

# UNITED STATES PATENT OFFICE.

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## MANUFACTURING STEEL.

SPECIFICATION forming part of Letters Patent No. 746,281, dated December 8, 1903.

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*To all whom it may concern:*

Be it known that I, CHARLES VANDELEUR BURTON, doctor of science, a subject of the King of England, residing at Fulham, in the county of London, England, have invented certain new and useful Improvements in or Relating to the Manufacture of Steel, of which the following is a specification.

This invention relates to the manufacture of steel, and has for its object to effect the carbonization of the metal in a simple and effectual manner.

According to this invention acetylene gas is brought in contact with the metal at a high temperature. The metal to be treated may be either wrought-iron or a comparatively low carbon steel, or cast-iron even may be thus treated with the object of increasing the combined carbon content.

One method of effecting the carbonization of a quantity of molten metal in a container is to blow the acetylene through suitable twyers or passages into the metal, the amount of gas introduced being in accordance with the extent of the carbonization required. In an open-hearth steel furnace the acetylene can conveniently be passed through a swannecked pipe dipping into the metal. When a Bessemer converter is employed, after the air-blow is completed acetylene is blown into the converter through the ordinary air-passages or through separate twyers of like construction. If desired, the pressure due to the generation of the acetylene may be utilized to drive the gas through the molten metal, this pressure being regulated as desired.

In some cases it may be desirable to purify the acetylene gas before it is brought into contact with the metal. This purification may be effected in any convenient manner. After the metal has been treated by the acetylene the waste gases, consisting mainly of hydrogen mixed with unaltered acetylene, may be used either for combustion purposes or car-

ried off with a view to being brought in contact with molten metal at an earlier stage, the arrangement being on a step-by-step system.

To prevent explosion, the acetylene gas should be diluted with a less explosive diluent, such as carbon monoxid, before being blown through the molten metal.

In carbonizing steel according to the above-described method the amount of carbon to be introduced can be regulated with great nicety.

The product of this manufacture may be utilized for tools or other purposes, or the very high-carbon steel may be mingled with lower-carbon steel in proportions corresponding to the various grades required.

This process is equally applicable to the carbonization of special steels containing a moderate percentage of other metals—such, for example, as nickel, chromium, or tungsten.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The herein-described process for the carburization of steel which consists in blowing acetylene diluted with a less explosive diluent gas through molten metal.

2. The herein-described process for the manufacture of steel which consists in blowing acetylene diluted with a less explosive diluent gas through the molten metal and bringing the waste gases into contact with the metal at an earlier stage of the process.

3. As a manufactured product steel which has been carburized by blowing acetylene diluted with a less explosive diluent gas through the molten metal.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES V. BURTON.

Witnesses:

W. J. NORWOOD,  
T. J. OSMAN.