

# UNITED STATES PATENT OFFICE.

ROBERT A. HADFIELD, OF SHEFFIELD, ENGLAND.

## MAGNETIC ALLOY.

No. 836,756.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed July 5, 1906. Serial No. 324,892.

*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 Magnetic Alloys, of which the following is a specification.

The invention is an alloy having magnetic and electric properties especially adapting it for use in ballast-coils, transformer-plates, and like electrical apparatus wherein it is of great importance to reduce the total magnetic and electric losses to the lowest possible degree; and also having improved physical properties in point of capacity for being worked, forged, or rolled.

In United States Letters Patent No. 745,829, granted to me December 1, 1903, I have set forth an alloy of iron and silicon which is subjected to a described heat treatment and which possesses a magnetic permeability and electric resistance above and a hysteresis quality below, respectively, those of the best Swedish charcoal-iron or, generally, the purest iron commercially obtainable. I have now discovered that the said

alloy may be rendered more perfectly and readily wrought or rolled and also more easily produced in furnaces by the addition of manganese in amount not sufficient to impair the aforesaid improved magnetic qualities. To make said alloy, I melt in any suitable vessel iron, silicon from one to five per cent., and manganese in a proportion less than one-half of one per cent. of the entire mass, which portion is not sufficient to disturb the magnetic qualities of the mixture. The alloy is then cast into ingots and afterward worked in the usual way. It is preferable to keep whatever sulfur may exist in the mixture in the lowest proportion possible.

I claim—

An iron - silicon - manganese alloy containing silicon from one to five per cent. and manganese in proportion less than one-half of one per cent.

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

ROBERT A. HADFIELD.

Witnesses:

HENRY E. DIXON,  
FRANK HUTSON.