UNITED STATES PATENT OFFICE.

ROBERT ABBOTT HADFIELD, OF SHEFFIELD ENGLAND.

PROCESS OF IMPROVING THE MAGNETIC QUALITIES OF IRON-SILICON-ALUMINIUM ALLOYS.

No. 836,762. Specification of Letters Patent. Patented Nov. 27, 1906.

Application filed August 21, 1906. Serial No. 331,422.

To all whom it may concern:

Be it known that I, ROBERT ABBOTT HADFIELD, a subject of the King of Great Britain, residing at Sheffield, England, have invented a certain new and useful Improvement in Processes of Improving the Magnetic Qualities of Iron-Silicon-Aluminium Alloys, of which the following is a specification.

In United States Letters Patent No. 745,829, granted to me December 1, 1903, I have described and claimed a process of producing a magnetic material of high permeability and low hysteresis action which consists in alloying a magnetic body with silicon, heating the alloy to a relatively high temperature below its melting-point, allowing the alloy to cool, reheating it to a temperature below that first employed, and finally cooling. In another application for Letters Patent, Serial No. 324,894, filed July 5, 1906, I have set forth the addition of aluminium to the aforesaid alloy of iron and silicon, whereby the structure of said alloy is solidified and physically improved.

My present invention is a process of increasing the permeability and electric resistance and decreasing the hysteresis of said iron-silicon-aluminium alloy.

I carry my said process into effect by melting together the ingredients in a suitable vessel, casting into ingots, converting said ingots into desired shapes and thicknesses by appropriate means, and thereafter treating the same by first heating the alloy to between about 900° and 1,100° centigrade, cooling, then reheating to between 700° and 850° centigrade—that is, to a temperature lower than the one attained during the first heating—and then finally cooling. Also for certain purposes, if desired, the material as cast may be used, being suitably treated in the same manner as the forged or rolled material. An example of such an alloy may contain iron, silicon in proportion of from one to five per cent., and aluminium in proportion less than one per cent., as set forth in my aforesaid application.

I claim—

The process of producing a magnetic alloy of high magnetic permeability and electric resistance and low hysteresis action which consists in adding to an alloy of iron and silicon, an admixture of aluminium, then heating said iron-silicon-aluminium alloy to a relatively high temperature below its melting-point, allowing the alloy to cool, reheating it to a temperature below that first employed, and finally cooling.

In witness whereof I have signed my name hereto in the presence of two witnesses.

ROBERT ABBOTT HADFIELD.

Witnesses:

WILLIAM CROSS,

WILLIAM CRAWLEY.