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SILICON IRON CASTINGS AND METHOD OF MAKING THE SAME

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The principal object of the present invention is to provide silicon iron castings which can be machined and which are possessed of the desirable non-corrosive properties of known high silicon iron castings.

To these and other ends hereinafter set forth the invention, generally stated, comprises machinable high silicon iron castings.

The invention also comprises the method of producing such machinable high silicon iron castings which consists in adding antimony to the molten silicon iron prior to casting.

The invention also comprises the improvements to be presently described and finally claimed.

For the sake of further description it may be said that an ordinary high silicon iron casting, which is not machinable, may respond to, for example, the following analysis of components other than iron:

Silicon	8.00 to 20.00
Manganese	.25 to 2.50
Sulphur	0.01 to 0.15
Phosphorus	0.05 to 0.20
Total carbon	0.20 to 3.50

The analysis referred to is merely descriptive and varies considerably with known high silicon content iron castings which, however, as has been said, are not machinable. Contrasted with such non-machinable silicon iron castings machinable silicon iron castings of the present invention may, for convenience, and not by way of limitation referring to the same analysis, be described as responding to the following constituents other than iron:

Silicon	8.00 to 20.00
Manganese	.25 to 2.50
Sulphur	Traces to .15
Phosphorus	Traces to .20
Total carbon	0.20 to 3.50

Contrasted with known high silicon iron castings which are very brittle and have to be ground, high silicon iron castings of the present invention are machinable, are much less brittle, and possess the desirable non-corrosive properties of the previously known high silicon iron castings and exceed the latter in tranverse strength.

To practice the invention metallic antimony is added to the molten high silicon iron prior to casting. The antimony produces a finer crystalline form in the final alloy. The antimony tends to break up silicon and reduces the number of silicates found in the finished alloy. A certain amount of the antimony is dissipated but some remains in the final alloy. The temperature of the silicon iron prior to casting is higher than the melting point and the boiling point of antimony, so that although a major portion of the antimony is dissipated some must appear in the final casting. However, the antimony imparts to the casting machinability while permitting the finished casting to retain the quality of being highly resistant to a great number of corrosive substances.

As an example of proportions and in respect to antimony mention may be made to .0003125 to .1 of the total alloy or high silicon iron.

By way of further description it may be said in respect to high silicon iron metals or alloys such as are now employed for making high silicon iron castings which are not machinable, the quality of machinability is added by the addition of antimony, as has been described, and the proportion in which the antimony is used is dependent upon the degree of machinability desired, but as a practical matter the range given is a good guide and falls within safe limits.

I claim:

1. The process of making machinable high silicon iron castings which consists in adding sufficient antimony to the molten metal before it is cast to leave antimony weighing from 0.0003 to 0.1 of the total weight of the alloy in the casting.

2. A machinable, high silicon iron casting containing silicon 8.0 to 20.0%, manganese 0.25 to 2.50%, sulphur traces to 0.15%, phosphorus traces to 0.20%, total carbon 0.20 to 3.50%, and antimony 0.0003125 to 0.1%.

3. A machinable, high silicon iron casting containing silicon 8.0 to 20.0% and antimony 0.0003125 to 0.1%.

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