

UNITED STATES PATENT OFFICE

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MAGNET CORE

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The present invention relates to magnet cores and is more particularly concerned with cores for use in connection with loading-coils as employed in telephone circuits. The object of the invention is the provision of a new and improved core material which is cheap to manufacture and can readily be formed to the desired shape and which moreover possesses in a high degree the properties most advantageous for cores in loading coils, viz. high specific gravity and high ohmic resistance.

It has been usual hitherto to construct cores for loading-coils by subjecting a mixture of finely divided magnetic material with insulating material for magnetically separating the particles of magnetic material, to very high pressures so that the particles cohere and form a solid mass the specific gravity of which approximates to that of pure iron.

According to the present invention the insulating material comprises a film of iron phosphate and the particles are preferably held together by a binder of synthetic resin varnish, for instance a phenol-aldehyde condensation product.

In order that the invention may be better understood one method of carrying it into effect will now be described. Use is preferably made of commercial iron powder which can be cheaply obtained, or use may be made of a powdered iron alloy such as ferro-silicon or nickel iron. The powdered iron is first annealed in air-tight pots at a temperature of about 600° C. and is then boiled in a solution of zinc phosphate. As a result of this treatment an insulating film of metallic phosphate of iron is formed on the surface of the iron particles. This film has great mechanical strength and very high electrical resistance and is therefore particularly suitable for loading-coil dust cores, as its mechanical strength enables it to withstand moulding at pressures of 20 to 90 tons per square inch without losing its insulating properties and at the same time ensuring an initial permeability approximating to that of pure iron.

The magnetic powder after being boiled in the solution of zinc phosphate is washed in water and dried. In order to bind the mag-

netic particles together they are next coated with one coat of synthetic resin varnish of suitable consistency, this varnish preferably being prepared from a powder composed of material known under the registered trade name of "Bakelite." The magnetic powder is then subjected to pressure of about 40 tons per square inch in moulds heated to about 200° F. to form rings. The rings may now be made up into loading coils for use on telephone lines and for this purpose a suitable number, for instance, from four to eight, are bound together with tape and are wound with two windings on opposite halves of the core followed by a further two windings on top of those previously wound. In use one inner winding is connected with the opposite outer winding, and the two coils thus produced form the windings of the loading coil. The coil is then dried and embedded in resin.

It will be seen therefore that the arrangement according to the invention permits the cheap construction of satisfactory loading coils having properties which make them comparatively small in bulk and highly efficient in use.

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

1. A magnet core composed of finely divided iron particles, a coating of iron phosphate on said particles, and insulating material separating said phosphate coated particles.

2. A magnet core composed of finely divided particles of magnetic material, a coating of phosphate on said particles, and insulating material separating the phosphate coated particles.

3. The method of making magnet cores, which consists in covering particles of magnetic material with a coating of phosphate of the magnetic material, then covering the coated particles with a binding material, and then forming a mass of the coated particles into a solid body by pressure sufficient to give it a specific gravity approximating that of the magnetic material.

4. The method of making magnet cores, which consists in covering particles of pure iron with a coating of iron phosphate, then

covering the coated iron particles with a binding material, and then forming a mass of the coated particles into a solid body by pressure sufficient to give it a specific gravity approximating that of pure iron.

5. The method of making magnet cores, which consists in covering particles of pure iron with a coating of iron phosphate by boiling the iron particles in a solution of zinc phosphate, then covering said coated particles with a binding material, and then forming a mass of said coated particles into a solid body in a heated mold by pressure sufficient to give it a specific gravity approximating that of pure iron.

In testimony whereof I have signed my name at Liverpool, England, this 5th day of April, 1929.

PHILIP NORTON ROSEBY.