

UNITED STATES PATENT OFFICE.

JOHN W. GEBHARD, OF JOLIET, ILLINOIS.

PROCESS OF HARDENING THE FACE OF STEEL CASTINGS.

997,801.

Specification of Letters Patent.

Patented July 11, 1911.

No Drawing. Application filed September 21, 1906, Serial No. 335,535. Renewed December 5, 1910. Serial No. 595,734.

To all whom it may concern:

Be it known that I, JOHN W. GEBHARD, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Processes of Hardening the Face of Steel Castings, of which the following is a specification.

My invention relates to improvements in processes of hardening and toughening the faces of metal castings and particularly of soft steel castings, and involves a step in the making of the casting as distinguished from processes which relate to the manipulation or composition of the metal before casting or to the treatment of the product of casting.

In carrying into effect my improved process, I apply to the face of the sand-mold (made in the usual manner) a coating composed of a mixture of finely-ground manganese, silica, aluminum in liquid form, and oil preferably of a vegetable origin, the thickness of such coating depending somewhat on the depth to which it is desired to harden the face of the casting. If a very thick strong and durable face is desired, a thick coating of composition is applied. The coating is applied to the face of the mold in any approved manner and the mold is then placed in the oven to dry out before pouring in the metal in the usual manner. The aluminum is preferably finely divided in suspension.

When the mold is taken from the oven, the oil is still moist owing to its ability to withstand a higher temperature than the water in the sand. I preferably employ linseed oil for mixing with the manganese owing to its high fusing point. When the mold is properly dried out I pour in the molten steel slowly to give opportunity for the complete escape of the gases, with the result that the manganese is taken up by the molten metal and becomes thoroughly incorporated therewith and no air holes are left in the face of the casting thus formed.

While I have found in various experiments, that the manganese will fuse with the low carbon steel composing the body of

the casting more or less perfectly when mixed with oil alone, I have discovered that with the aluminum, especially in liquid form, the fusing is more complete. I may however under certain conditions omit the aluminum as it is not essential to produce a hard and tough face on the casting in some instances.

I do not wish to be limited to the use of manganese in this process, as other grades or kinds of minerals or metals possessing high degrees of carbon may be employed in lieu thereof. In some cases I find it desirable to use manganese that is from forty to fifty per cent. pure instead of the higher grade. To facilitate the fusing of the manganese I use about one-twentieth in bulk of pure ground silica which is mixed with the manganese before moistening.

Having thus described my invention what I claim as new and desire to obtain by Letters Patent, is:—

1. In the art of producing steel castings, making the mold in any well known manner, then applying to the face of the mold, a coating composed of finely ground high carbon mineral mixed with silica and oil to form a paste, then pouring the mold in the usual manner.

2. In the art of producing steel castings, first preparing the mold in any well known manner, then applying to portions of the face of the mold, a coating composed of a finely ground high carbon product mixed with silica, oil and aluminum.

3. In the art of making steel castings, first, preparing a sand mold in any approved manner, then applying to the face of the mold where desired, a coating composed of a mixture of a finely ground high carbon product, silica and a vegetable oil, then drying the mold with its coating, then filling the mold with the molten steel.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. GEBHARD.

Witnesses:

F. BENJAMIN,
WM. B. MOORE.