

UNITED STATES PATENT OFFICE.

ROBERT C. TOTTEN, OF PITTSBURG, PENNSYLVANIA.

MANUFACTURE OF CAST METAL.

No. 854,126.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROBERT C. TOTTEN, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Manufacture of Cast Metal; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a composition of casting iron and the manufacture of the same, its object being to produce from what are known as coke or coal irons, that is, pig metal smelted with coke or anthracite coal, a casting iron suitable for the manufacture of chilled castings or like castings which have heretofore been made from what is known as charcoal iron. This charcoal iron has been considered a necessity in the production of such articles as chilled rolls, chilled car wheels, etc., the fact being (though this was not fully understood) that it is the only kind of pig iron that contains combined carbon, that is, carbon combined with the iron in itself, in sufficient quantities to produce a chilled surface when cast in contact with a metal chill, and at the same time give a strong body to the chilled roll or car wheel formed from it. This charcoal pig iron has also been considered a necessity in the manufacture of malleable castings where the combined carbon apparently imparts to the same a peculiar strength not obtained where such castings are made of the ordinary gray pig iron containing little or no combined carbon. While the demand for this charcoal pig iron has been constantly increasing the production of the same has apparently reached its limit, largely on account of the cost of the charcoal necessary for smelting the same. By my invention I am enabled to produce a casting iron where the iron is made by the coke or coal process suitable for the making of this class of castings.

My invention consists, generally stated, in a new composition of casting metal consisting of coke or coal iron, and spiegeleisen; the composition preferably containing at least one-half ($1/2$) of one (1) per cent. of combined carbon and manganese at least one (1) per cent. in excess of the combined carbon. It also consists in producing the same from irons forming a mixture of coke or coal iron containing little or no combined carbon, and

spiegeleisen, which is a pig iron high in manganese, and containing a large proportion of combined carbon, so producing a casting iron having the necessary proportion of combined carbon, while the manganese present aids the combined carbon in imparting chilling properties to the iron.

In the manufacture of this casting iron I melt together in a cupola or other suitable melting furnace such as an air furnace the gray coke or coal iron and the spiegeleisen in suitable proportions according to the proportion of combined iron and manganese in the spiegeleisen, or I melt the pig iron and the spiegeleisen in separate furnaces and mix or combine the same when in molten condition. The ordinary gray pig iron contains a large proportion of graphitic carbon, and a small proportion, sometimes only a trace of combined carbon. Spiegeleisen contains a large proportion of carbon combined with the iron, the combined carbon present being usually as much as 4 per cent. while the manganese present is usually from 8 to 20 per cent. These metals I mix in suitable proportions in order to obtain the requisite amount of combined carbon in the resultant casting iron, it being desired that this proportion shall be at least as much as one-half of one per cent. of combined carbon, and preferably shall be over one per cent. thereof, and that the manganese shall be at least one per cent. higher than the combined carbon. For example, if the combined carbon present is one per cent., then the manganese will be two per cent. or over. For the purpose I can vary the amount of spiegeleisen added, employing, say, from one-sixth to one-half of spiegeleisen, the metals in such desired proportions being melted together or melted separately and then mixed in any suitable way so as to produce the desired depth of chill in the casting to be made from the composition, the chill usually being from one-half inch to two inches in depth. I have found that in this way I am enabled to produce a casting iron adapted to produce the desired depth of chill, and having a strong body back of the chill, obtaining in this way the hard wearing surface of the chilled casting and the necessary strength for the body of the chilled roll, car wheel, or other article. The manganese of the composition increases the hardness of the

chill, producing a chilled surface having greater wearing qualities than the ordinary chilled casting made from charcoal pig iron. The casting metal so produced can be made
5 at lower cost than the charcoal pig iron usually employed for the making of such castings, as the cost of the ordinary gray coke or coal iron is much lower than the cost of charcoal iron, and though the cost of spiegeleisen is
10 higher than that of charcoal iron the small proportion usually employed does not materially increase the cost of the casting produced, the actual cost of the composition being less than the ordinary charcoal pig iron.
15 As the supply of the charcoal iron is limited, and the supply of ordinary coke or coal iron is practically unlimited, I am thus enabled to produce a cheap and suitable substitute for the ordinary charcoal iron, one which is not
20 liable to materially increase in cost, and which produces a harder and more durable wearing surface. The casting iron so made is also suitable for the manufacture of malleable castings and for all like purposes for
25 which charcoal iron has heretofore been used.

What I claim is:

1. A new composition of casting metal, consisting of coke or coal iron and spiegeleisen.

2. A new composition of casting metal, 30 consisting of coke or coal iron and spiegeleisen, and containing at least one-half of one per cent. of combined carbon and manganese at least one per cent. in excess of the combined carbon. 35

3. A new composition of casting metal containing iron, at least one-half of one per cent. of combined carbon, and manganese at least one per cent. in excess of the combined carbon. 40

4. A new article of manufacture consisting of coke or coal iron and spiegeleisen and having a chilled surface. 45

In testimony whereof, I the said ROBERT C. TOTTEN have hereunto set my hand.

ROBERT C. TOTTEN.

Witnesses:

J. R. KELLER,
H. M. CORWIN.