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UNITED STATES PATENT OFFICE.

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HARD TOOL AND IMPLEMENT AND IN PROCESS OF MAKING.

No Drawing. Application filed December 27, 1922. Serial No. 609,337.

To all whom it may concern:

Be it known that I, HEINRICH BAUMHAUER, a citizen of the German Republic, residing at Charlottenburg, near Berlin, Germany, have invented certain new and useful Improvements in Hard Tools and Implements and in Processes of Making, of which the following is a specification.

My invention relates to hard tools and implements and the process of making them. Heretofore devices of the above character have been made of carbide of tungsten or molybdenum but they have proven too brittle and too porous and consequently are not satisfactory. In particular, drawing blocks for the manufacture of tungsten wires made from material of the above character have been quite unsatisfactory.

Therefore, it is one of the objects of my invention to treat the implement made from such carbide so as to render it free from the foregoing objections, and to provide tools that may be used satisfactorily for drawing wire from tungsten and other elements of similar hardness.

The details of my invention are hereinafter more fully set forth and claimed. In the process of my invention the implement may be obtained in either of several ways, for example, the carbide itself may be employed or a mixture of carbon and the carbide producing element may be pressed, after which the article may be sintered. Also the element may be brought to the desired form without carbon by sintering the same to a non-dense form and then carburizing. The carburizing can be done by saturating with substances which after glowing leave carbon. As an example of such substances we have sugar, tar and the like. After the carburizing process is complete, the article is then heated. The carburizing may also be done by heating in a carburizing atmosphere such as illuminating gas, carbon monoxide, etc., or by heating while packed in carbon dust and the like.

The porous carbide body thus formed is then saturated with a metal. Such a metal must be one which is more easily fusible than the carbide. A metal which is adapted for this purpose is, for example, iron. By this operation, the iron or other similar metal is brought into contact with the surface of the carbide body, the whole being heated to the melting point of the iron or other metal, thereby permitting the iron or such metal to soak into the carbide, the latter absorbing the molten metal.

In order to facilitate the absorption process, the carbide surface to be exposed to the metal is made as large as possible. In the process, after the first soaking operation, the treatment with the molten metal may be repeated several times if necessary. It will be understood that the operation of applying the molten metal to the carbide surface is not restricted to any one particular way, but I contemplate resorting to any method of filling of the pores of the carbide surface. It will be found advantageous to continue heating the implement after the application of the molten metal and after the metal is soaked in, in order to cause as uniform a distribution of the absorbed metal as possible. The carbide body treated by the foregoing process becomes suitable for drawing blocks for the manufacture of wire from such hard metals as tungsten, molybdenum and the like. This material is also suitable for tools and other purposes.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. The process of treating a metal carbide which consists in saturating the pores of the carbide with a metal.

2. The process of treating a metal carbide which consists in saturating the pores of the carbide with iron.

3. The process of treating a porous sintered piece of tungsten which consists in first subjecting the tungsten to the carburizing process and then saturating the pores of the carbide with a metal.

4. A tool for working hard metals made from a carbide with its pores saturated with a metal.

5. A tool for working hard metals made from a tungsten carbide with its pores saturated with a metal.

6. The process of treating a carbide which consists in impregnating the pores of the carbide with a metal.

7. A tool made from a carbide impregnated with a metal.

8. The process of treating a metal carbide which consists in impregnating the pores of the carbide with a metal.

In witness whereof, I have hereunto set my hand this 4th day of December, 1922.

HEINRICH BAUMHAUER.