UNITED STATES PATENT OFFICE.

ANDRES G. LUNDIN, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNITED STATES STEEL COMPANY, OF SAME PLACE.

STEEL CASTING.

SPECIFICATION forming part of Letters Patent No. 648,508, dated May 1, 1900.

Application filed January 19, 1899. Serial No. 702,740. (No specimens.)

To all whom it may concern:

Be it known that I, ANDRES G. LUNDIN, a subject of the King of Sweden and Norway, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Steel Castings, of which the following is a specification.

My invention relates to the manufacture of steel castings containing the ingredients mentioned below, such ingredients or constituents being in the proportions hereinafter set forth. The present invention is particularly adapted for the manufacture of heavy or large castings, such as crank-shafts, cross-heads, &c.

In this invention I take steel scrap and melt it and add copper, ferrosilicon, ferromanganese, and aluminium in the manner and proportions indicated by the following example of manufacture: One hundred (100) pounds of steel scrap is placed in a crucible in a furnace and melted to a boiling-point—say about 4,000° Fahrenheit. When the boiling-point has been reached, one (1) to four (4) pounds of copper is placed in the molten metal. When the copper has melted, which occurs in fifteen minutes or more, one and a half ($1\frac{1}{2}$) to two and a half ($2\frac{1}{2}$) pounds of ferrosilicon containing twelve (12) per cent. silicon is thrown into the molten metal. After the ferrosilicon has melted two (2) to eight (8) ounces of ferromanganese containing eighty (80) per cent. manganese is mixed with three (3) pounds or less of aluminium and this mixture is thrown into the molten metal, in which it quickly melts. The resulting composition or alloy is, after all its constituent parts are melted, poured into a mold and cast into the shape desired.

It will thus be seen that the percentage in weight of the ingredients added to the molten metal is substantially as follows: copper, one per cent. to four per cent.; ferrosilicon containing twelve per cent. silicon, 1.5 per cent. to 2.5 per cent.; ferromanganese containing eighty per cent. manganese, .125 per cent. to .5 per cent.; aluminium, three per cent. or less.

It will readily be seen that the product of the above-described process is a trifle over one hundred pounds of metal—probably not more than one hundred and three to one hundred and seven pounds—containing an addition to the original one hundred pounds, of copper, one pound to four pounds, equaling one per cent. to four per cent.; pure silicon, 2.88 ounces to 4.8 ounces, equaling .18 per cent. to .3 per cent.; pure manganese, 1.6 ounces to 6.4 ounces, equaling .1 per cent. to .4 per cent.; aluminium, three pounds or less, equaling three per cent. or less, and the iron which bore the silicon and manganese.

Of course I do not confine myself to the employment of ferrosilicon or ferromanganese with the exact proportions of silicon and manganese mentioned; but if I use ferrosilicon containing a greater or less percentage than twelve per cent of silicon, or ferromanganese containing a greater or less percentage than eighty per cent. of manganese, I vary the proportions of ferrosilicon and ferromanganese inserted in the molten metal, so as to produce the above-mentioned proportions of pure silicon and pure manganese—viz., .18 per cent. to .3 per cent. of pure silicon and .1 per cent. to .4 per cent. of pure manganese in the product.

I am aware that it is not broadly new in metallurgy to apply ferrosilicon or ferromanganese in certain proportions to molten metal, and I am also aware that aluminium has been used as an alloy in the manufactnre of iron and steel. In this invention it should be understood that the improvement relates to the manufacture of steel castings and also that the range of proportions above mentioned is essential in effecting the desired result.

In the example of manufacture given above I have mentioned that the scrap is melted in a crucible. I do not, however, confine myself to the employment of a crucible, as the scrap can be melted by the open-hearth process, if desired.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

As a new article of manufacture, steel castings containing an admixture of from one per cent. to four per cent. of copper, .18 per cent. to .3 per cent. of silicon, .1 per cent. to .4 per cent. of manganese, and three per cent. or less of aluminium.

ANDRES G. LUNDIN.

Witnesses:
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