

UNITED STATES PATENT OFFICE

2,137,144

PROCESS FOR THE PRODUCTION OF METAL CARBIDES

Nicolas Sainderichin, Paris, France, assignor to Follisain Syndicate Limited, London, England

No Drawing. Application October 23, 1937, Serial No. 170,703. In Great Britain January 9, 1936

3 Claims. (Cl. 23—208)

This invention relates to the production of carbides of metals such as iron, tungsten, titanium, chromium, and molybdenum but is not concerned merely with the formation of a surface zone of carbides on such metals.

The object of the present invention is to devise an improved process for the formation of such carbides by which good quality carbides will be obtained and the invention consists in a process for the production of metal carbides which consists in heating the metal (of which the carbide is to be formed) in a finely divided condition in admixture with a carburizing mixture containing manganese dioxide, in a hermetically sealed box.

Further features of the invention will be apparent from the description given hereafter.

In carrying my invention into effect in one convenient manner I form my improved carburizing material for the formation of metal carbides from a mixture of finely divided charcoal or other suitable form of carbon, caustic potash, manganese dioxide and ammonium chloride and while the proportions in which the various ingredients are mixed together may be varied to suit any particular requirements, I find the following mixture to be suitable, namely,

	Kilograms
Finely divided charcoal	1.
Caustic potash	0.15
Manganese dioxide	0.1 to 0.3
Ammonium chloride	0.05

The metal to be treated, for example, in the form of ferro tungsten or tungsten metal, ferro titanium or titanium metal, ferro molybdenum or molybdenum metal, or the like is finely divided as by grinding and mixed with the carburizing mixture and packed in a hermetically sealed box in such a manner to avoid so far as possible the occlusion of air but in actual operation under heat the ammonium chloride will expel the occluded air from the mixture.

The sealed box is heated in a furnace to a temperature of 1200° C. for about 1½ to 2 hours and the metal carbide obtained by the process after cooling slowly while protected from the air, may be utilized for any desired purpose. For

example, when producing an alloy in which high hardness and great toughness are required I may use a mixture resulting in a product having the following proportions:—

	Percent
Carbide of iron	30
Carbide of tungsten	70

For a tool steel I should use a mixture consisting of:—

	Percent
Carbide of iron	20
Carbide of tungsten	70
Carbide of chromium	10

For dies, the ingredients and proportions would be:—

	Percent
Carbide of iron	75
Carbide of chromium	25

The carbides produced by my process contain no manganese, or if manganese be present, it is in so small a quantity as not to affect the properties of the carbide.

I may vary the constituents in my improved mixture and the proportions in which they are incorporated and the temperature at which the carburizing process is carried out depending upon the nature of the metal to be treated or any practical requirements which may have to be fulfilled.

I claim:

1. The process for the production of metal carbides which consists in heating at least one metal selected from the group consisting of iron, tungsten, titanium, chromium, and molybdenum in a finely divided condition in admixture with a carburizing mixture consisting of charcoal, manganese dioxide, caustic potash and ammonium chloride.

2. A process as claimed in claim 1 wherein the carburizing mixture consists of 100 parts charcoal, 10 to 30 parts manganese dioxide, 15 parts caustic potash and 5 parts ammonium chloride.

3. The process as claimed in claim 1 wherein the heating step is carried out at a temperature of 1200° C.

NICOLAS SAINDERICHIN.