

ALIEN PROPERTY CUSTODIAN

ARTICLES IN WHICH CONSTANT AND STABLE PERMEABILITY VALUES ARE REQUIRED, AS FOR INSTANCE PUPIN COILS, KRARUP CONDUCTORS, ETC.

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In telephone and telegraph engineering, for instance in the construction of Pupin coils and Krarup conductors, magnetic materials possessing constant and stable permeability values are used. These materials, technically known as "Isoperm" alloys, are at present manufactured almost exclusively from the two fundamental constituents iron and nickel, to which other elements, such as copper, aluminum, and titanium can be added. Such iron-nickel alloys do not exhibit the "Isoperm" properties, e. g. stable and constant initial permeability and low remanence values, until they have undergone certain rolling operations and heat treatments.

According to the invention, the above mentioned "Isoperm" properties can also be obtained in alloys which do not contain any nickel but consist mainly of iron and chromium, to which aluminum, silicon, manganese, molybdenum, tungsten, titanium, and vanadium can be added with advantage. Since nickel is more expensive than chromium, the use of the alloys proposed in the present invention would already offer considerable advantages for this reason alone. Similarly to all the "Isoperm" materials known heretofore, the said Fe-Cr alloys do not exhibit their "Isoperm" properties before they have become mechanically hard, whereas the high permeability values are obtained in a mechanically soft

state. The said "Isoperm" properties can be achieved by means of cold or hot rolling. All the processes applied heretofore with iron-nickel alloys may also be used advantageously in the present case. Thus for instance, after having been hot worked at about 700 deg. Cent. to 90 per cent. reduction of area, an alloy containing 20.5 per cent. Cr, 4.5 per cent. Al, and 2.5 per cent. Si, with the remainder Fe and the usual impurities, exhibits an initial permeability of 55 which remains constant in fields of up to several oersteds, and an instability of the initial permeability of 2.8 per cent. after superimposing direct current fields of over 100 oersteds. It is also possible to apply the processes known for iron-nickel alloys in which the alloys obtain an ordered texture and, as a consequence thereof, particularly good properties in definite directions of magnetisation. Such a process, as applied to iron-nickel alloys, was described f. i. in the "Zeitschrift für Metallkunde" 1936, page 230-233. In every single case the alloys proposed according to the invention showed very good workability. All these alloys possess high specific electrical resistance values and consequently low eddy-current losses, which make them particularly suitable for use with high-frequency alternating currents.

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