

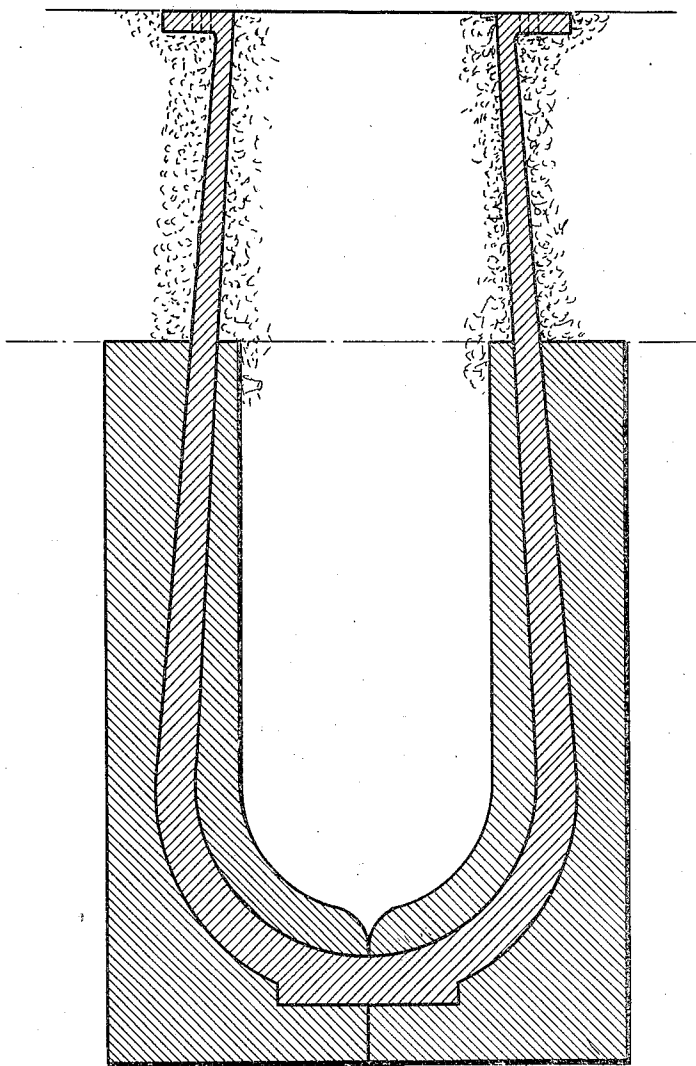
June 17, 1924.

1,498,128

O. SOWERS

PROCESS OF MAKING MALLEABLE IRON CASTINGS

Filed July 30, 1921



Inventor
Ossa Sowers
By attorneys,
Southgate & Southgate

UNITED STATES PATENT OFFICE.

OSSA SOWERS, OF NEW YORK, N. Y.

PROCESS OF MAKING MALLEABLE IRON CASTINGS.

Application filed July 30, 1921. Serial No. 488,514.

To all whom it may concern:

Be it known that I, OSSA SOWERS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Process of Making Malleable Iron Castings, of which the following is a specification.

The principal objects of this invention are to shorten the time necessary for the production of malleable iron castings and, at the same time, reduce the temperature at which they are converted and especially to permit of the manufacture of complicated and large castings of malleable iron that have had to be made without that advantage. To accomplish these objects, I use a grey iron mixture, convert a part, or all, of its surface into white iron, having free carbon, by the use of chillers, and then convert the white iron into malleable by the usual treatment, but shortened and at a lower temperature than usual. This can be done because of the fact that I have started the process, so to speak, in the casting operation. I also prefer to use a deoxidizer to prevent cracking.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawing, which is a central vertical sectional view of a retort, shown in a mold to illustrate a preferred way of carrying out this invention.

The use of malleable cast iron has been confined heretofore to small articles and articles of not too irregular a shape. It is well understood that malleable iron is a superior product for a great many purposes and extending its use into fields, in which it has not heretofore been possible to employ it, obviously is a valuable addition to this art.

In the usual process of producing malleable iron castings the metal is cast in a very brittle state which in itself prevents its use for many kinds of castings. After the castings are cleaned, they are subjected to an annealing process which renders the metal malleable by changing the condition of the carbon as is well understood. By my process, as stated, I virtually start the conversion of the iron into malleable in the casting process. To do this, I set chillers into the inside and outside of the mold over such part of the surface as desired, or usually the whole of it. Then I pour into the mold a

mixture which, if cast in the usual way, in sand, will produce a grey iron casting. Of course, the iron is of such composition that, if the carbon is obtained in a combined state, it can be malleableized. This differs from the known malleable iron foundry practice. I use iron that normally would have its carbon in the free state mainly, but, by means of the chillers, I convert the surface of the metal into a condition in which most or all of the carbon is in the combined state.

This white iron is then converted into malleable iron by the usual malleable iron process, but at a lower temperature and in a shorter time because of the presence of so much free carbon at the beginning of the heat treatment. The free carbon greatly facilitates the precipitation of free carbon in the white iron.

I also find that the use of a deoxidizer before casting is always of great benefit and, in some classes of castings, is absolutely necessary to prevent the casting from cracking. I do not confine myself to any certain deoxidizer, but will mention aluminum and titanium as being very efficient. I also find that the presence of copper also aids in producing a better casting.

The use of the chillers differs widely, the principal determining factors being the design of the casting and the use to which the casting will be subjected in service.

In the retort illustrated, it is not necessary to make the entire casting of malleable iron, because only the lower two thirds of the casting is subjected to severe service.

In making a casting where the design involves difficulties in preventing the casting from cracking when cooling, only light chillers are used to form parts of the inside and outside of the mold, which will produce white cast iron in the adjacent sections of the casting, leaving an inner core of grey iron.

Although using principles that are well known for producing other results, I associate them in a new way, as stated, and provide a malleable iron article that will give a greater length of service, especially when subjected to high temperatures in use. I can also produce malleable iron castings of large size and irregular shapes that could not be made heretofore in a practical manner. Yet the malleableizing process is much

shorter than has been necessary before and the heat does not have to be maintained so high.

Although I have illustrated and described only a single embodiment of the invention, I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims.

Therefore, I do not wish to be limited to all the details of procedure herein shown and described, but what I claim is:—

1. The method of producing malleable iron castings which comprises casting an iron mixture suitable for making grey iron, chilling its surface to convert the surface into white iron, and subjecting it to heat to convert it into malleable iron.

2. The method of making a malleable iron article which consists in melting an iron mixture suitable for producing a casting that can be converted into malleable

iron and of a composition that, if cast in sand, will cool in a state with a large percentage of its carbon in the free state, chilling the surface during casting to convert carbon into the combined state, and heating to malleableize the casting at a lower temperature than that ordinarily required for malleabilizing.

3. The method of making a malleable iron article which consists in melting an iron mixture containing a small percentage of a deoxidizing metal and suitable for producing a casting that can be converted into malleable iron and of a composition that, if cast in sand, will cool in a state with a large percentage of its carbon in the free state, chilling the surface during casting to convert the carbon into the combined state, and heating to malleableize the casting.

In testimony whereof I have hereunto affixed my signature.

OSSA SOWERS.