out is controlled by the sliding door 8 the position of which is adjustable by means of the rack and pinion gear 9 controlled by the thumbscrew 10. The alignment of the particles is effected by the permanent magnet 11 preferably of cobalt steel which is adjustably mounted in an inclined position as shown and is supported by the vertical bracket 12. This bracket is adapted to be given vertical movement by means of suitable gearing contained in the box 13 and may be clutched by means of the control handle 14 to this gearing which is driven by the motor 2. Accordingly by suitable adjustment of the delivery of powder by means of the thumbscrew 10 it is possible to arrange that as the mould fills up the magnet 11 will be gradually raised at such a speed as to maintain the most favourable position with regard to the surface of the powder for exercising the maximum aligning effect.

This effect could be enhanced if desired by some arrangement for shaking the mould but since it is falling from the hopper such an arrangement will probably not be necessary.

The subsequent operations in the formation of a core ring may follow usual practice except that after pressing has taken place the magnetic properties of the ring may be improved somewhat by annealing without impairing its insulating properties or mechanical strength.

Accordingly the invention constitutes an advance in loading coil construction whereby the core rings are endowed with improved magnetic

and mechanical properties so that the efficiency of the coils may be increased or alternatively they may be of smaller dimensions.

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

1. A magnet core for use in loading coils and the like comprising finely-divided particles of magnetic material having one dimension substantially longer than the others and which are arranged substantially parallel with their longer dimension and in the same direction as the magnetic field generated during the subsequent use of the core.

2. A process for making magnet cores for use in loading coils and the like in which short lengths of finely drawn nickel-iron wire are fed into an annular mould and are subjected to the effect of a strong magnetic field extending circumferentially so as to cause the particles to align themselves with their longer dimension in the same direction as the magnetic field.

3. The method of making magnet cores which consists in treating finely divided particles of magnetic material with a proportion of calcined magnesia, insulating the mixture with insulating varnish, treating the particles with a further proportion of calcined magnesia and then subjecting the mass to high pressure after which it is annealed.

4. The method of making magnet cores which consists in treating finely divided particles of magnetic material with a 3% mixture of calcined magnesia, mixing the treated particles with an insulating varnish, treating the particles with a further 3% mixture of calcined magnesia and then binding the whole together into a homogeneous mass under heat and pressure after which it is annealed.

5. A process for making magnet cores in which finely-divided particles of nickel-iron alloy are mixed with a proportion of magnesia in two stages between which the particles are treated with insulating varnish, and finally the whole is subjected to high pressure to cause the same to agglomerate.

6. The method of making magnet cores which consists in treating short lengths of magnetic particles in one stage with calcined magnesia and in another stage with an insulating varnish, then subjecting the particles to a magnetic field to cause them to align themselves with their larger dimension in the same direction as the magnetic field, after which they are subjected to pressure to bind them together and are finally annealed.

7. The method of making magnet cores which consists in treating short lengths of nickel-iron particles with a mixture of calcined magnesia to insulate them from one another, mixing the particles with a binder of insulating varnish, then subjecting the particles to a magnetic field so that they are arranged substantially parallel with one another, after which the mass is subjected to pressure and then annealed.

8. A method of making magnetic cores from finely comminuted core material which comprises mixing the comminuted core material with insulation, moulding the mass to the desired form and subjecting the mass to the action of a magnetic field while moulding.

PHILIP NORTON ROSEBY.