

# UNITED STATES PATENT OFFICE.

GEORGE HALE BRABROOK, OF TAUNTON, MASSACHUSETTS.

## METHOD OF PRODUCING CASTINGS.

No. 865,562.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed January 9, 1905. Serial No. 240,187.

*To all whom it may concern:*

Be it known that I, GEORGE HALE BRABROOK, a citizen of the United States, residing at Taunton, county of Bristol, State of Massachusetts, have invented a certain new and useful Improvement in Method of Producing Castings, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to a process of making castings from what is commonly known as hard metal, such for example as iron, alloys of copper, or the like.

It has been found impracticable to make thin castings from such a metal in the ordinary manner of running the molten metal into a mold, because by reason of chilling or oxidation the metal will not flow readily and fails to properly fill the mold. This is especially true in the case of articles which are relatively thin as compared with the area of their surfaces, such for example as ornamental bronze plaques or similar articles. Such articles are usually made from sheet metal on account of the impossibility of producing practical castings. I have discovered that phosphorus applied to hard metal while the latter is in a molten state in the mold will improve its fluidity or flow, thereby causing it to properly and completely fill the mold.

In practicing my invention I prefer to use phosphorus in the form which is commercially known as amorphous or red phosphorus, this form being non-poisonous and safer and more convenient to handle. When the mold, which may be constructed in any well known manner, is ready to receive the molten metal, I sprinkle or otherwise place a preferably thin layer or coating of the phosphorus powder upon and within the cavity of the mold so that it will come into contact with the metal which is poured into the mold. While I prefer to distribute, as above described, the phosphorus throughout the surface of the mold, my best results having been thus far obtained in this way, yet I do not know that this is essential, since so far as I am able to determine good results might be obtained without covering or coating or otherwise distributing the phosphorus over or upon the whole of the mold surface. I have found it very conven-

ient to apply the phosphorus to the mold by admixing it with kerosene oil and then spraying the mixture on to the mold. After applying the phosphorus I run the molten metal into the mold and it flows readily, and completely and perfectly fills the latter, even in the case of molds for relatively thin articles of considerable area or extent, and a very sharp, sound, and homogeneous casting is produced.

I have mentioned "hard" metals and referred specifically to iron and alloys of copper. I do not wish to be limited to any kind or class of metals. I first employed my invention in casting hard alloys of copper, but practice in the casting of other metals justifies me in believing that where the use of my invention is not absolutely necessary in order to obtain a casting, it is, nevertheless, a great benefit in producing a better casting with more certainty than is done without the use of my invention. Even castings from so-called soft metals are in my opinion benefited by the employment of my invention, although in the case of metals having a very low fusing point a form of phosphorus, for example, yellow phosphorus may be used in preference to red phosphorus, on account of its more active chemical nature at a lower temperature.

What I claim is

1. The method of producing a metal casting which consists in applying a phosphorus to the inner surface of the mold and then running the molten metal into the mold.
2. The method of producing a metal casting which consists in coating the inner surface of the mold with a mixture of phosphorus and a volatile hydrocarbon oil and then running the molten metal into the mold.
3. The method of producing a metal casting which consists in applying amorphous phosphorus to the inner surface of the mold and then running the molten metal into the mold.
4. The method of producing a metal casting which consists in spraying the inner surfaces of the mold with a mixture of phosphorus and volatile hydrocarbon oil and then running the molten metal into the mold.

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

GEORGE HALE BRABROOK.

Witnesses:

WM. A. MACLEOD,  
ALICE H. MORRISON.